



PAPUA NEW GUINEA METEOROLOGICAL SERVICE 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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Purpose

To provide the Pacific Meteorological Council on (1) the Progress made by Papua New Guinea with respect to the Pacific Key Outcomes(PKOs), (2) the progress in the different strategies employed and engaged to continue the work of the PNG National Weather Service against challenges faced over the reporting period, (3) to express the appreciation to the development partners on the assistance and 4. To highlight the gaps currently existing in the PNGNWS with respect to seeking further continued support in national activities towards the achievement of PKOs of the Strategic Plan.

1.0 Summary

Papua New Guinea's Meteorological Service, the PNGNWS achieved modest development during 2015- 2017 PMC period. Against a background of unfavorable in-country economic climate especially during 2016-2017, the achievements mainly involved 1. Sustenance of the few development partner funded projects beyond the scope of the projects and 2. Setting the foundations for future development activities aimed at achieving PKOs under the Pacific Islands Meteorological Strategy(PIMS).

Notable among achievements are 1. The sustenance of certification of the National Weather Service by the PNG Civil Aviation Safety Authority (CASA PNG) under Part 174 of Civil Aviation Rules. Since the initial certification in 2015, 12 month certification has been renewed each time in 2016 and on 31st March, 2017 despite increasing risks due to existing Audit findings that need urgent intervention to address.

PNG also continued to undertake the National Climate Outlook Fora(NCOFs) with the activity having been included as part of 2016 and 2017 work plans and having renamed it Seasonal Outlook Forum to incorporate geologic hazards. Furthermore, PNG as one of 6 WMO pilot countries to implement the Framework of Global Climate Services(GFCS) extended towards undertaking stakeholder consultations culminating in the PNG Framework of Climate services and securing funding for the PNG CREWS project to the tune of USD2.5M.

PNGNWS signed of a number of Memorandum of Understandings(MOUs) that are serving as foundations of development in the majority of PKOs relating to provision of services of climate, weather, hydrology and hazards of the geologic nature.

The MOUs include (1) with the National Maritime Safety Authority (NMSA) on the sharing of data and sharing of relevant information to advance services to the marine sector (PKO2).

Secondly PNG established an Integrated Multi-hazard Early warning Services through its membership in Regional Integrated Multi Hazard Early warning systems(RIMES) centre with subsequent MOUs with national stakeholders for much closer working relationship aimed at improved provision of improved weather, climate and hydrological services relating to a majority of the PKOs through resources sharing partnerships which are resulting in strategic resources mobilization for the PNGNWS.

Thirdly the signing of the MOU with the Australian DFAT in relation to bilateral working relationship from 2017-2019 with the Bureau of Meteorology will contribute to facilitate the achievement of other PKOs.

In terms of regional project activities, great appreciation is expressed to the Secretariat of the Pacific Regional Environment Programme (SPREP) for the facilitation through the Pacific Meteorological Council Partnership Desk (PMCPD) Implementation of various projects through a whole range of development partners including DFAT, CANADA Fund, FINPAC that tended to fill the resources gap whilst improving decision support tools within the PNG NWS.

Numerous Training provided through WMO and through different SPREP PMC Partnership Desk continued to benefit the PNGNWS creating real impact in each of the 14 Strategic Priorities of the Strategic Plan 2012-2021.

The PNGNWS also improved its position and interaction with National Disaster centre and associated partners and stakeholders of disaster management with the elevation of the Director of PNGNWS to the position of Chairman of the multi-hazard National Disaster Awareness and Preparedness committee which is responsible for the wholistic and proactive awareness of natural hazards of both meteorological and Geologic origin

