VANUATU METEOROLOGY AND GEO-HAZARDS DEPARTMENT - COUNTRY REPORT

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

This Report is presented to the Fourth Pacific Meteorological Council (PMC-4) Meeting held in Honiara from 14-18 August 2017

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1.0 Summary

The Vanuatu Meteorology and Geo-Hazards Department (VMGD) have experienced many developments in the last five (5) years. This has been driven by the Vanuatu Government's long term development plans (NSDP or the people's plan), the Ministries three (3) year cooperate Plan, the Vanuatu Meteorology and Geo-Hazards Strategic Development Plan and the Vanuatu Framework for Climate Services. This report will outline the achievements of 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.

NAME	TITLE	MOBILE NUMBER	EMAIL
ADMINISTRATION DIVISION			
David Gibson	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			
Melinda Natapai	Acting Manager	7793704	melnat@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

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 organization, 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 was enacted in December of 2016, which then becomes law in early 2017. In addition, a new regulation was created at the beginning of July 2017. The new regulation focus on services to the aviation sector.

2.2.2 National Plan

Vanuatu has a national strategic plan, called the National Sustainable Development Goal, or the People's Plan.

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 People's plan.

Governance	**Description**
MET LEGISLATION: Update on whether or not your country have a stand-alone Meteorology Act or equivalent or is it part of other government's legislations to guide the NMHS to perform its role and responsibility? Briefly describe it.	Vanuatu has a new act called the Meteorology, Geological Hazards and Climate Change Act. It replaces the old Meteorological service act of 1989.
Do you require for your Act to be reviewed? If it is already reviewed, what is the current status of your Act	

Strategic Planning	
Describe how meteorology (weather) and climatology (climate variability and climate change) are featured in the current national development plan, government ministries corporate and implementation/operational plans.	Meteorology and climate change are included in the Environmental Pillar of the sustainable development goal, or the peoples plan
Describe the process if your NMHSs is reporting against the SDG or its national equivalent	At the end of every year, each government ministry must submit an annual report to the Public Service Commission and the Prime Minister's office. VMGD provides its annual report through the Ministry of Climate Change, who then submits it to the Prime Minister's office
Does your NMHS have a strategic plan, implementation/operational plan or equivalent(s)?	VMGD has a strategic development plan for 2014 through to 2023
Describe how meteorology (weather), climatology (climate variability and climate change), disaster management and early warning systems are feature in your NMHS strategic plan, implementation/operational plan or equivalent(s).	VMGD has its own strategic plan, and contributes to the Ministries corporate plan. From that, it then develops its annual plan each year.

2.2 Staffing

2.2.1 Staff Qualification

The ministry of climate change, in which the VMGD is under, has its own human resource strategy. The strategy guides human resource development within all four departments, including VMGD.

Staff	Qualification	Division/Section	No. Professional Staff		Total
Staff Name	(Description the qualification under each division) Example; WMO Class 1-4 or other qualification or professional training)	Responsibility of Staff (Forecast, Climate, Observation, Administration, etc)	Male	Female	Total Number of Staff
Administration					
David Gibson	BSc, WMO Class I (Graduate Diploma), MBA	Director	M		
Williams B. Worwor	WMO Class III & II, Certificate in Management	Admin-Training Officer	M		
Rebecca Nihapi	Diploma	Admin-Finance/Admin Officer		F	
Octavie Meltenoven	Certificate	Executive secretary		F	

John Moses		Driver	M		
Henry	Certificate	Receptionist	M		
Lina Mark		Admin-Cleaner		F	
Total			**4**	**3**	**7**
Forecasting					
Fred Jockley	WMO Class I (Graduate Diploma), BEd	Forecast-PSO, Aviation	M		
Allan Rarai	WMO class II, BA, MSc	Forecast-PSO, Public/Commercial, Forecast	M		
Levu B Antfalo	BEd, WMO Class 1	Forecast-Forecaster	M		
Tom N	WMO Class 1 (Graduate Diploma), BSc	Forecast-Forecaster	M		
Jerry Timothy	BEd, Graduate Dip (Mathematics), WMO Class 1	Forecast-Forecaster	M		
Ellen Luke	BEd, WMO Class 1	Forecast – Forecaster		F	
Iuma Bani	BEd	Forecast – Forecaster	M		
Franky Peter	BSc	Forecast – Forecaster	M		
Total			**7**	**1**	**8**
Climate					
Philip Malsale	BSc, MSc	Manager	M		
Melinda Natapai	BA	Acting Manager		F	

