2015

Vanuatu Meteorology and Geo-Hazards Country Report

Reporting on National Priority Actions of the Pacific Islands Meteorological Strategy (PIMS) 2012-2021

David Gibson
Vanuatu Meteorology and Geo-Hazards Department (VMGD)
3/7/2015

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1.0 Summary

The Vanuatu Meteorology and Geo-Hazards Department (VMGD) has undergone a range of developments in the last five (5) years. This has been driven by the Vanuatu Government's long term development plans (PAA and PLAS), the Ministries three (3) year cooperate Plan, as well as the previous Vanuatu Meteorological Services 10 year strategic Plan. This report will outline the achievements of the VMGD, the progress of major activities and proposed developments for the next ten (10) years. The report will finally outline gaps and the challenges it may face ahead.

1.1 VMGD Division Managers

NAME	TITLE	MOBILE NUMBER	EMAIL
ADMINISTRATION DIVISION			
David Gibson	Acting Director (VMGD)	5344091	dgibson@meteo.gov.vu
Williams Worworkon	Principal Training Officer	7793697	wbworwor@meteo.gov.vu
FORECAST DIVISION			
Fred Jockley	Manager	5408941	fjockley@meteo.gov.vu
CLIMATE DIVISION			
Philip Malsale	Manager	7793704	malsale@meteo.gov.vu
ICT/ENGINEERING DIVISION			
Patricia Mawa	Manager	7750202	patou@meteo.gov.vu
OBSERVATION DIVISION			
Joe Mala	Manager	5907426	jsmala@meteo.gov.vu
GEOHAZARDS DIVISION			
Esline Garaebiti	Manager	7747970	gesline@vanuatu.gov.vu
CLIMATE CHANGE DIVISION			
Brian Philip	Manager	7744388	piccap@vanuatu.gov.vu
Florence Iautu	Community & Communication Officer	7778383	fiautu@meteo.gov.vu

Table 1. Names and contact details of VMGD Managers and relevant staff

2.0 Background Information

2.1 Institutional Setup

The Vanuatu Meteorology and Geo-Hazards Department (VMGD) is a Department within the Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Energy, Environment and Disaster Management. The Ministry is made up of four (4) Departments, and the VMGD oversees Meteorology, Geo-Hazards and the Climate Change/Project Management Unit.

VMGD's vision is to be a world class meteorological and geo-hazards institution that contributes to the sustainable development of Vanuatu, and the Pacific region.

VMGD works to achieve its vision by being a fully professional institution comprising skilled and motivated staff using updated and state of the art science and technology within an efficient and effective organisation, providing high quality meteorological and geo-hazards services that are widely available and accessible, effectively applied, beneficial and highly valued by all sections of the community in Vanuatu.

Specifically, this is achieved through the excellence in the following areas:

- Excellence in weather and climate forecasting processes/products.
- Leading in climate change adaptation and mitigation implementation, monitoring, and negotiations.
- Active monitoring and state of the art implementation of early warning systems for geo-hazards.
- Accessing and supporting international and regional observation networks.
- Research and innovation targeting improved products and services to all stakeholders.
- Facilitating cooperation with respect to its monitoring networks.
- Implementation and use of cutting edge technology.
- Quality control systems in place with supporting administrative and financial resources in place.

The Department is made up of seven (7) Divisions, which work to achieve the VMGD's vision and mission as follows:

2.1.1 Administration Division

The **Administration Division** provides leadership and management structures for the operation of the VMGD. Given the relatively rapid development of the VMGD over the past decade it has acquired the appropriate and relevant capabilities for capacity building and resource support for the increasingly wide array of services that it provides, and the resources that go with supporting those services. This Division works closely with the Ministry to ensure the Strategic Plan, the Annual Business Plan and the Corporate Plan are developed and implemented.

2.1.2 Observations Division

The **Observations Division** maintains adequate observational networks to provide the required data and information needed within VMGD and for other national, regional and international users and further networks. The Division installs, maintains and updates all observational networks that provide adequate coverage, real-time, accurate and high quality observation data for weather, climate and water. The Division also works closely with regional and international technical partners to meet the VMGD's network data and information reporting obligations.

2.1.3 Weather Forecasting and Services Division

The **Weather Forecasting and Services Division** provides timely and quality weather services and products to the general public, mariners, and commercial end users, via qualified meteorologists and through the deployment of the appropriate and state of the art weather forecasting systems.

2.1.4 Climate Division

The **Climate Division** provides climate information, long term forecasts, services and warnings. Through its qualified staff, modern and sound technology the Climate Division analyses climate and related environmental data to monitor, predict and provide climate and other related environmental information, forecasts, advisories and warnings.