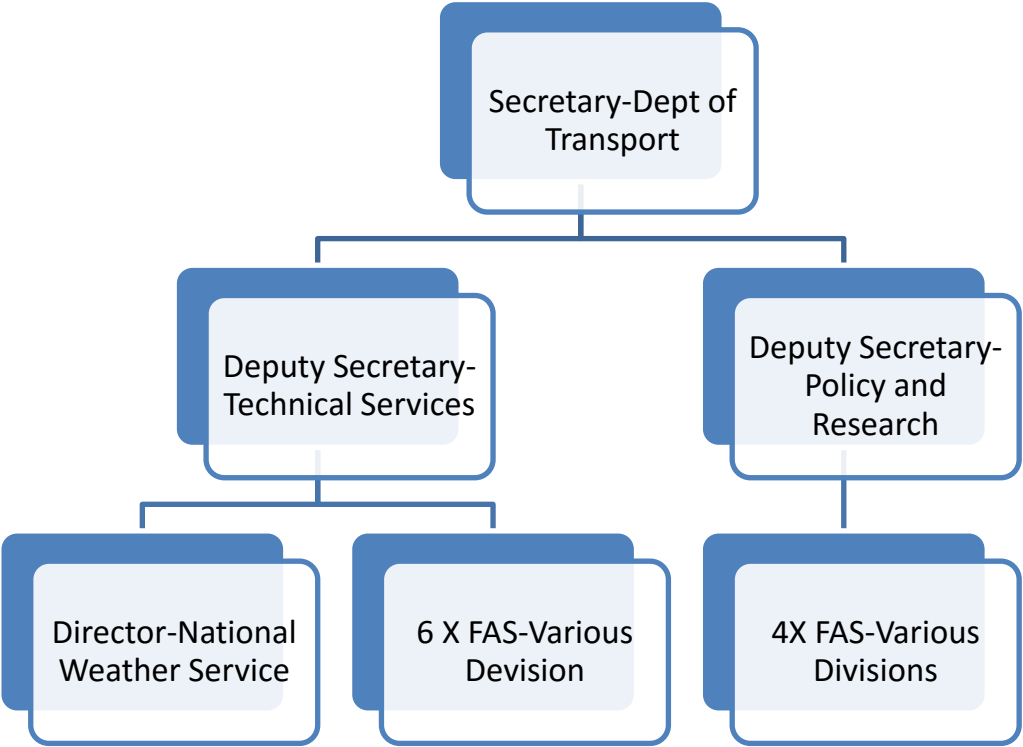
Despite the improvements , significant challenges remain in terms of addressing Instrumentation and communication, Decision support tools and Human resources capacity gaps. We endeavor to make further in roads under new initiatives and projects over the next PMC reporting period through the continuous support of development partners.

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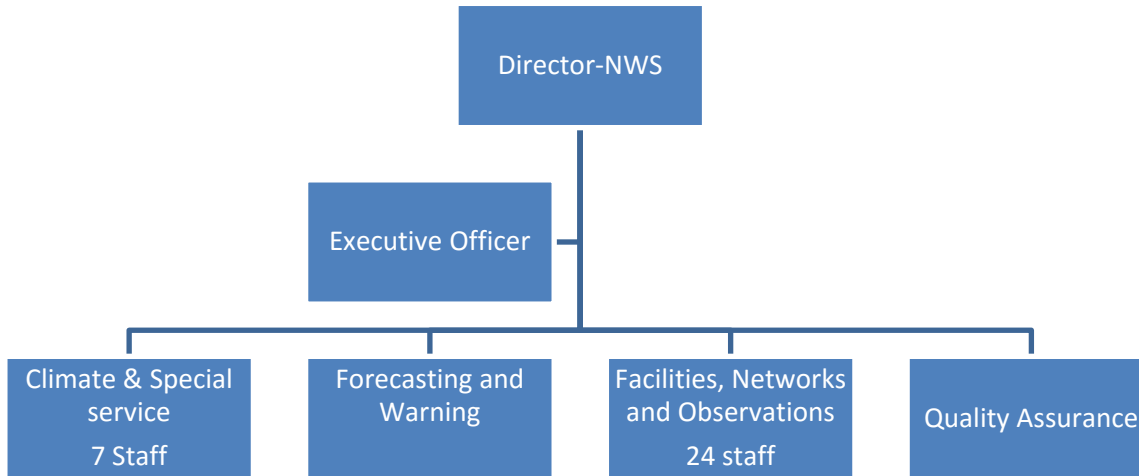
2.0 Background Information

2.1 Institutional Setup

PNGNWS continued to function as a division of the Department of Transport which is headed by the secretary Roy Mumu. Under the Secretary are two Deputy Secretaries responsible for Technical Services and or Policy and Research matters. The NWS is under the Technical Services headed by former Director of PNGNWS Mr. Kevin Luana who is also the Permanent Representative of PNG with WMO.



