

Climate Risk and Early Warning Systems (CREWS) for Pacific Island Nations:

Droughts, Floods, and Tropical Cyclones

CREWS Members



Australia



Finland



France
(Chair)



Germany



Luxembourg



Netherlands



Switzerland



United
Kingdom

Panelists

- Mr Kasis Inape, PNG National Weather Service
- Ms Kila Kila, PNG National Weather Service
- Mr Richard Higgins, PNG Disaster Management Team
- Mr John Harding, CREWS Secretariat
- Prof Yuriy Kuleshov, Bureau of Meteorology and Royal Melbourne Institute of Technology (RMIT) University, Australia

Content

- CREWS (Climate Risk and Early Warning Systems)
- ICCAI (International Climate Change Adaptation Initiative)
- WMO SWCEM (Space-based Weather and Climate Extremes Monitoring)
- Climate Risk Assessments
 - ✓ Tropical Cyclones
 - ✓ Floods
 - ✓ Drought
- Drought Early Warning System for PNG
- Recommendations



Early Warning and Early Action

UN unveils ambitious target to adapt to climate change and more extreme weather



“

We must boost the power of prediction for everyone and build their capacity to act. On this World Meteorological Day, let us recognize the **value of early warnings and early action** as critical tools to reduce disaster risk and support climate adaptation.

”

António Guterres

Secretary-General of the United Nations

CREWS

- Developing and least developed countries are particularly vulnerable to the impact of climate extremes, including droughts, floods, and tropical cyclones.
- Recognizing the urgency of enhancing early warning systems to assist vulnerable countries with climate change adaptation, the Climate Risk and Early Warning Systems (CREWS) international initiative has been established at COP-21 in Paris in 2015.



CREWS



“ CREWS has proven that it is on the ground and efficient, **saves thousands of lives**, and saves millions in assets. ”



— Stéphane Crozet, French Climate Ambassador, Remarks at the Climate Adaptation Summit Disaster Risk Management Anchoring Event 25 January 2021



CREWS has already supported 73 countries through

- 9 country projects
- 7 regional projects
- 1 global project.



CREWS PNG



- In Papua New Guinea (PNG), severe drought caused by the strong El Niño in 2015-2016 affected about 40% of the population, with almost half a million people impacted by food shortages.
- To build resilience to impact of future droughts, PNG NWS and Australian BoM, in partnership with the WMO, implemented CREWS project (2018 – 2022) developing
 - ✓ drought risk assessment, and
 - ✓ EWS for drought