Robson Silas	BSc, MSc, PhD	Climate-PSO, Research &Dev	M		
Mairah Yerta	WMO Class I (Graduate Diploma), BSc, MSc	Forecast-PSO, Marine		F	
Mercy Nalawas	WMO Class IV	Climate-SMO, Climate		F	
Kalo Abel	WMO Class IV	Forecast-Forecaster	M		
Ian Nelson	WMO Class IV, INTV Certificate	Forecast-Forecaster	M		
Peter Feke	WMO class IV	Climate-Rainfall Network	M		
Kalsuak Gordon	WMO class IV	Observation-SMO, Observation	M		
Total			6	3	9
ICT/Engineering					
Patricia Mawa	BSc, MSc	ICT/Engineering-Manager		F	
Esther Saul	BSc	PSO		F	
Igor Michel	Diploma		M		
Patterson Naut	Certificate	ICT/Engineering - IT	M		
Severing Langon	WMO class IV, BSc			F	
Loic Jimmu	Electrical Certificate, ITV	ICT/Engineering - Electrician	M		

Janvion Cevuard	Electrotechnical HVC 1, VIT, 2007		M		
Athanas Worwor	Certificat 12 e anne'eElectrotechnique, INTV, 2006		M		
Julius Mala	Bachelor of Engineering		M		
Jerry Bani	WMO class IV, Certificate in Maintenance and Calibration	Observation-Technician, Instruments	M		
Total			**7**	**3**	**10**
Observation					
Joe Mala	WMO class IV, Certificate/Diploma in Management	Observation-Manager	M		
Grace Johnolson	BA	PSO		F	
Fredrick Vuti	WMO class IV	Observation-Observer	M		
Bradley Bani	WMO class IV	Observation-Observer	M		
Joseph Nishina	WMO class IV	Observation-Observer	M		
Tom Kaio	WMO class IV	Observation-SMO, Observation	M		
Alvin Wotlolan	WMO class IV	Observation-Observer		F	

Robson Willie	WMO class IV	Observation-SMO, Observation	M		
Willie Molisa	WMO class IV	Observation-Observer	M		
David Tari	WMO class IV	Observation-Observer	M		
Paul Manamena	WMO class IV	Observation-SMO, Observation	M		
Nigel David	WMO class IV	Observation-Observer	M		
Philip Namu	WMO class IV	Observation-SMO, Observation	M		
ArnaurdYakelo	WMO class IV	Observation-Observer	M		
Hilton Henry	WMO class IV	Observation-Observer	M		
Patterson Malsale	WMO Class IV	Observation-Observer	M		
Total			**14**	**2**	**16**
Geo-Hazards Section					
Esline Garabitie	Diploma (DEUG) in Earthsciences, University of New Caledonia, 1997, Bachelor in Earthsciences Major in Volcanology, University Blaise Pascal of ClermonFerrand, France, 1999, Masters Degree in Geology of Land Management, University Blaise Pascal of			F	

	ClermonFerrand, France, 2001, Masters Degree in Seismology, Earthquake Engineering, Tsunami and Disaster Mitigation				
Morris Harrison	BSc, MSc, USP		M		
ShopieJimmykone	CAP-AFAT, Noumea, LyceeProfessionnel, 1989, BEP, Noumea, LyceeProfessionnel 1988			F	
Sandrine Cevuard	Premier Annee de Licence en Sciences Vigterres et Univers et univers, Universite de Nouville, NC, 2008, BAC, AUF, 2005			F	
Melinda Aru	BSc			F	
Glen Siba	BSc				
Dan Tari	BSc				
Juanita Laga	Diploma			F	
Total			**3**	**5**	**8**
Project Management Unit					

Brian Philips			M		
MalcomDalesa			M		
Jimmy Mangawai			M		
Rebecca Iaken				F	
Sam Tapo			M		
Florence Iautu				F	
Humao Sele			M		
Jackson Tambe			M		
Elian Bangtor				F	
Samuel Lnparus			M		
Lidvina Karie				F	
Rensly Hanka			M		
Cindy Thomas				F	
Total			**8**	**5**	**13**

2.3 Finance

Below is the financial statement for the Vanuatu Meteorology and Geo-Hazards Department for 2016 and 2017

Description	2016	2017 Funds		Total
	Total Budget	Administration	Operation	
Government Support				

	Payroll: 96,996,378VT	Payroll: 107,431,525VT		Total Payroll 2016 & 2017: 204,427,903VT
	Operation: 34,806,794VT	Operation: 18,269,881VT		Total operation 2016 & 2017: 53,076,675VT
…….				
Total (USD)	**VUV 131,803,172**	**VUV 125,707,406**		Total: VUV 257,504,578

2.3.1 Projects supporting the Vanuatu Meteorology and Geo-Hazards Department

Project	**Brief Description**	**Funding**
1. Increasing Resilience on Climate Change and Natural Hazards (IRCCNH) Project	Institutional strengthening; Technology investment and transfer; Training; Community capacity building. Implemented by DLA, NDMO, VARTC, Rural Water	USD $ 11.1 million Funding Admin- World Bank Global Environment Facility (GEF)/LDCF, European Union (EU),