2.1.5 Climate Change and Disaster Risk Reduction Division

The **Climate Change and Disaster Risk Reduction Division** manages and operates the implementation and integration of climate change and disaster risk reduction programs and projects to support national level commitments to Climate Change and Disaster Risk Management multilateral agreements.

It is also involved in the management of projects which includes financing, procurement, administration and secretariat duties for National Advisory Board on Climate Change (NAB).

2.1.6 Geo-Hazards Division

The **Geo-Hazards Division** is a highly effective and efficient Division delivering quality services and products on Geo-hazards and related phenomena using modern science and technology to mitigate against potential impacts of geological hazards (earthquakes, tsunamis and volcanic eruptions) by preventing disastrous consequences on the people, environment and economy of Vanuatu.

2.1.7 ICT and Engineering Division

The **ICT and Engineering Division** ensures the VMGD uses up-to-date, modern and sound infrastructure to support all the services of the VMGD. It also ensures there is sound ICT equipment and that there are all other necessary assets for data processing; as well as the required interfaces for all Divisional requirements, including support for corporate and administrative functions.

2.2 Governance

2.2.1 VMGD Act

The VMGD Act was developed in 1989 to guide the then Vanuatu Meteorological Services function, which it did for many years. However the Act because obsolete as the Department grew dramatically in size and function. A new Act has been drafted and covers all areas of VMGD, which includes Meteorology, Climate Variability, Climate Change Adaptation, Geo-Hazards and Disaster Risk Reduction. It is still under review.

2.2.2 National Plan (PAA and PLAS)

Vanuatu has a national strategic plan, called the Priority Action Agenda, PAA for short. In 2015, the PAA is no longer the most up to date document and is coming to the end of its lifespan as a strategic plan. The PAA ran alongside a shorter version called Plan Long and Act Short (PLAS) which is no longer used.

2.2.3 Corporate and Strategic Planning

A new Strategic Development Plan (SDP) 2014-2023 was completed at the end 2013, and launched by the then Minister for Climate Change, the Hon. Thomas Laken in 2014. The VMGD SDP is in line with the existent Corporate Plan and the National Plan (Priority Action Agenda), and will direct developments for the VMGD over the next 10 years. The first review of the Strategic Plan is due to take place in 2015. The VMGD also has some more informal operational plans in place as well as a newly launched Communications Outreach and Partnerships (COP) Strategy launched in 2014. The COP Strategy

underpins a new endeavor to use VMGD communication channels and those established by other Government Departments, NGOs and Civil Society to share and receive information, knowledge and actions on meteorological and geo-hazard issues. COP activity is supported by a COP Internal Working Group, which is staffed by a representative from each Division.

2.3 Staffing

2.3.1 Staff Qualifications

The new structure to reflect the amalgamation of Meteorology and Geo-Hazards was approved on the 29th January 2014. In the new structure a total of 89 positions and Job descriptions were created and approved by the PSC for VMGD. The Structure is made up of of six Divisional Managers, a Deputy Director and a Director. Below is a staffing table for the VMGD for 2014.

Divisions	Male Staff		Female Staff		Total Staff	Remarks
	Permanent	Temporary	Permanent	Temporary		
Administration	3	1	4	1	8	I AVID volunteer
Weather Forecasting	5	2	1	1	9	
Climate Serves	5	0	2	2	9	1 Officer on secondment and 1 on Study Leave
Geo-Hazards	1	1	2	2	5	1 World Bank Support Staff
Weather Observation	15	4	1	1	21	1 officer on study leave and 1 AVID Volunteer
Climate change (PMU)	1	2		3	6	Almost 10 Project Consultants
ICT & Engineering	6	3	2		11	

Table 2. VMGD staff details 2014

2.4 Finance

VMGD's annual budget continues to grow year after year. Donor funding continues to increase, and this has resulted in many activities being carried within VMGD. The amalgamation of Geo-Hazards Department proves to be a challenge, as some of its activities were not budgeted for during the transfer. However, Geo-Hazards role is now recognized and adequate funding will be allocated in the coming years to gather for its functions and services to the wider communities.

2.4.1 Recurrent Budget

The table below summaries the total recurrent Budget for the Department, since 2010, including two major projects that are not managed by the Project Management Unit, in local currency.