THE STRUCTURE OF THE NATIONAL WEATHER SERVICE IS AS SHOWN BELOW>



[

[The Matrix below asks questions related to Governance and Planning's of the NMHS]

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.	PNG National Weather Service continues to be covered under the Civil Aviation Act(2000) as amended 2010.
Do you require for your Act to be reviewed? If it is already reviewed, what is the current status of your Act	The Civil Aviation Act as it is does not adequately provide for the ultimate in the development of Weather and climate services to the optimum and even to the ultimate as it is hope for.
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 feature prominently in each of the country's development plans including the PNG Vision2050; the STARS-Sustainable and Responsible Development Strategy

Describe the process if your NMHSs is reporting against the SDG or its national equivalent	Currently non Existent
Does your NMHS have a strategic plan, implementation/operational plan or equivalent(s)?	PNGNWS doesn't currently have a Strategic Plan of its own. Under the ASA 2017-2019 the development of the Strategic Plan for the PNGNWS is a priority activity.
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).	PNGNWS and National Disaster Centre work very well in Disaster Management; The Director of the PNGNWS is currently the Chairman of the National Disaster Awareness and Preparedness committee(NDAPC). Even though it is not really well documented as such; the PNGNWS relationship with the NDC is probably a best proactive of sorts that can be developed further.

2.2 Staffing

2.2.1 Staff Qualification

- (a) The Human Resource Function of the PNGNWS is still under the main Department of Transport and although NWS may have its human resource strategy any proposals for changes are subject to approval by the Secretary of the Department of Transport and is part of the overall government human resources development strategy.
- (b) The updated list of personnel is as presented below together with their academic qualification
- (c) Under the overall government human resource strategy there has been a recruitment freeze on staffing recruitment since 2015. The National weather service has therefore been unable to make any new recruitments of cadet staff for observations, meteorologists, climatologists and engineering positions
- (d) There remain key capacity building issues which range from a. having an aging workforce that needs urgent intervention; b. staff retention challenges due to low staff salaries; c. lack of funding to conduct an initial observer training course; lack of funding to run refresher training of aviation forecasters, climatologists on science to service in PNG Framework of Climate Services(PNGFCS) activities.

Staff	Qualification	Division/Section	No. Professional Staff		Total
			Male	Female	
<i>Staff Name</i>	<i>(Description the qualification under each division) Example; WMO Class 1-4 or other qualification or professional training, education and research)</i>	<i>Responsibility of Staff (Forecast, Climate, Observation, Administration, etc)</i>			<i>Total Number of Staff</i>
Samuel Maiha	BSC,WMO Class 1, MBA	Administration	M		
Dunstan Itagau	WMO Class 3	Administration	M		
Vagi Edea	WMO Class 4	Administration	M		
Kasis Inape	BSC, WMO Class 1, MSC	Climate and special services	M		
Kisolel Posanau	BSC	Climate and special services		F	
Nanau Vulum	BSC	Climate and special services		F	
Kila Kila	BSC	Climate and special services		F	
Ruth Wari	WMO Class 3	Climate and special services		F	
Agnes Diap	WMO Class 3	Climate and special services		F	
Gabriel Tuno	BA, WMO Class 4	Climate and special services	M		
Jimmy Gomoga	BSC, WMO Class 1, MSC	Forecasting and Warning	M		
Ruben Wamuni	BSC, WMO Class 1	Forecasting and Warning	M		
Charlie Vulum	BSC, WMO Class 1	Forecasting and Warning	M		
Anthony Kalai	BSC, WMO Class 1	Forecasting and Warning	M		
Percy Haruku	BSC, MSC	Forecasting and Warning	M		
Kingston Harbon	BSC, MSC	Forecasting and Warning	M		
Murray Kwapena	WMO Class 2	Forecasting and Warning	M		