	Supply, and Agriculture. (2013 – 2018).	Global Facility for Disaster Risk Reduction (GFDRR)
2. Managing Disaster Risk Reduction (MDRR)	Institutional strengthening; Technology investment and transfer; Training; Community capacity build. Implemented by NAB / PMU / VMGD. (2013-2015).	USD $ 2,728,000 Funding Admin- World Bank Government of Japan- Policy and Human Resource Development Trust Fund (PHRD)
5. Pacific Risk Resilience Programme (PRRP)	Strengthening governance mechanisms for Disaster Risk Management (DRM) and Climate Change Adaptation (CCA). Based on Tanna, Tafea Outer islands, Santo and Emae. (2013-2016).	USD $ 4 to 5 million (approx.) Funding Admin- UNDP UNDP/ GEF / AusAID
7. (V-CAP) Adaptation to Climate Change in the Coastal Zone in Vanuatu	Focus on community based climate change adaptation measures at 6 different sites with Infrastructure resilience, upland management and coastal resource management components. Early warning systems and policy support as well. Implemented by PMU, PWD, Environment, Agriculture, and Fisheries & Forestry. (2014-2019).	USD $ 8 million (approx.) UNDP/ GEF LDCF
16. Climate Resilient Road Standards Project (PWD-SMEC)	Integrating CCA practices and resiliency into design and delivery of services from Public Works Department. Not officially endorsed by NAB yet.	AUD $ 575,000 Australian Aid (DFAT)
21. Solar and Bio-Solar electrification of Vanuatu with the	Increased sustainability of livelihoods in Vanuatu through the	Euro $ 710,000 EU

implementation of a sector-specific Climate Early Warning System "Dash Board".	enhanced energy security and Climate Early Warning System that strengthens, supports and enables both the Energy and Livestock sectors to adapt to the adverse effects of climate change.	

2.3.1 Potential Collaboration on project proposals

The Vanuatu Meteorology and Geo-Hazards and SPREP have submitted a project proposal to the Green Climate Fund, GCF, called Climate Services for Resilient Development in Vanuatu, and the proposal has since been approved in 2016. The project totals 22.9 million US dollars and will be implemented within the Vanuatu Meteorology and Geo-Hazards Department, including five sectors, namely Water, Tourism, Agriculture, Infrastructure, and Fisheries. It is anticipated that the inception of the project will occur towards then end of 2017.

The Vanuatu Meteorology and Geo-Hazards Department is also part of the regional project titled Early Warning System, developed in partnership with the World Meteorological Organization. VMGD will aim to use this project to strengthen not only its flood forecasting capabilities, but its early warning service to rural communities in Vanuatu.

2.4 Development

The VMGD continues to recruit staff every year, and it is expected that by the end of 2017, the total number of staff will increase to 89. Graduates were also being recruited to fill in new and vacant positions. Additionally, in 2016, the current government sees it a priority to establish a hydrology division within the VMGD. Budget was given at the beginning of 2017 to implement this activity, and shortly, before the end of 2017, two new hydrologists will be recruited, and their function will focus mostly on flood forecasting.

The Vanuatu Meteorology and Geo-Hazards Department continues to maintain a 24/7 weather watch. It houses a multi hazard early warning centre, monitoring meteorological and geological hazards within Vanuatu.

In 2016, with the assistance from NIWA, SPREP (RTSM Funding), and WMO, the Vanuatu Framework for Climate Services was developed. The framework is in line with the VMGD strategic development plan, and has guided and assisted Vanuatu to tap into the Green Climate Fund.

VMGD was also part of the project proposal on early warning system developed by WMO, and it is anticipated that this project, if approved, will further strengthen Vanuatu's early warning system, particularly on flood forecasting, and warning services to rural communities within Vanuatu.

A new legislation has been enacted in parliament in 2016, and a new regulation was gazetted in 2017. The new legislation, called Meteorology, Geological Hazards and Climate Change has captured well developments within the VMGD now and those that are yet to come. A new regulation was also developed and gazette on the 3rd of July 2017. The new regulation focus mostly on recovering costs on services to the aviation sector.

The VMGD continue to modernize its way of work, and has recently installed an integrated weather forecasting system. The system, called Meteo Factory, was installed by Meteo France International, with training support from Meteo France in New Caledonia. They system improved the preparation and dissemination of short term forecasts and warnings, as it automates the way forecasters do their work. Additionally, a new website was developed and launched at the beginning of May 2017. The new website displays all products and services that the VMGD provides.