Description	2011		2012		2013		2014	
	Operations	Payroll	Operations	Payroll	Operations	Payroll	Operations	Payroll

Government (Recurrent Budget)	45,269,215	127,221,127	79,885,451	104,885,066	44,408,849	87,774,815	36,408,665	107,056,254
Geo-Hazards Section			11,833,672					
Total (Vatu)	127,221,127		116,718,738		132,183,664		143,464,919	

Table 3. Budget figures from 2010 to 2014, in local currency (VATU)

2.4.2 Projects managed within the Project Management Unit (PMU)/Climate Change (2014)

Climate Change and Disaster Risk Reduction Division Projects	
Programs	**Objective (Targets)**
IRCCNH	Increasing resilience of local communities to adapt to climate change and natural hazards
MDRR	Strengthen urban planning and tsunami preparedness
UNDP-PRRP	Communities are more resilient to risks from climate change and disasters.
ICLIM	Supporting the regional management of climate change information in the Pacific
V-CAP	To improve the resilience of the coastal zone to the impacts of climate change in order to sustain livelihoods, food production and preserve and improve the quality of life in targeted vulnerable areas
RPP REDD+ (FCPF)	The RPP sets out how Vanuatu intends to develop its REDD+ programme which is referred to as the National REDD+ scheme.

Table 4.Current PMU Projects

2.5 Development

2.5.1 Administration

The Administration Division has celebrated a number of successful developments over the past two years. On an administrative level, the successful completion of over 80% of activities proposed in 2014 Division Business Plans is reflective of the good commitment to planning and evaluating shown by all staff.

At the national level, the creation of the Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Energy, Environment and Disaster Management is seen as a huge success for the VMGD, as it reflects that the National Government sees the importance of the role played by the VMGD on the

issues of weather, climate variability, climate change, disaster risk reduction, mitigation and early warning systems.

In 2014 the VMGD also played an important role in international meteorological space as the hosts of the 15th WMO Tropical Cyclone Committee Meeting at Le Lagon, Port Vila. It was a 5 day event, with participants coming from the South West Pacific Countries, Australia, New Zealand, the US, and Indonesia. The meeting covered many aspects of the Tropical Cyclone Warning System used in Region Five.

Other important developments include the launching of the strategic development plan for the VMGD for 2014-2023 as well as the approval of the revised structure, which will increase the number of the staff to 89 within the next two years. The staff structure that had previously been approved has also been enacted.

2.5.2 Weather Forecasting and Services Division

A key development in the Weather Forecasting and Services Division (WFSD) has been the implementation of 24/7 weather watch services.

The WFSD continues to maintain the quality of the weather forecasting services and continues to improve on all current products to ensure the needs of end users are met.

With regards to human resources and capabilities, the WFSD still has nine staff including 4 WMO class I Forecasters, with one staff member currently on WMO fellowship at the BoM.

The WFSD also responded well to Tropical Cyclone Pam with the commitment of WFSD staff particularly notable in staffing the Division during peak times.

2.5.3 Climate Division

The Climate Division continues to provide quality Climate Services to Vanuatu through the management and analysis of climate and related environmental data to monitor, predict and provide climate and other related environment information, forecasts, advisories and warnings.

The Division continues to produce, issue and circulate monthly climate bulletins to stakeholders, and actively participates in regional teleconferences and briefings. There has been increased use of provincial noticeboards to display information relevant to communities including rainfall outlook, that information is also uploaded to the VMGD webpage.

The Division's ENSO Directive was updated which allowed for the smooth dissemination of information at the commencement of the 2015 ENSO event. A variety of technologies were used including video conferencing to inform regional VMGD stations, SMS service and other traditional methods of dissemination.

A Traditional Knowledge project has also been launched and a variety of resources developed. The Vanuatu Rainfall Network continues to expand with 88 stations now in place. The network allows communities to collaborate on the collection of important rainfall data.

Data digitization continues to be a priority and 2014 saw all three hourly rainfall data for Port Vila and Bauerfield digitized and submitted. Finally, the Division has both hosted and participated in a range of trainings and workshops including the very successful information sessions about El Nino mentioned above.

2.5.4 Geo-Hazards Division

The Geo-Hazards Division has seen a number of developments in the past few years. Of particular note is the establishment of a standard laboratory for technical works and for equipment and tools storage as well as the comprehensive procurement of electronic equipment and spare parts.

Real-time volcano monitoring continues to be a priority and has now extended to the Lopevi volcano. Real-time monitoring includes live photo feeds, seismic data collected from standalone stations on the islands and seismic data collected via satellite and retrieved from satellite images. Staffing is managed with an on-call roster with three staff members' on-call daily.

