



CREWS PROJECT PROGRESS REPORT

(July – December 2021)




1. Project title	Weather and Climate Early Warning System for Papua New Guinea	2. Project Reference CREWS/CProj/08/Papua New Guinea
3. Implementing Partners involved in the project	WMO	4. Regional/National Partners involved in the project Papua New Guinea National Weather Service (PNG NWS), Australia Bureau of Meteorology (BoM)
5. Project Duration/Timeframe (from year – to year)	Oct 2017 – Jul 2022	6. Total Funding Approved by Steering Committee (in US dollars), including fees 1,650,000
7. Reporting focal point(s) from Implementing Partners	Robert Stefanski rstefanski@wmo.int	
8. Project overview	<p>Please include objectives, key project deliverables, leveraging, contextual information/statistics, significant events during the reporting period in <u>bullet points</u>. (max 250 words)</p> <ul style="list-style-type: none"> In Papua New Guinea, CREWS builds the capacity of the national meteorological agency and strengthens its cooperation with key sectoral ministries, departments and other stakeholders for agriculture, disaster management, energy and infrastructure. 	



	<ul style="list-style-type: none"> • The project puts in place end-to-end EWS focused on reducing drought, flooding and frost impacts, through improved weather observations, climate data management of historical data, climate data rescue, state-of-the-art seasonal and sub-seasonal forecasting coupled with monitoring and advisories for drought, and a more efficient distribution of alerts and information suitable for decision making at a national and local level. • The main focus is on building the capacity of the National Meteorological Service and strengthening its cooperation with key sectoral ministries, departments and other stakeholders working in the above areas to put in place complete systems that deliver warnings and relevant information to end-users. Enhancement of these basic capabilities will be complemented with support for integration of early warnings into national processes. • The project draws on advanced technical expertise from cooperating institutions to ensure access to relevant data, products, tools, training and equipment. • This project coordinates with several other initiatives and organizations: Climate and Oceans Support Program in the Pacific (COSPPac); PNG Capacity Development Project (PNG-CDP) project under BoM and Australian Centre for International Agricultural Research (ACIAR) was further strengthened. In terms of leveraging, the project is implemented in close synergy, with a single project officer, with BoM Climate and Oceans Support Program in the Pacific (COSPPac) funded by the government of Australia (about US\$600,000).
<p>9. Progress summary</p>	<p>What has been achieved <u>during this reporting period</u>? – Please list <u>in bullet points</u> the most significant and tangible outcomes? (Highlight at least 1 key achievement that can be elaborated in the 2021 Annual Report). (max 250 words)</p> <ul style="list-style-type: none"> • Development of drought risk assessment for PNG using region-specific Drought Risk Index (DRI), integrating Drought Hazard Index (DHI), Drought Vulnerability Index (DVI) and Drought Exposure Index (DEI) has significantly progressed. • PNG NWS made decision to retain CliDE (Climate Data for the Environment) as a Climate Data Management System (CDMS). Climate and Oceans Support Program in the Pacific (COSPPac) started purchasing the necessary equipment.

	<ul style="list-style-type: none"> • Data Rescue initiative started with PNGNWS on obtaining interest from individuals on data digitization. • Collaboration with the Australian Centre for International Agricultural Research (ACIAR) was further strengthened. • Stakeholder workshop was planned for December 2021. Due to end-of-year issues, workshop was rescheduled to Q1 2022. • Functionality of the WMO Global Producing Centre for Long-Range Forecasts (GPC-LRF) Melbourne portal was enhanced and tested with users from PNG. Portal was designed with CREWS and COSPPac project teams. High resolution S2S climate prediction products from ACCESS-S (Australian Community Climate Earth-System Simulator-Seasonal) and satellite precipitation estimates and derived products from SWCEM are now available to PNG NWS. • Achievements of the project were presented at Asia Oceania Geosciences Society (AOGS) meeting on 1-6 August 2021. Presentations included synergies with WMO Space-based Weather and Climate Extremes (SWCEM) and development of NWP product and experimental drought products for PNGNWS. Manuscript on user-centred I-EWS for drought for PNG was prepared for and was accepted by <i>Remote Sensing</i> journal (IF 4.848). • WMO is considering submitting a request for additional financing, which would extend the project beyond July 2022 and enable piloting last-mile delivery of service to end-users.
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10. Project Performance