Additionally, VMGD has installed 8 automatic weather stations throughout Vanuatu, and will install an additional 3 by the end of 2017, totaling 11.

The VMGD is also nationally responsible for geological hazards within Vanuatu. It has built two new tide gauges, giving a total of four throughout Vanuatu. A new one is expected to be installed by December of 2017, giving a total of 5 tide gauges. Additionally, 8 new seismic stations have been completed, giving a total of 11 stations.

Climate services were also strengthened. All weather observation stations are now automated, meaning data is automatically transmitted to the CLIDE for archive, analysis and research purposes. Additionally, CLIDESC has been developed, and has assisted VMGD to develop tailor made products and climate services for health, water, fisheries, and agriculture.

VMGD continues to strengthen its tsunami warning system, and has installed 9 siren systems, 52 Tsunami information boards, 74 evacuation maps and 9 Tsunami siren around the areas in the Greater Port Vila zone. It has also installed 10 sirens in Luganville, the second largest town of Vanuatu.

The VMGD also strengthened its volcano services, by developing a 5 level volcano alert. VMGD also installed live video cameras on all of its six live volcanoes, also making it available on the department's website.

The VMGD has seven observation stations throughout Vanuatu, strategically located at all provincial areas. Following the current government's policy on the need to strengthen and improve services to provincial areas and rural communities, VMGD was able to build as well as refurbish all observational offices throughout Vanuatu. It also installed internet at all provinces, allowing for better and faster communication from the head office to the rural office, as well as allow staff at provincial office to provide additional services to rural communities.

2.4.1 Buildings Infrastructure

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.

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. All stations are now automated, and an additional AWS has been installed at Norsup Airport. This gives a total of 8 automatic weather stations.

All meteorological provincial offices throughout the country have been refurbished. Furniture and internet connection has also been installed in all offices.

VMGD, through JICA funding, has installed a new Himarawi satellite receiving system and SATAID. This allows for direct feed of satellite data to the forecasting office.

A total of 8 new seismic stations have been installed, giving a total of 12 seismic stations that feed live seismic data to the head office, to assist with Tsunami Warnings.

Two new tide gauge have been installed, and a new one is expected to be installed by the end of this year. This will raise the total number of tide gauge around Vanuatu to 5.

New servers have been installed for Meteo Factory, SInergie, CLIDE, GTS, and CLIDESC.

A total of 19 siren systems have been installed in Port Vila and Luganville.

2.4.3 Update on Communications Infrastructure (to support current and future development)

	Details
What is the mode of communication for transmitting oceanographic and hydro-	Satellite, HF, Internet, Email

meteorological data from remote stations?	
What is the Mode of transmitting data to the Global Data Network?	GTS
What is your Current Internet Speed and is your main office connected to a secure national Government provided IT network (inbound and outbound)?	The internet speed is excellent, as VMGD is using the government's broad band network
Does your NMHS have access to SATAID information?	VMGD does have access to SATAID information
Which geostationary satellite(s) do you utilize, and which product(s) do you rely upon and how do you obtain it?	Himawari and products that are available via SATAID
How many Upper Air Station does your NMHSs operate and what is their status? Do you have access to Lightning data, and do you use in in your forecasts?	1 upper air station We should have access to lightning data before the end of this year
What is the scope and extent of marine weather services provided by your NMHSs and describe your NMHSs interaction with your national	VMGD issue marine products and their associated warning every three

marine/port authorities and the marine user communities?	
What type of marine weather products, warnings, advisories do you provide?	VMGD is providing coastal marine forecast, coastal marine warning, high seas forecast and high seas warning
Does your NMHS have a Port Meteorological Officer and are they involved in the WMO VOS Programme?	No

2.4.4 Training

Below is a list of only long term training undertaken by the Vanuatu Meteorology and Geo-Hazards Department Staff. Short term trainings are not included on this list.

Training or Workshop Title attended by NMHS staff from 2011-2013	Start and End dates	Donor	Number of Participants from the NMS
Allan Rarain – MSc, The university of Auckland	2016-2018		
Moira Yerta – MSc, Melbourne	2014-2016		
Silas Robson – PhD, USP	2013-2017		
Ellen Luke – Postgraduate Diploma (WMO Class 1) Bureau of Meteorology Training Centre	2015		
Levu Antfalo – Post Graduate Diploma (WMO Class 1), PAGASA	2016		

2.4.5 Update on Climate Services (to support current and future development)

Questions	Details
What level is your climate services according to WMO standard? (Class 1-4)	1, 2
Do you have an update climate science publication for your country? If not, when is the last one and how often do you want to have climate science published?	No.
List the qualification obtained by climate officers (do not specify names)	PhD, MSc, BA/BSc, WMO Class 2, Diploma, Certificate
List the types of training needed by you to enhance the generation and production of climate services	
What tools do you use to provide seasonal forecast? (please select from SCOPIC, POAMA, METPI, CLIKP, PEAC)	SCOPIC, POAMA
What model(s) do your use to provide seasonal forecasts on monthly basis?	Statistic (SCOPIC)