Thanks to strong monitoring systems, the Division is able to issue Volcano Alert Bulletins for the tourism industry and local communities, as well as monthly and annual volcano bulletins for scientific and local communities.

The Division also contributes to National and International Monitoring Networks through the daily storage of earthquake data. A seismic Nase server has been purchased to better monitor that data. The Division is working to set-up and continually upgrade the Volcano Monitoring Network and in 2014 installed permanent monitoring stations on Gaua and completed Annual Volcano Hazards Assessments and station maintenance on Ambrym, Tanna, Ambae, Lopevi and Gaua.

Since the 12th September 2013 the Geo-Hazards Division is ensuring closer monitoring on Ambrym volcano with daily risk assessments seven days a week. An additional station was required, which was installed in September 2014. It is located in the area of Meltugun, West Ambrym.

The Division has also participated in and hosted a range of trainings including the successful facilitation of the Southwest Pacific Seismic Data Sharing Task Team Meeting in Port Vila in May 2014. A number of staff have completed training attachments or certifications including an attachment with the Institute of Geology and Nuclear Science in New Zealand and certifications in Public Sector Management.

The Division also collaborates with Scientific Research Institutes to contribute to world Geo-hazards research. There is also priority growth and upgrading of the Seismic Monitoring network including surveys to upgrade on Tanna, Efate and Malekula in 2014.

Finally the Division is supporting with the MDRR tsunami warning signage project including working with contracted consultants. There are also a huge range of other supporting technical and non-technical developments which are too numerous to list.

2.5.5 Observation Division

The Observation Division now provides 24/7 recording and measurement of land and atmospheric conditions, 365 days per year. All 7 observations continue to be maintained and properly staffed and

with the exception of an under-performance in February 2014 because of a technical communications issue, maintained over high-level data reporting for the year 2013-2014.

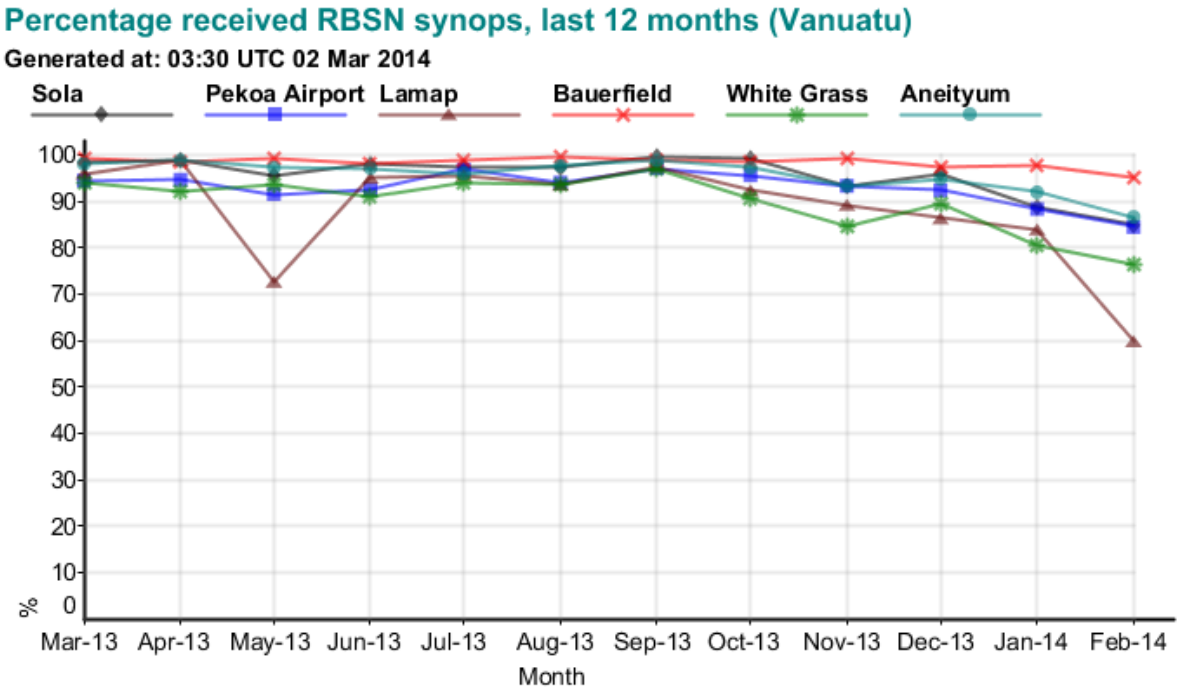

Table 5. Performance Data from (7) VMGD Observation Stations

Other developments for the Division include the installation of an internet connection at Santo, White Grass and Ambae weather sites allowing for much faster data transmission. The Division has also commenced Upper Air Observation Operations through the release of daily weather balloons into the upper atmosphere allowing for the transmission of weather data taken at different levels.