<i>Leo Hawarry</i>	WMO Class 2	Forecasting and Warning	M		
<i>Lawrence Aumora</i>	WMO Class 2	Forecasting and Warning	M		
<i>Leo Hendricks</i>	WMO Class 2	Forecasting and Warning	M		
<i>Ula Virobo</i>	BBM, WMO Class 2	Forecasting and Warning	M		
<i>Heau Lohia</i>	WMO Class 2	Forecasting and Warning	M		
<i>Sakumai Kanawi</i>	WMO Class 2	Forecasting and Warning	M		
<i>Peter Warupi</i>	WMO Class 2	Forecasting and Warning	M		
<i>Eminon Sowape</i>	WMO Class 4, WMO Class 3	Forecasting and Warning	M		
<i>Tracy Bogela</i>	WMO Class 4	Forecasting and Warning		F	
<i>Lipan Raphael</i>	BSC, WMO Class 4	Forecasting and Warning	M		
<i>Adolf Bessie</i>	WMO Class 4	Forecasting and Warning	M		
<i>Steven Bip</i>	WMO Class 4	Forecasting and Warning	M		
<i>Justin Maneu</i>	WMO Class 4	Forecasting and Warning	M		
<i>Tau Ray Gabi</i>	WMO Class 2	Facilities	M		
<i>Robert Thompson</i>	WMO Class 2	Facilities	M		
<i>Albert Walonggor</i>	WMO Class 2	Facilities	M		
<i>Elijah Gareitz</i>	B.ENG	Facilities	M		
<i>Amos Kaili</i>	B.IT	Facilities	M		
<i>Augustine Kuannangi</i>	WMO Class 2	Facilities	M		
<i>Moruwo Mammo</i>	WMO Class 4	Facilities	M		

<i>Hymson Waffi</i>	BBM, WMO Class 2	Facilities	M		
<i>Myra Selan</i>	WMO Class 4	Facilities	M		
<i>John Wiringa</i>	WMO Class 4	Facilities		F	
<i>Charles Sauupai</i>	WMO Class 4	Facilities	M		
Mondo Amapula	WMO Class 3	Facilities	M		
Busop Yaeng	WMO Class 3	Facilities	M		
Alan Mihen	WMO Class 4	Facilities	M		
Brian Sirip	WMO Class 2	Facilities	M		
Daisy Siraba	WMO Class 4	Facilities	M		
<i>Macdonald Sideni</i>	WMO Class 4	Facilities	M		
<i>Konsy Konnoberi</i>	WMO Class 4	Facilities	M		
<i>Alex Gabi</i>	WMO Class 4	Facilities	M		
<i>Andrew Adarei</i>	WMO Class 4	Facilities	M		
<i>Adolf Bessie</i>	WMO Class 4	Facilities	M		
<i>Posa Pangum</i>	WMO Class 4	Facilities	M		
<i>Cornelius Gembod</i>	WMO Class 4	Facilities	M		
	WMO Class 4	Facilities	M		
<i>Francis Anuma</i>	WMO Class 4	Facilities	M		
Total	MBA=1, MSC=5, BBN=1, BSC=7, BA=5; WMO Class 1=8, WMO Class 2=14, WMO Class 3=6, WMO Class 4=22		48	9	57

2.3 Finance

[In the PMC-3 in 2015, we have been able to show that the total investment in the region on meteorology per annum is around USD20 million with 80% supporting staff personal. The secretariat would like continue monitoring these investment. This section can be kept confidential. It should describe an UPDATE on the financial status of the NMHSs andalso highlighting other external financial support. They can be summarized in the table below;]

Description	2016	2017 Funds [Own currency]		Total [Own Currency]
	Total Budget (PGK)	Administration (PGK)	Operation (PGK)	
<i>Government Support</i>	4700000	2800000	2800000	5600000
.....				
Total (USD)	1.6M	0.9M	0.9M	USD1.8M

[You can also highlight some of the key issues in finance that needs to be addressed to contribute to the improvement of your operations under section 4 of the report]

2.3.1 Projects supporting the NMHSs

[This will contribute to agenda 28.7 on the mapping of projects in the region. Provide a list of the number of projects available to each NMHSs

Name of Project	Total Project Budget	Percentage of how much is provided to the NMHSs	Summary of NMHSs activities covered by the project
<i>COSPPAC</i>	AUD35.m	1	
<i>UNDP Coastal Flooding Early Warning</i>	USD35.M	10	
<i>Wold Bank Wind Measurement Project</i>	USD2.0 M	10	
<i>RIMES HUB Project</i>	USD.1.2M	100	