What are the climate variables you are forecasting?	Rainfall, temperature
What are some variables you would like to forecast in the future to meet needs of your client?	
How many AWS do you have that feed into the database you are using?	8
List in order of importance some sectors you engage with? List what products you issue for these sectors?	Agriculture, Fisheries, Water, Tourism, Infrastructure, Health
List 5 most important mode of communication of seasonal forecasts in your country.	Website, Email, Monthly Briefs
Do you have any early warning system (EWS) for climate extreme events?	Yes
What are some climate extreme events that you want to be included in your EWS?	
What are some challenges that you have in climate division that you	

want to address with climate science and climate change mitigation and adaptation issues	
What are some priority needs for your services that you want to achieve in the next 5 years?	The needs are stated in the VMGD strategic development plans

3.0 Progress of the VMGD

3.1. UPDATE on Achievements of VMGD from 2015-2017

Weather Forecasting Division

Programs	Objective (Targets)	Result ✓ or ✗	Results Summary
Recruitment of 3 Forecasters	Recruit 2 Weather Forecasters & 1 PSO-Aviation to maintain 24/7 shift operation	✓	2 forecasters has been recruited, while PSO - Aviation by 2017
24-hours Operations	Provide 24-hour weather watch forecast	✓	24/7 operations sustained

Upgrade Synergie Platform with an IWFS (VCAP)	To purchase and install synergy IWFS software and PCs through VCAP funding	✓	Upgrade done for Synergies and Mateo Factory system has been installed.
Annual Internal Training	Conduct in-house training and assessment	✓	2-week In-house training conducted Assess staff knowledge before and after training
Awareness Material	Improve Vanuatu TC Tracking map	✓	New TC tracking map has completed by June and has been launched.
Awareness Material	Marketing of Commercial & Public Weather Products & Services	✓	Been done but has not been heavily advertised.

Geo-Hazards Division

Geo-Hazards Division			
Programs	**Objective (Targets)**	**Result** ✓✖	**Result Summary**

Research and scientific collaborations	Improve current knowledge, and responses to volcanism, Seismicity and Tsunami	✓	1.1. Engage in research activities with local and international scientists on earthquakes and volcanoes of Gaua, Ambae , Ambrym, Lopevi, and Tanna 1.2. Carry out scientific assessment and research activities after major earthquake and tsunami events 1.3. Training workshop on volcano-seismic data processing & analyze 1.4. Coordinate & facilitate training workshop and attachment with other counterparts in Geo-Hazards field 1.5. Participate in regional and international conferences and seminars 1.6. Facilitate Internal technical trainings relevant to Geo-Hazards areas of work for Geo-Hazards staff 1.7. Retrieve Lidar data and training on using data for tsunami modelling/hazard mapping

Scientific collaborations and partnership for data sharing	Enhance collaboration with regional institutes to promote the regional geophysical network		2.1 Establish Trilateral and multilateral agreements with ORSNET communities, DASE, , GEOSCOPE, MVN/MSG, To address Geo-Hazards Observations and data sharing 2.2. Share seismic data with other Earthquake Information centre's to encourage research and to re-enforce monitoring system in Vanuatu 2.3. Collaborate with Regional Partners in strengthening the Regional seismic network Vanuatu/New Caledonia with other observatories in the region
Crisis response	Undertake responses to volcanism, Seismicity and Tsunami	✓ ✓	3.1. Liaise with NDMO, and other stake holders for disaster response plan and action in times of volcanic eruptions, earthquake and tsunami 3.2. Carry out hazard assessment in response to major volcano activity events 3.3. Carry out earthquake intensity survey and hazards assessment in response to major earthquake events 3.4. Carry out tsunami run up and hazards assessment in response to a major tsunami

			event
Geo-hazards Warning System	To improve Geo-Hazards warning systems in Vanuatu		4.1. Ensure Geo-Hazards Warning centre operations up and running. 4.2. Contribute to the development of tsunami risk map for Port Vila and Luganville 4.3. Contribute in the development of the tsunami warning signage project 4.4. Contribute to the Development of the reviewed Hazard map and contingency planning for Tanna and Ambrym 4.5. Finalize the Vanuatu Volcano Alert System review 4.6. Maintain Geo Hazards warning centre operations g. Ensure 24H/7 on call services for Geo-Hazards Early Warning systems 4.7 Carry out the observations of earthquakes and volcanoes in real-time 24H/7 for tsunami and volcanic eruptions early warning