Finally, the installation of Automatic Weather Stations at Bauerfield and Pekoa is in final stages with the team from JICA in Port Vila to support at the time of writing (June 2015) and 5 more AWS are in the pipeline as part of the V-CAP project.

2.5.6 ICT and Engineering Division

The ICT and Engineering Division continues to develop its ICT/Engineering support network for staff and in 2014 provided support to over 200 devices including Servers, laptops, smart devices, video and network devices, electrical appliances and telecommunications products for over 100 staff from the VMGD as well as the NDMO, Energy Department, external project staff and Ministry staff who all sometimes work in the VMGD building. Staffing is still an issue with 1:20 the ratio of number of technicians to number of enquiries per day.

The ICT/Engineering Division has also underpinned the installation or updating of a number of VMGD products and services including the Port Vila Sea Tide Station, the Port Vila SPLCMP GPS Station, the Sola

Synoptic Station, the Pekoa Station, the Whitegrass Synoptic Station, and the Upper Air Station. As well as communications and systems monitoring upgrades at Saratamata Station, Bauerfield Station and the VMGD Data Centre.

The Division is also integral to the performance of large scale projects including the NARI EU ARD Project, the NAB Portal, CliDE Data Service, and the JICA Automatic Weather Stations Project plus many more.

The Division has been successful in achieving scheduled monthly backups for VMGD and NDMO operational data which is vital in VMGD systems contingency planning. The Division has also supported a range of on-site conferences and workshops including successful use of the iGOV videoconferencing system to communicate El Nino information to regional observers. Finally, WiFI communications for the Bauerfield Observation Station were backhauled to VMGD's domain bringing communications down to 3%.

2.5.7 Project Management Unit

The Project Management Unit was established in 2012. It acts as a secretariat to the Vanuatu National Advisory Board (NAB), a body which compromises of the Director of VMGD and the National Disaster Management Office, Climate Change and Disaster Risk Reduction experts in Vanuatu, and government officials and NGOs. The unit currently oversees six core projects; the IRCCNH, MDRR, UNDP-PRRP, iCLIM, V-CAP and RPP REDD+ Projects. Apart from project work, PMU continues to provide secretariat services to the NAB and coordinates international and regional agendas on CC/DRR on behalf of the government of the Republic of Vanuatu. These include the coordination of COP20 meeting, SIDs meeting in Samoa, LEG meeting hosted by Vanuatu, Regional meetings and several other COP related meetings attended by the head of PMU and the Ministry in 2014.

All Projects are currently at various stages of their operation and are supported by a range of VMGD Divisions.

NAB/PMU was fully dependent on donor funding to implement all its activities in 2014. NDMP-PRRP, MDRR and IRCCNH projects shared their resources to support the on-going operations and activities of the NAB/PMU throughout 2014. With support from VMGD, NDMO, PMO and other key sectors involved in CC/DRR agendas, PMU/NAB was able to achieve results planned for 2014.

2.6 Buildings Infrastructure

2.6.1 VMGD Main Office

The VMGD continues to centrally operate out of the VMGD Main Office in Numbatu, Port Vila, which was completed in 2009. The building houses all Divisions including the Ministry of Climate Change, the Corporate Service Unit the Energy Department and the National Disaster Management Office. Post TC Pam the building has served as a central hub for NDMO operations as well and has supported a vast array of activities, core staff and visiting project staff during what has been a very busy time.

2.6.2 Observation Stations

The VMGD has a total of seven observation stations throughout the country, with each weather station strategically located in each province. Sola Station is located in TORBA Province, Saratamata in PENAMA Province, Lamap in MALAMPA province, Pekoa in SANMA Province and Bauerfield in SHEFA Province. TAFEA Province has two observation stations, one on the island of Tanna and one on Aneityum. As discussed, movement to Automatic Weather Stations is underway through the JICA supported project.