Interpretation of color coding		
	High 	Good progress; on track in most or all aspects of delivery
	Medium 	Moderate progress or on track in some aspects of delivery
	Low 	Less than moderate or poor progress. Not on track in critical areas of its delivery. Requires remedial attention



	Rate of expenditure	Rate of delivery	Alignment of Objectives
Coding	●	●	●
Narrative	The expenditures are at US\$1,495,177 (out of which US\$949,241 in obligations and US\$545,935 in actuals), representing in total 91% of the approved \$1,650,000 funding. The expenditures in the country are late, in part due to a resurgence of COVID-19 cases at the end of 2021.	The rate of delivery is moderate, the project suffered from additional delays due to the COVID-19 situation in Q3-Q4 2021.	The project remains strongly aligned to the CREWS objectives.

11. Risk Management Status

Risk Status	<p>What is the current risk status as compared to what was identified in the project proposal?</p> <p>In line with the assessment performed at proposal stage, a risk related to the weak project management capacity in Papua New Guinea National Weather Service (PNGNWS) brings the overall project risk to moderate.</p>
Measures to address	<p>What mitigation measures have been developed to address the risk status? In bullet points</p> <ul style="list-style-type: none"> • Hiring of a full time project manager and • Support received from BoM and the Government of Australia through the Capacity Development Project (PNGCDP) that aims to increase the reliability of weather observations and to train PNGNWS staff. The PNGCDP project significantly increases the likelihood of success for CREWS PNG project with the provision of one additional full time staff in the country for several months.



12. Contributions to CREWS Output(s)

(use number for activities and products and % for project component completion)

11.1 National Output(s)

CREWS Output(s) 1: National Meteorological and Hydrological Services service delivery improved, including the development of long-term service delivery strategies and development plans				
State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for reporting period	Progress by December 2021
1.1 Integration of national meteorological, hydrological and climate observing systems in OSCAR/Surface, the official repository of surface-based observing stations and platforms metadata of WMO Integrated Global Observing System (WIGOS) - Assessments were made on how to increase some of the stations with low-cost AWS. These assessments and discussions will continue into Q1 2022.	100%	35%	35%	35%
1.2 Improved climate databases based on Australia Climate Data for the Environment (CliDE) activities - -The PNG NWS made the decision to retain CliDE (Climate Data for the Environment) as a stand-alone PC-based Climate Data Management System (CDMS) rather than move it to the cloud; the Climate and Oceans Support Program in the Pacific (COSPPac) has begun the process of purchasing necessary equipment. CREWS supported the cost of several PNGNWS staff to continue the Data Rescue work.	100%	50%	50%	50%
1.3 Implementation of enhanced climate database and climate data rescue - -The Data Rescue initiative started with PNGNWS calling for expressions of interests from interested individuals to be engaged on a part-time basis to assist with the data digitization.	100%	50%	50%	50%

<p>1.4 Adapt and implement Australian Climate and Weather Extremes Monitoring System to PNG for basic monitoring of drought, heavy rainfall and frost events - <i>-The functionality of the WMO Global Producing Centre for Long-Range Forecasts (GPC-LRF) Melbourne portal was enhanced and tested with users from PNG. High resolution sub-seasonal-to-seasonal (S2S) climate prediction products from the ACCESS-S (the Australian Community Climate Earth-System Simulator-Seasonal) and satellite precipitation estimates and derived products from SWCEM are now available to the PNG NWS and used for operational production of climate bulletins, Early Action Rainfall Watch, etc.</i></p>	100%	75%	75%	75%
<p>1.5 Develop NWP products from Global NWP centres including BOM for use in short-range forecasting – BOM provide PNG NWS with access to new high-quality NWP products from BoM ACCESS-G (the Australian Community Climate Earth-System Simulator-Global) model. BOM will continue to train PNG NWS staff.</p>	100%	70%	75%	75%
<p>1.6 Guidance about how to use sub-seasonal and seasonal forecasts (1week to 3 months) from Global Centers - <i>PNG-CDP developed a Moodle training program which includes Observations and Meteorological Weather Forecasting components, among others. During this reporting period, tablets were purchased by PNG-CDP and provided to PNG NWS staff. It is expected that Moodle training in NWP products and observation practices will be delivered to PNG NWS staff in 2022 using the tablets.</i></p>	100%	60%	70%	70%
<p>1.7 Develop an operational climate early warning system for drought – <i>The performance of the user-centred Integrated Early Warning System (I-EWS) for the months of April, May, June, July, August and September 2021 was tested; an evolution of staged</i></p>	100%	60%	60%	60%