Earthquakes and volcano monitoring	Improve seismic and volcano monitoring systems to prevent disastrous consequences of natural disasters to humans and the environment	✓ ✓	5.1. Establish agreements with provinces Malampa /Shefa/ Tafea and/ or customary landowners for the use of rural lands for Geohazards monitoring systems 5.2. Upgrade the national seismic network by extending the network to Tanna , Malekula and Port Vila 5.3. Upgrade the Efate seismic network 5.4. Maintain the Efate seismic network 5.5. Maintain the Geoscope station for global earthquake monitoring network 5.6. Continue Installation of Real-time seismic monitoring system on Tanna, Lopevi, Paama, Ambrym, ,Ambae, Gaua and Vanua lava 5.7 Improvement of Sea Level Monitoring in Vanuatu 5.8. Volcanic hazards Assessment on Ambrym, Tanna, Ambae, Lopevi and Gaua
Geo-hazards data/products and services	Organise Geo-hazards information into the hazards database and issue the corresponding hazards information to reduce Geohazards risks to	✓	6.1. Issue earthquake occurrence bulletins for local communities 6.2. Issue monthly and annual earthquake bulletins for scientific communities

	local communities, the general public and the tourism industry	✓	6.3. Issue volcano Alert Bulletins for tourism industry, local communities and general public 6.3. Issue monthly and annual volcano activity bulletins for scientific communities 6.4 Issue monthly volcano activity update bulletins for general public 6.5. Issue weekly report of Geo-hazards monitoring systems and operations 6.6. Review and develop specific education and awareness materials for specific audience using specific software 6.7. Participate in education and outreach missions in schools and during global events as WMO/WW day, sciences week, environment week 6.8. Prepare outreach/awareness materials based on thesis findings North Malekula/South Santo seismic gap 6.9. Conduct outreach awareness based on thesis findings – North Malekula/South Santo

Geo-hazards management and operating procedures	To ensure a high standard operation of the Vanuatu Geo-Hazards Observatory and a proper management of Geo-Hazards staffs and assets	✓	7.1. Update Draft SOPs for Admin response/Geo-Hazards response, emergency response, Issuance of Geo-Hazards products 7.2. Review Tsunami detection and operation procedures 7.3. Finalise Geo-Hazards operating manual/Geo-Hazards Directive including all hazards/Geo-Hazards Monitoring Systems Manual 7.4 Engage in the VMGD Business/corporate planning and annual budgeting for 2014/2015 7.5 Report annually and bi-annually on the Geo-hazards operations and achievements 2013 7.6. Assess staffs through staff appraisal 7.7 Control the Geo-Hazards assets 7.8. Ensure the Geo-Hazards business plan is well implemented within means and timeframe 8.1 Mainstreaming Disaster Risk Management (MDRR) Project 8.2. Increasing Resilience to Climate Change and Natural Hazards (IRCCNH) project 8.3. Project of cooperation through the Government of New Caledonia 8.4. Oceania Regional Seismic Network (ORSNET) Project

Project Management **Extra responsibility due to Cyclone PAM**	To ensure that all Go-Hazards projects are well implemented and that project targets are reached in a timely manner. To assist in the distribution of relieve supply	✓	8.5 Other small project 9.1 Tropical cyclone warning 9.2 Distribution of relief supply

Observation Division			
Programs	**Objective (Targets)**	**Result ✓✖**	**Result Summary**
Provision of Weather & climate Monitoring	365 days & 24/7 recording and measurement of land and Atmospheric conditions	✓	All sites staff continue to provide 24/7 weather monitoring despite some short falls.
VCAP Climate Early warning systems	Sites Assessment	✓	Site Assessment Completed for all Sites. Report submitted to Director Office

Improve Upper air Building at Bauerfield Office	Source a Contractor to remove old damaged roof and install new roofing	✓	New Roofing Completed. Repair Report Submitted
Develop Work plan of all Observations staff (PMS)	To Manage Staff Performance	✓	2016 Performances appraisal completed and submitted to HRM, CSU
Improve of Data Network in Rural Weather Offices	Provide structural Maintenances for all outer island weather Offices. Installations of Solar systems Installation of PCs, Internet etc…	✓ ✓ ×	All Renovations works completed on most sites except Sola/Lamap
Improve Combinations Link & Coms Links	Install PCs, Display screens and other equipment on all Sites	×	This will done during 2nd/3rd quarter of 2017

Data Quality	Review & Amend Current QMS	✓	No changes Made, likely changes this year to accommodate for AWS procedures.
Trainings Development	External & Internal Training for staff	✓	Willie Molisa attached with Pacific desk in Hawaii for 4 weeks. A refresher course on Metar and SPECI was conducted at the airport
AWS TRaining	To introduce the understanding of the new Technology to onsite staff	×	Will be carried out in 2017