2.6.3 Training

VMGD Staff participated in a huge number of workshops in 2014 with highlights as follows:

Training or Workshop Title attended by VMGD staff in 2014	Start and End dates
Silas Tigona – PHD at USP	2013-2015
Jerry Timothy – WMO Class 1 at BoM Australia	2014
Allan Rarai & Sophie Turure – IOC ITIC Training Programme for Pacific Island Countries on PTWC New Enhanced Products in Nadi, Fiji	May 2014
Tom Natick – Reinforcement of Meteorology in the South Pacific	October – December 2014
Allan Rarai – Third Flood Risk Management and Urban Resilience Workshop in Manila, Philippines	June 2014
Tropical Cyclone Analysis in house training	October/November 2014
Fred Jockley – WESTPAC Training Course on Climate Models at IOC Regional Training and Research Center on Ocean Dynamics and Climate in Qingdao, China	November 2014
Moirah Yerta – Tsunami Workshop in Apia, Samoa	October 2014

Table 6. Training completed by VMGD Personnel

3.0 Progress of Vanuatu Meteorology and Geo-Hazards Department

3.1. Achievements of Vanuatu Meteorology and Geo-Hazards Department from 2013-2015

No.	VMGD Achievement	PKO Achieved
1	Quality Management System in implementation phase focusing on Aviation Services	PKO 1
2	Expansion of VMGD Structure	PKO1, PKO2, PKO3 i
3	Quality Management System in implementation phase focusing on Aviation and Marine Services. 4-Day coastal Marine forecast issued twice-daily. High Seas forecast for Vanuatu area prepared and uploaded online every twelve hours.	PKO 2
4	24/7 operations of Weather Forecasting Centre + continuous improvement and integration of core services. Operation of Geo-Hazards [8 hour shift] to monitor volcanoes and seismic activity	PKO1, PKO2, PKO3, PKO4
5	Project progression: MDRR Project (Tsunami Warnings), IRCCNH (Provincial Disaster Office + real-time communications systems) progressing Early Warning Systems.	PKO4, PKO5, PKO7
6	Ongoing digitization of Climate Data into CliDE system through funding from PACCSAP project incl. all Bauerfield Station Data from 1985 – 2013 and Port	PKO8

	Vila Station from 1970 to 2013. Commitment to continuing with other stations and other sub-daily variables.	
7	Establishment of Communications, Outreach and Partnerships Working Group (COPIWG) to manage and oversee education	
8	PMU operational as oversight Division for donor funding means that funding is coordinated efficiently and effectively and that Divisions are able to respond to tasks relevant to their areas of expertise.	PKO12
9	Installment of two (2) AWS through JICA project and planning phase for (5) more.	PKO7
10	Strategic Plan for the next 10 years finalised	PKO10
11	Improved public weather service, public weather forecasts covering up to 7 days. Forecasts are provided and updated every three hours, and around the clock via website, email, radio outlets and phone briefing + new SOPs for use of SMS service through Digicel and TVL	PKO3
12	ENSO early warning system established and followed through 2015 ENSO declaration incl. mass communications through SMS, iGOV video conferencing with regional networks, collaboration with other line ministries etc.	6, Climate information and services are improved
13	Increased capacity of National Advisory Board (NAB) through support from external project funds on Climate Change and Disaster Risk Reduction	6, climate information and prediction services are improved
14	Improvement and implementation of joint warning centres [Tropical Cyclone and the Tsunami Warning Centre]	PKO4
15	V-CAP Project phase commencement including Division planning for procurement.	PKO6,
16	Mainstreamed management of relationships with strategic partners through NAB/PMU + noted as communication priority for COPIWG	PKO13
17	VMGD real-time communication systems development including manuals on warning dissemination and radio network infrastructure through IRCCNH Project funded by World Bank	PKO4, PKO3,
18	MDRR Project development including contracting of Beca (NZ consultancy) to carry out risk assessments, mapping and planning for urban preparedness for Port Vila to prepare for tsunami early warning system	PKO4, PKO5, PKO12
19	UNDP PRRP supported Government endorsed Risk Governance Analysis providing lessons learned for other countries	PKO10, PKO12
20	Integration of CCDRM at the provincial levelincluding area Council guide now finalized by DLA	PKO10, PKO12
21	PRRP secured partnership with Digicel Vanuatu for community engagement through SMS paving the way for use of SMS for disaster community engagement and use in El Nino alerts.	PKO3, PKO4, PKO10, PKO12
22	Commencement of Pacific iCLIM Project managed through NAB/PMU in collaboration with VMGD ICT/Engineering Division including push to finalize draft National Climate Change and Disaster Risk Reduction Policy ahead of assessment of managing climate change and DRR data to enable more informed planning	PKO6, PKO8, PKO12, PKO13