<p>drought warnings from “DROUGHT CRITICAL” to “DROUGHT ALERT” and then to “DROUGHT WATCH” was observed in most provinces in PNG, as the 2020-2021 La Niña event has concluded in May 2021.</p>				
<p>1.8 Equipment including car, observing stations, data concentration, data management, forecasting and service production hardware, based on needs and assessment – A car was delivered in early 2021 but PNG NWS was able to take over the vehicle registration.</p>	100%	70%	70%	70%
<p>Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). <u>Please list in bullet points.</u></p> <ul style="list-style-type: none"> • Unique: Twinning with BoM and PNG NWS successfully continues with access to new high-quality NWP products and continuing BoM training of PNG NWS staff (Item 1.5). • Innovation and Solution-Oriented: BOM is providing access to PNG NWS to high-quality NWP products from BoM ACCESS-G (the Australian Community Climate Earth-System Simulator-Global) model (.1.5) • People-centered & Multiplier: Contined interactions with the BoM CDP Project, use of Moodle for training (item 1.6). 				

CREWS Output(s) 2: Risk Information to guide early warning systems and climate and weather service developed and accessible				
State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
<p>2.1. Catalog of maps of flood prone areas and flood causes, some to be addressed by</p>	100%	20%	20%	20%



SouthEastern Asia Oceanic FFG (SAOFFG) - <i>Discussion will occur in Q1 2022 on this issue.</i>				
2.2. Introducing impact-based drought forecasts and risk-informed warnings for improved decision making by the users - <i>The development of drought risk assessment for PNG using a region-specific Drought Risk Index (DRI) which integrates Drought Hazard Index (DHI), Drought Vulnerability Index (DVI) and Drought Exposure Index (DEI) has significantly progressed.</i>	100%	75%	75%	75%
<p>Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). <u>Please list in bullet points.</u></p> <ul style="list-style-type: none"> Innovation & Solution Oriented: Development of drought risk assessment for PNG using multiple indices and indicators (station data, remote-sensing and impacts; Item 2.2). 				

CREWS Output(s) 3: Information and Communication Technology, including common alerting protocol, strengthened				
State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
3.1. Enhanced multi-channel weather forecast and warnings communication systems – <i>Due to COVID-19, this activity has been delayed.</i>	100%	0%	0%	0%

Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.

None

CREWS Output(s) 4: Preparedness and response plans with operational procedures that outline early warning dissemination processes developed and accessible

State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
4.1. Pilot testing and evaluation of EWS based on prior stakeholder consultation - <i>The performance of the user-centred Integrated Early Warning System (I-EWS) for the months of April, May, June, July, August and September 2021 was tested; an evolution of staged drought warnings from "DROUGHT CRITICAL" to "DROUGHT ALERT" and then to "DROUGHT WATCH" was observed in most provinces in PNG, as the 2020-2021 La Niña event has concluded in May 2021.</i>	100%	50%	50%	50%

Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.

- Multiplier, People-Centered: The drought warnings are provided to national and international organizations which were particularly relevant during this La Nina event (item 4.1).