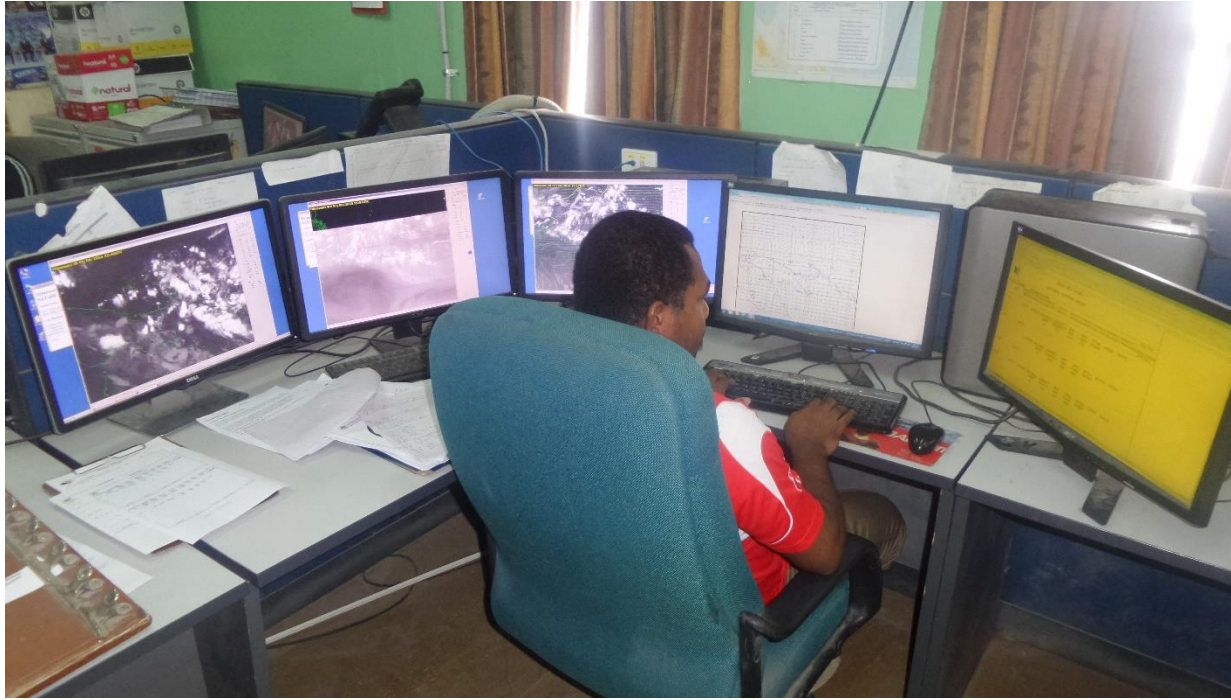
CREWS Project	USD2.5M	N/A	This project would provide improved monitoring and early warning systems primarily for drought. It's been approved awaiting availability of funds.
ASA(DFAT)	USD0.4m	100	
Total (USD)			

2.3.1 Potential Collaboration on project proposals

1. Governance
2. Instrumentation
3. Management Training
4. Meteorologist, Technical Officer Training
4. Priority areas for collaboration on future projects]

2.4 Development

[Highlight development since 2015 and also anticipated development in the near future. Pictures would assist in this section. Highlight gaps and needs.]





2.4.1 *Buildings Infrastructure*

Construction In progress of Regional Integrated Multi-hazard Early warning System(RIMES) sub hub of South Pacific.



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-meteorological data from remote stations?	/Telephone/and FAX PNGNWS continues to communicate via Telephones, VHF and Email as the preferred means of communication in that order of priority and backup option.
What is the Mode of transmitting data to the Global Data Network?	[eg. GTS, e-mail and to whom, etc.] Means of Transmission is via CADAS/GTS & Email
What is your Current Internet Speed , and is your main office connected to a secure national Government provided IT network (inbound and outbound)?	Current Internet band with is 2MBS
Does your NMHS have access to SATAID information?	PNGNWS have very good SATAID courtesy of Japanese Meteorological Agency(JMA)

Which geostationary satellite(s) do you utilize, and which product(s) do you rely upon and how do you obtain it?	HIMAWARI 9 is the current Satellite PNGNWS is using.
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?	None of PNGNWS upper air stations are operating mainly due to non-availability of consumeables. PNGNWS doesn't have access to Lightning data as well. Some attempt is being done to implement or access Lightning detection system.
What is the scope and extent of marine weather services provided by your NMHSs and describe your NMHSs interaction with your national marine/port authorities and the marine user communities?	PNG NWS has very good relationship with National Maritime Safety Authority(NMSA) via an MOU signed in 2016. We share our data together without any hindrance at all. Currently PNGNWS uses mainly the Bureau of Meteorology model outputs as the forecasting Aid.
What type of marine weather products, warnings, advisories do you provide?	Ocean Forecasts, Small ships Forecasts, Tropical cyclone Advisories, Seasonal Outlook of possible Marine trends.
Does your NMHS have a Port Meteorological Officer and are they involved in the WMO VOS Programme?	No. But that responsibility may be done by the National Maritime Authority.