23	Launch of Upper Air Observations through daily launch of weather balloons with attached radiosonde for sound scientific data transfer.	PKO9, PKO6
24	Traditional Knowledge Program launched including 3 day training and signing of MOU for implementation of 3 year Traditional Knowledge Project	PKO7, PKO11
25	See *Table 6* for overview of training activities	PKO11
26	AVID Red Cross Volunteers sought and secured to support in capacity development in specific areas including IT/ICT, COP and Project Management.	PKO11

No.	Achievements of VMGD (FROM PREVIOUS REPORT)	PKO Achieved
1	New VMGD Office Building completed and in use. The new building houses Meteorology, Geo-Hazards and the Vanuatu National Disaster Management Office	4, multi-Hazard Early Warning System in place
2	Expansion of VMGD Structure	1, 2, 3 Aviation, marine and public weather services are improved
3	Amalgamation of Geo-Hazards with Met Service, changing the name of the Department from Vanuatu Meteorological Service to Vanuatu Meteorology and Geo-Hazards Department	4, multi-Hazard Early Warning System in place
4	Creation of a new Ministry [Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and NDMO]	6, climate information and prediction service are improved
5	Strategic Plan for the next 10 years, in draft format	10, VMGD is more capable and effective
6	New corporate plan in draft format, and will drive developments within the new ministry for the next three years	10, VMGD is more capable and effective
7	New VMGD Act, now in consultant phase	6, Climate information and prediction

		services are improved
8	A training Unit is created, within the Administration of VMGD	11, Education, training and capacity development
9	24/7 operations of Weather Forecasting Centre Operation of Geo-Hazards [8 hour shift] to monitor volcanoes and seismic activity	1, 2, 3 Aviation, marine and public weather services are improved 4, Multi-Hazard Early Warning System
10	Improvement and implementation of joint warning centres [Tropical Cyclone and the Tsunami Warning Centre]	4, Multi-Hazard Early Warning System
11	WMO Class 1 Meteorologist increase to four (4) at the Forecasting Centre. All aviation forecasts issued by Meteorologists	1, 2, aviation and marine weather services improved
12	Quality Manager appointment appointed, Quality Management system established for Aviation Services established, Certification of VMGD by Vanuatu Civil Aviation Authority per part 174 regarding its services to the Aviation Sector	1, Aviation Weather services are improved
13	VMGD issues own tropical cyclone advisories and warnings, NSMC Nadi ceased to Vanuatu Special Advisory	4, Multi-Hazard Early Warning System
14	Installment of Synergie System for use by the Forecasting Centre	1, 2, 3, aviation, marine and public weather services improved
15	Improved services to all sectors (marine, aviation, hospitality, etc.), SOPS/Manuals/procedures/work instructions prepared for all products/services issued. Work instructions reviewed every year	2, marine weather services are improved

16	High seas forecast [new marine product issued], including warnings, coastal waters forecast and warning covers 6 boundaries	2, marine weather services are improved
17	Improved public weather service, public weather forecasts covering up to 7 days. Forecasts are provided and updated every three hours, and around the clock via website, email, radio outlets and phone briefing	3, public weather services are improved
18	Severe Weather Forecast outlook and severe weather warning issued for Vanuatu [covers flood, heavy rainfall, strong inland winds not related to tropical cyclones and rough seas and high swells]	5, improved early warning system for floods
19	Expand Rainfall Network to over 70 voluntary rainfall stations throughout Vanuatu	6, Climate information and prediction services are improved
20	Three (3) Agro-Met Workshops held in Vanuatu	6, Climate information and services are improved
22	MOA signed between VMGD and Agriculture on products issued from VMGD	6, Climate information and services are improved
23	Digitization program ongoing	6, Climate information and services are improved
24	ENSO early warning system established	6, Climate information and services are improved
24	Creation of National Advisory Board (NAB) on Climate Change and Disaster Risk Reduction	6, climate information and prediction services are improved
25	Performance of Weather station reporting maintained at 90% and above for more than a year	7, Improved quality of observations
26	Installment of two (2) AWS	7, Improved quality of observations

27	Creation of Project Management Unit/Climate Change (PMU) and incorporation of structure (PMU) into VMGD	12, Donor funding is coordinated effectively