CREWS Output(s) 5: Knowledge products and awareness programmes on early warnings developed



State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
5.1. Assessment of user needs including PNG NWS and other stakeholders (through a series of 6 stakeholders' workshops)	100%	80%	80%	80%
5.2. Assessment of observation systems (meteo, hydro, climate) for early warning systems and recommendations on improvements	100%	50%	50%	50%
5.3. Assessment of national capabilities on flood / flash flood forecast for urban or near-by areas, some to be addressed by SouthEastern Asia Oceanic FFG (SAOFFG)	100%	40%	40%	40%
<p>Additional information: briefly indicate the contributions, with concrete examples, to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list bullet points.</p> <p>None</p>				

CREWS Output(s) 6: Gender-sensitive training, capacity building programmes provided				
State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
6.1. Training in statistics and basic tools for climate services - Training of PNG NWS staff in statistics and basic tools for better climate applications was conducted over six day during 22-24 June and 29 June – 1 July 2021. Eight staff from the PNG NWS	100%	50%	60%	60%



attended the training and evaluated it as highly relevant and very useful.				
6.2. Training in preparing and interpreting the forecasts	100%	60%	60%	60%
6.3. Training on multi-channel forecast and warnings communication systems	100%	50%	50%	50%
6.4. Training on climate data management and data rescue	100%	60%	60%	60%
6.5. Training on OSCAR/Surface	100%	0%	0%	0%
6.6. Training on climate extremes monitoring and drought forecast	100%	50%	60%	60%
6.7. Management training	100%	40%	40%	40%
6.8. Gender analysis to identify opportunities and include specific interventions to promote gender equality in EWS	100%	10%	10%	10%
6.9. Development and implementation of a gender action plan to ensure gender-specific activities are identified and implemented. The action plan will be discussed at the kick-off meeting and will be integrated into the project work plan.	100%	0%	0%	0%
<p>Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). Please list in bullet points.</p> <ul style="list-style-type: none"> • Multiplier and Promote coherence: Some of the training with PNG NWS staff was done in conjunction with other projects (item 6.1, 6.2)- 				



Regional Output(s) (for Regional Projects)

CREWS Regional Output(s): Institutional and human capacities at Regional WMO and Intergovernmental organizations to provide regional climate and weather services to LDCs and SIDS increased				
State Project Output(s) in this section	Overall Project Target	Progress by July 2021	Target for the reporting period	Progress by December 2021
Development of draft drought EWS was given to international organizations for consideration of La Nina impacts. Project outputs were directly linked to this activity (Item 4.1).	100%	0%	40%	40%
<p>Additional information: briefly indicate, with concrete examples, the contributions to CREWS value propositions (gender-responsive, multiplier, people-centered, promote coherence, solution-oriented, unique), as relevant (150 – 200 words). <u>Please list in bullet points.</u></p> <ul style="list-style-type: none"> • Multiplier, People-Centered: The drought warnings are provided to national and international organizations which were particularly relevant during this La Nina event (item 4.1). 				

13.Certification on Use of Resources

This is for authorized representatives from the Implementing Partners to certify that the resources allocated are used for their intended purpose. Please fill one table per Implementing Partner.

A certification from WMO was already submitted.



14. Visibility products

a. Insert or copy any links to press releases, videos or communication items and/or social media links produced during the reporting period only

- Achievements of the project were presented at Asia Oceania Geosciences Society (AOGS) meeting on 1-6 August 2021. Presentations included synergies with WMO Space-based Weather and Climate Extremes (SWCEM) and development of NWP product and experimental drought products for PNGNWS.
- Manuscript on user-centred I-EWS for drought for PNG was prepared for and was accepted by *Remote Sensing* journal (IF 4.848).

15. Supporting documents

a. List and annex to the report any documents providing details on project activities conducted during the reporting period such as reports of training sessions, assessment reports, online solutions and tools, manuals, summaries of high-level discussions etc.

- Manuscript on user-centred I-EWS for drought for PNG was prepared for and was accepted by *Remote Sensing* journal (IF 4.848).

16. Project History

a. Highlight key achievements since project started in bullet points, include all visibility and supporting documents other than those from the last 12 months

- Letters of Agreement have been signed with the PNG National Weather Service (NWS, 28 Nov 2018) and Bureau of Meteorology of Australia (BoM, 29 Nov 2018).
- These agreements were amended to reflect the extension of the project to July 2022. This process started in Nov/Dec 2021 and is expected to be completed in Feb 2022.