2.4.4 Training

List any international, regional or national training, educational or research related events or workshops in which the NMHS has participated in the last 2 years(2015-2017) by using the table below;

Training or Workshop Title attended by NMHS staff from 2015-2017	Start and End dates	Donor	Number of Participants from the NMS
2015-Summer course on Climate & Energy-Kasis Inape	4-7 July 2016	WMO	1
2015-Enhancing climate & weather communications for resilient island communities.-Kasis Inape	21-23 July 2016	SPREP	1
2015-Seminar on climate change & climate information services for developing countries-Kila Kila	4-25 June 2015	China Government	1
2015 -Communicating climate information-Kila Kila	8-15 Sep 2015	FINPAC/SPREP	1
2015- MSc-Meteorology-Percy Haruku	July2014-Ju		
2016 FFFG Flood Forecasting(02 nd Feb—07Feb(S. Maiha& M.Kwapena	02ndFeb-05 th Feb	WMO,USAID	2
2016 Pacific Desk Training(01 st Feb-26 th)S.Kanawi & P.Warupi	01 st Feb-26 th Feb,2016	NOAA,USAID	2
2016 Pacific Desk Training(25April-20May) H.Lohia & Ula Virobo		NOAA,USAID	2
2016 Multi-hazard risk Assessment;GIS Applications-K.Posanau	Sept13-15, 2016	WMO	1
2016 Smart Met Training(Charlie Vulum& P.Haruku)	Sept27-30, 2016, NADI, Fiji	FINPAC	2
Aviation Forecasting Technics Training-Lawrence Aumora	22ndOct-05 th November, 2016	WMO; CMA	1
2016 Satellite users Training(Murray Kwapena)	21-28 th October, South Korea	WMO	1
2017 Training on Himawari Satellite-Operational and Climate staff	Feb 2017, Port Moresby, PNG	JICA	30
2017 Climate Communications Training(Gabriel Tuno)	01-05May	DFAT	1
2017 Training on Flood Forecasting(.M Kwapena)	10-12 July, 2017, Jakarta, Indonesia	WMO, USAID, NOAA	1
2017.MSC in Meteorology-Kingston Habon	Sept2015-June2017	WMO,CMA	1
2017 CAP Training		WMO, GoPNG	5
2017 Training on Disaster Management(P.Haruku & K.Posanau)	July-August	UNESCAP	2
2017 Training on AWS Installation and Maintenance(Messrs Thompson & Gareitz		UNDP	2
2017 Training on Tropical Cyclone(Anthony Kalai)		WMO	1

2017 Training on Management of Radio-Nucleid Station	Sept, 2017	UN	2
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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)	UNCERTAIN.
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?	Yes. Climate Change in the Pacific: Scientific Assessment and New Research, Volume 1: Regional Overview and Volume 2: Country Report. These reports were done under the Pacific Climate Change Science Program (PACCSAP), An International Climate Change Adaptation Initiative of the Australian Government's contribution to Pacific Island Countries. This report was compiled in 2011 by CSIRO and BOM research scientists in partnership with the regional partner countries. I strongly feel that this report should be updated regularly, preferably every 5 years or so.
List the qualification obtained by climate officers (do not specify names)	Msc, BSc, BA, and Meteorological Observers
List the types of training needed by you to enhance the generation and production of climate services	<ul style="list-style-type: none"> • Introduction to statistics • Basic course in climatology/Agrometeorology • Data analysis using statistical soft wares such as R, Systat, MetLab etc. • Scientific report writing
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?	Use model guidance from BOM (POAMA), CPC (NOAA), IRI
What are the climate variables you are forecasting?	Mostly rainfall at the moment.
What are some variables you would like to forecast in the future to meet needs of your client?	Temperature, Water balance, soil moisture, sea surface temperature, radiation
How many AWS do you have that feed into the database you are using?	Nil at the moment due to technical issues.