Table 9 Achievements of VMGD

3.2. Proposed Activities to be carried out in the Future

No	Proposed Activities to be carried out from 2015	PKO to be Achieved
1	(1) Effective enabling environment for development of weather, climate, climate change, water, volcano, earthquake and other related environment and geo-hazards information, forecasts, services and warnings; (2) VMGD's continued institutional adjustment; (3) VMGD's human resources management; (4) VMGD's human resources development and training; (5) Communication and delivery of weather, climate, climate change, water, volcano, earthquake and other related environment and geo-hazards information, forecasts, services and warning through targeted projects and dedicated COP strategy; (6) Education and awareness on weather, climate, climate change, water, volcano, earthquake and other related environment and geo-hazards continued through dedicated COP strategy; (7) Research on weather, climate, climate change, water, volcano, earthquake and other related environment and geo-hazards continued through dedicated Research Working Group; and (8) VMGD's Governance	Regional and NMSs are more capable and effective
	Contribute to Weather Services Section Overall Objective (Medium) through the following areas: (1) Improve weather information, forecasts, services and warnings for air navigation; (2) Improve weather information, forecasts, services and warnings for mariners; (3) Improve weather information, forecasts, services and warnings for the public and communities reflecting on recent successes with SMS services and general alerts; (4) Improve tropical cyclones warning system, information, forecasts, services and warnings including lessons learnt from TC Pam; (5) Develop and provide information, forecasts, services and warnings for storm surges, swells and high waves; and (6) Develop, establish and operate early warning system for floods.	Aviation weather services in the Pacific Island Countries and Territories (PICTs) region are improved. **2:** Marine weather services in the PICTs' region are improved. **3:** Public weather services in the PICTs' region are improved. **4:** Multi-hazard early warning system for tropical cyclones, storm surges, waves and tsunami in PICTs' region are implemented and improved. **5:** Improved early warning system for floods.

2	(1) Extend digitization project to Improve preservation of historical rainfall, other meteorology, climatology, hydrology and environment data; (2) Improve and sustain quality of rainfall, other climatology, hydrology and other relate environment data at VMGD HQ's server ; (3) Continue operation of climate database such as CliDE;(4) Continue to improve development of seasonal climate information, forecasts, services and warnings; (5) Improve development of drought information, forecasts, services and warnings; (6) Develop agro-meteorology; and (7) Access to other data.	Climate information and prediction services, including drought prediction, in PICTs region, are improved. **8.** PICTs' historical climatological data are preserved.
3	(1) complete tsunami early warning system project; (2) Develop early warning system for earthquakes; (3) Develop early warning system for volcanoes; (4) Improve accuracy, timeliness and quality of tsunami information and alerts; (5) Improve accuracy, timeliness and quality of earthquake / seismicity information and alerts; (6) Improve accuracy, timeliness and quality of volcanic information and alerts; (7) Establish and develop geo-hazards' mappings; (8) Operate and manage volcano database; and (9) Operate and manage earthquake / seismic database	4. Multi-hazard early warning system for tropical cyclones, storm surges, waves and tsunami in the PICT's region are implemented and improved.
4	(1) Automate observation data networks, stations, systems, sensors and equipment; (2) Automate verification schemes for weather, climate, flood, volcano, earthquake, tsunami, other related environment and geo-hazard information, forecasts, services and warnings; (3) Establish automate "centralize point" for in-coming weather, climate, water, volcano, seismic / earthquake and other related environment and geo-hazard observation data and information; (4) Automate accessibility to and use of Vanuatu real-time observations data and information by each VMGD section; (5) Sustain climate, volcano, seismic / earthquake data and information and other related databases, forecasting systems, platforms and applications; (6) Develop database system, platform, and application for historical data and information on tropical cyclones and impacts in Vanuatu; (7) Establish automate documentation management system; (8) Enhance VMGD e-	**1.** Aviation weather services in the Pacific Island Countries and Territories' (PICTs) region are improved. **2.** Marine weather services in the PICTs' region are improved. **3.** Public weather services in the PICTs' are improved. **4.** Multi-hazard early warning system for tropical cyclones, storm surges, waves and tsunami in the PICT's region are implemented and improved. **5.** Improved early warning system for floods. **6.** Climate information and prediction services including drought prediction, in

		the PICTs' region are improved. **7.** Improved quality of observations and coverage of networks in PICT's region. **8.** PICTs' historical climatological data are preserved. **10**. Regional and NMSs are more capable and effective.

Table 10 Proposed activities, extracted from VMGD's Strategic Plan (2013-2022)

3.3 Gaps and Future Needs for VMGD improvement

No	Gaps and Needs of VMGD	PKO Addressed
1	Marine weather services – improve marine observations, QMS for marine services	2 improved marine services
2	More effective public weather presentations	3 improved public weather services
3	Improved early warning system for floods	5 Improved early warning system for floods
4	Install more AWSs/observation stations in remote areas of Vanuatu	7 improved quality of observations and coverage

Table 11 Gaps and future needs for VMGD