Project management Unit

Programs	Objective (Targets)	Result ✓✖	Result Summary
Services and support for the National Advisory Board on Climate Change and Disaster Risk Reduction (NAB) transferred to the established NAB secretariat	NAB is recognised as an on-going decision-making and advisory body NAB secretariat will function independently from PMU	✓	a. All relevant functions of the NAB secretariat handed over to the NAB secretariat proper under the CSU of MCC b. Handover of templates and SOPs completed c. 2 trainings conducted to facilitate hand over including handover of iCLIM project activities d. NAB updated and fully coordinated by new NAB Secretariat

Programs	Objective (Targets)	Result ✓✖	Result Summary
Support the coordination, management and implementation of relevant CC and DRR projects endorsed by the NAB	PMU and NAB is aware of all CC & DRR projects being undertaken or planned in Vanuatu and coordinates to ensure complementarity PMU supports and facilitates the implementation of CCA/DRR programmes and projects with NAB stakeholders	✓	a. Projects Operational Manual finalised b. Micro-Projects Manual finalised c. Financial Management Manual Finalised d. Adjustment of Vanuatu Gov FMIS to meet standard donor reporting requirement completed and being utilised by 3 projects e. GIS database directory and SOP developed f. Baseline database for Tanna developed and maintained g. Progressive reporting of all projects directly managed through PMU h. Engagement with UNEP, IsraAid and UNDP to develop and implement new projects i. Strengthened working relationships with implementing partner agencies through establishment of multi-sector Operational Teams on the ground and executing joint missions at technical, policy and political levels.
Advisory Services	PMU is recognised as an informed, accurate source of best practice knowledge for CC and DRR PMU provides timely and appropriate advice to GoV, NGO and CSO actors on CC and DRR issues	✓	a. Information management system established with key resources and data with an open access policy for all stakeholders (key reports, LiDAR data, GIS data, multi-hazard maps, Vanuatu coastal risk tool) b. Direct input into the NAB Project Screening Committee as Chair to review and support key CC/DRR perspectives in new project proposals and work plans

Programs	Objective (Targets)	Result ✓✖	Result Summary
Policy and Strategy	Support the implementation of CCDRR Policy. Support the development and implementation of CCDRR Policy action plan.	✓	a. Support and input of CC & DRR priorities into VMGD and NDMO legislative frameworks as well as NDMO strategic plan. VMGD Bill passed by parliament in Dec 2016. NDMO legislation ready for parliament.
Project Management and Operations	Effective PMU coordination and project management PMU adequately staffed	✓	a. Projects Operational Manual finalised b. Micro-Projects Manual finalised c. Financial Management Manual Finalised d. Adjustment of Vanuatu Gov FMIS to meet standard donor reporting requirement completed and being utilised by 3 projects e. GIS database directory and SOP developed f. Assets register developed and maintained g. Conflict of interest register developed and utilised h. Contracts management process established i. Monitoring and evaluation framework drafted j. Retention of key staff through existing projects achieved
International CC & DRR obligations	Support the national implementation of international CCA/DRR obligations	✓	a. Contribute to UNFCCC obligations through the NAB and the UNFCCC Task Force b. Facilitated the ratification of the Paris Agreement and subsequent deposition with the UN HQ in New York.

Programs	Objective (Targets)	Result ✓✖	Result Summary
Participation in international agenda	Support to raise capacity of GoV representatives to participate in international fora	✓	a. Attended the UNFCCC Subsidiary Bodies meeting Bonn, Germany.
Adaptation & DRR	Support CCA & DRR initiatives in Vanuatu	✓	a. Progressed implementation of existing CCDRR initiatives - Increasing Resilience to Climate Change Hazards (IRCCNH) Project, Mainstreaming Disaster Risk Reduction (MDRR) Project, Forest Carbon Partnership facility (FCPF) REDD+ Project, Vanuatu Coastal Adaptation (VCAP) Project, Pacific Risk Resilience (PRR) Project b. Supported new CCDRR GCF Climate Early Warning Project through SPREP c. Engagement of IsraAid to execute projects in Shepherds d. Design NAPs project with UNEP e. Design new adaptation project for GCF with UNEP and KEI f. Support start-up of ACSE Aquaculture Project with QUT and Department of Fisheries
Climate Change Mitigation	Support Improved GoV oversight of CC mitigation projects in Vanuatu Support mainstream CC perspectives into energy-related projects and improve CC mitigation outcomes	✓	a. Continues World Bank Client Connection system support to World Bank administered Energy Projects b. Consistent involvement in the REDD+ Steering Committee and backstopping implementation of the National REDD+ Programme