<p>List in order of importance some sectors you engage with? List what products you issue for these sectors?</p>	<ul style="list-style-type: none"> • National Disaster Centre – EWS • Climate Change Development Authority – Climate change issues • Agriculture, Water, Energy, Health, Infrastructure etc • Stakeholders, Development Partners, CBO's etc <p>At the moment, we are providing them with general climate forecast but not tailored to user-specific needs.</p>
<p>List 5 most important mode of communication of seasonal forecasts in your country.</p>	<ol style="list-style-type: none"> 1. Email 2. Fax
<p>Do you have any early warning system (EWS) for climate extreme events?</p>	<p>The seasonal climate outlook produced on a monthly basis is ENSO based forecast which we have been utilizing to assess the potential for climate extremes of drought or flooding due to the underlying ENSO indicators.</p>
<p>What are some climate extreme events that you want to be included in your EWS?</p>	<ul style="list-style-type: none"> • Potential for Droughts, Flooding, Heat wave etc. • Potential for frosts, especially at higher altitudes. • Potential for forest fires. • Water & Food shortages due to prolonged droughts
<p>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</p>	<ul style="list-style-type: none"> ✓ The climate science is well understood and documented. Our biggest challenge at the moment is to make socio-economic sense out of the science and data that is available. We need to create partnership with our stakeholders so that we understand each other's need to help guide us in our attempt at addressing user-derived products tailored to their specific requirements and needs. ✓ Currently, our mandated responsibility does not clearly define our role in terms of addressing climate change and adaptation issues hence we only provide technical assistance to the Climate Change Development Authority, who is the lead agency.
<p>What are some priority needs for your services that you want to achieve in the next 5 years?</p>	<ol style="list-style-type: none"> 1. Data is and will continue to be the core of our business as far as climate services is concerned so we would like to invest in expanding our current network to cover all the provinces in the country. This can be done thru direct funding from the Government or thru partnership. 2. We need to upgrade our current database (CLiDE) to a more user friendly platform where data analysis can be easily conducted there to respond immediately to client requests as well as conducting personal research. This would also contribute meaningfully to realizing our need to develop tailored products specific to clients needs. NIWA through CLiDESC is progressing in this direction hence need to support their effort.

4	01 st Seasonal Outlook Forum				X												
5	Participation in Review of Pacific Meteorological Strategy.										X		X				X
6	Attend training on Maintenance of Nucleid Station									X							
7	Participation in Pacific Met Desk Training-	X	X														
8	01 st Multi-hazard Seasonal Outlook Forum				X												
9	Participation in Sigmet simulation Exercise	X		X	X												
10	Participation in Tsunami Awareness			X	X												
11	Signing of Memorandum of Understanding with National Maritime Safety Authority.(NMSA)		X														X
12	Certification of PNGNWS for the Provision of Meteorological Services to Aviation	X															
13	Participation in SEA-O FFFG Project.			X		X											
14	Renewal of the Certification of the NWS to continue to provide Meteorological Services for Aviation	X															
15	Signing of MOU to participate in Bilateral assistance with Australian Department of Transport and Infrastructure.																X
16	Implementation of UNDP Coastal Flooding Early warning System		X	X	X	X											
17	Membership with the RIMES				X												X
18	Continued Data Digitization Activities				X					X							
19	Participated in numerous PMC, WMO Meetings										X						
20	Hosting of the RIMES Ministers Meeting in August 2017.				X								X				

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

[Proposed Activities indicated in the Matrix will give an indication on the priorities

No	Proposed Activities to be carried out between 2017-2019	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Initial Meteorological Observer Training	X	X	X	X	X	X								
2	Observer Refresher Training	X	X	X	X	X	X	X							
3	Forecaster Refresher Training	X	X	X	X	X	X								
4	PNGNWS Strategic Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	Meteorology Act	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	PNG CREWS Project	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Revitalization of Observational systems to GCOS standard	X	X	X	X	X	X	X							
8	Upgrade of Communication Systems	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	Recruitment and Training of new Personnel.	X	X	X			X	X							
10	PNG Framework of Climate Services activities.				X	X	X								

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

Main Gaps in National Weather Service

1. Meteorology Act
2. Strategic Plan
3. Adequate Staff levels
4. In Adequate Funding Levels
5. Management Training