Programs	Objective (Targets)	Result ✓✖	Result Summary
Financial Management & Procurement	Establish PMU capacity to manage donor funds Support NAB oversight of all GoV managed CC&DRR funding	✓	a. Projects Operational Manual finalised b. Micro-Projects Manual finalised c. Financial Management Manual Finalised d. Adjustment of Vanuatu Gov FMIS to meet standard donor reporting requirement completed and being utilised by 3 projects e. Assets register developed and maintained f. Conflict of interest register developed and utilised g. Contracts management process established h. Monitoring and evaluation framework drafted i. Retention of key staff through existing projects achieved
Monitoring, Evaluation and Reporting	Monitor progress and outcomes of government and externally funded CC & DRR projects Monitor and evaluate the work of the PMU	✓	a. Baseline surveys completed for Tanna and database created b. M&E frameworks drafted c. Training conducted for key staff and stakeholders in M&E processes, reporting and database for Tanna
Information management	Collect, manage and make accessible data and	✓	a. Information management system established with key resources and data with an open access

Programs	Objective (Targets)	Result ✓✘	Result Summary
	information on CC & DRR knowledge and activities relevant to Vanuatu		policy for all stakeholders (key reports, LiDAR data, GIS data, multi-hazard maps, Vanuatu coastal risk tool)
Communication & Engagement	Build partnerships with VMGD sections, NDMO and NAB stakeholders Ensure appropriate visibility of all PMU managed projects	✓	a. Full engagement with COP Working Group b. Implemented Visibility Plan for MDRR and IRCCNH projects
Training and capacity building	Increase PMU, VMGD & NDMO staff capacity to implement CCDRR agenda	✓	a. Facilitated and supported training for 2 procurement officers with ILO training centre, Turin, Italy b. Facilitated postgraduate DRR course for 1 PMU staff through Fiji National University c. Facilitated postgraduate DRR course for 1 NDMO staff through Fiji National University

Climate Division

Human resource, Policy, communications (Business Plan)			
Programs	**Objective (Targets)**	**Result ✓✘**	**Result Summary**

Restructuring Reporting Review Retirement	a. A new structure to include 7 new positions b. 4 quarterly reports, 1 Bi-annual and 1 annual report for climate Division c. Complete and operate Climate reporting system d. 2016 business plan reviewed e. Climate strategy plan reviewed f. Annual Update of SOP uploaded on intranet and print g. Organise a farewell party	✓ ✓ ✓ ✓ ✘ ✓	a. New structure has been incorporated in the Vanuatu Framework for Climate services.
Research	a. Report of Maewo cave (to collect speleothems) research b. Report of Lake in Efate regarding Tropical cyclone c. Publish TK paper on how to collect TK information d. A research proposal on MJO rainfall contribution on Vanuatu's monthly and annual rainfall. Develop a map of the different phase (1-8) of MJO	✘ ✓ ✘ ✘	a. Research was delay and not happened as planned b. Professor Sear will return in October to present findings or the research. c. In progress d. Research was delay
Policy	a. 1 VMGD Uniform Policy b. Amended Climate Operating Procedure c. Vanuatu National drought Policy d. Amended ENSO Directive e. Media release on review of TC seasonal outlook f. Launching of Vanuatu Framework on Climate Services	✓ ✓ ✓	
Studies	a. Study foundation and degree courses at USP b. Apply for PHD Studies	✓ ✓	
Training	a. Report on COP22 b. Report on IPCC meeting c. Training/Workshop report with recommendations d. COSPPac meeting report e. BOM attachment report	✓	

	f. f. NIWA attachment report		
Projects	EU-GIZ	✓	
	V-CAP a. Workshop report with priority needs for Agriculture, hydrology, health, energy and DRR captured b. 7 AWS procure c. Installation report d. On site testing report e. Launching of CLEWS f. Vehicle deliver to VMGD	✓	
	RUSSIAN		
	GCF		
	FAO	✓	
	RTSM		
	WMO-VCP		
	MDRR –web site		
Traditional Knowledge	a. Report on visit and database information	✓	-Report submitted for site visits

	b. TK database update c. Report of automatic rainfall visit	✓ ✓	-TK survey form into database

3.2. Proposed Activities to be carried out in the Future (2017-2019)

No	Proposed Activities to be carried out from 2017	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-	Regional and NMSs are more capable and effective

	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	
	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	(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-	4. Multi-hazard early warning system for tropical cyclones, storm surges, waves and tsunami in the PICT's

	hazards' mappings; (8) Operate and manage volcano database; and (9) Operate and manage earthquake / seismic database	region are implemented and improved.
4	(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) (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.

4.0. Identify Gaps and Future Needs that would Improve the National Meteorological and Hydrological Services

Future needs are well outlined in the VMGD strategic development plan (2014-2023), and the 2017 and 2018 VMGD annual business plan.