ICCAI

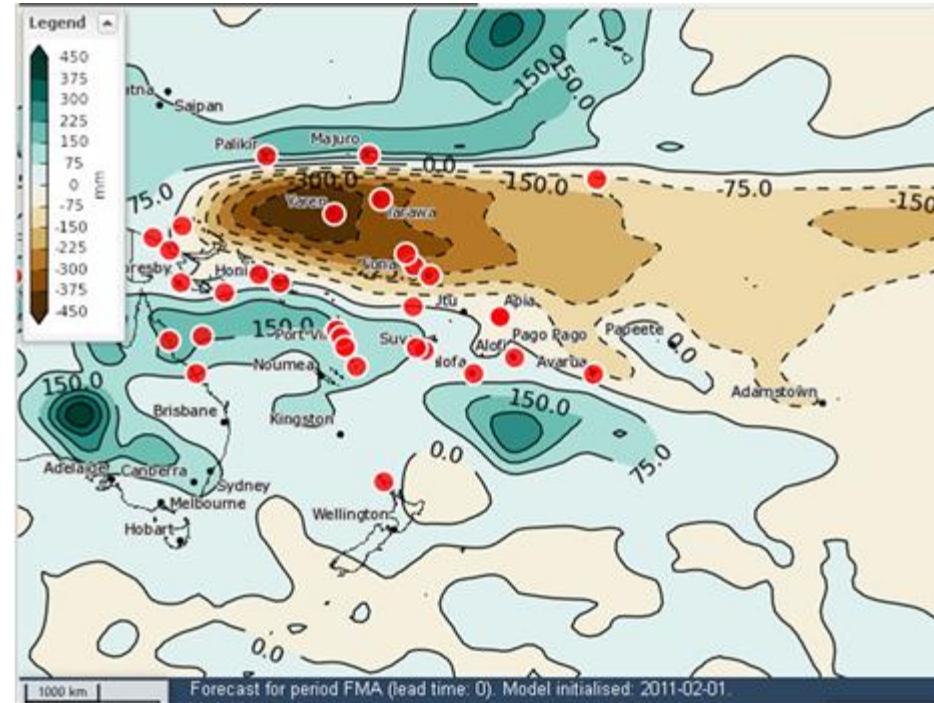


- For decades, the Australian BoM assists NMHSs in the Pacific, including PNG, with strengthening capacity of Climate Information Services.
- ICCAI (International Climate Change Adaptation Initiative), DFAT, (2008 – 2012)
 - ✓ PCCSP (Pacific Climate Change Science Program)
 - ✓ PASAP (Pacific Adaptation Strategy Assistance Program)
 - ✓ PACCSAP (Pacific-Australia Climate Change Science and Adaptation Planning Program)
- Climate and Oceans Support Program in the Pacific (COSPPac), and Climate Information Services for Resilient Development in Vanuatu (Van-KIRAP).
- Climate Science brought concrete adaptation solutions and improved proactive approach for preparedness to natural hazards.

ICCAI

In 2011, La Niña-induced drought in the Pacific; Tuvalu was particularly seriously impacted.

On the 28 September 2011, the Government of Tuvalu declared a state of emergency due to critically low water supplies; urgent delivery of fresh water supplies and portable desalination plants.



Prediction of seasonal rainfall anomalies in the South Pacific region. The seasonal forecasts issued in February 2011 for three-month period (Feb-March-April).

WMO GPC LRFs



World Meteorological Organization Global Producing Centre for Long-Range Forecasts
Melbourne

[About ACCESS-S](#) | [About GPCs](#)

Seasonal and inter-annual climate variability poses a major risk to many parts of our global society, the economy and the environment. The risks are particularly significant for Pacific Island Countries and compounded by human caused climate change which interacts with natural climate variability. This website provides dynamical model based climate outlooks, with an emphasis on the southwest Pacific Region.



World Meteorological Organization (WMO) Global Producing Centre (GPC) for Long-Range Forecasts



Development supported via DFAT-funded COSPPac and WMO-funded CREWS

ACCESS-S and Pacific climate monitoring charts

| Category | Domain | Period | Variable |
|-------------------|----------|--------------------------------------|----------|
| ACCESS-S outlooks | PNG | Week | Rain |
| PNG CREWS | Forecast | Week Fortnight Month Season | Anomaly |

Week
Fortnight
Month
Season

Rain
Tmax
Tmin

Related links

- [Download files](#)
- [Download global NetCDF data](#)
- [Download guidance documents](#)
- [BoM Climate Driver Update](#)

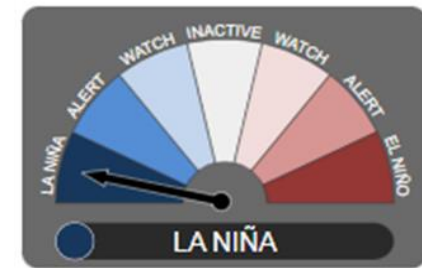
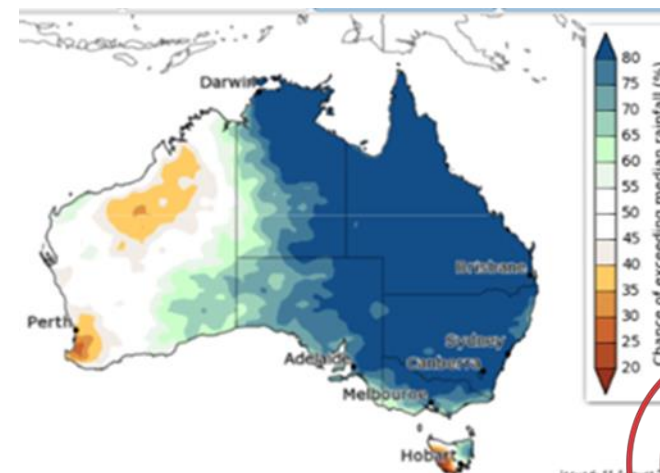
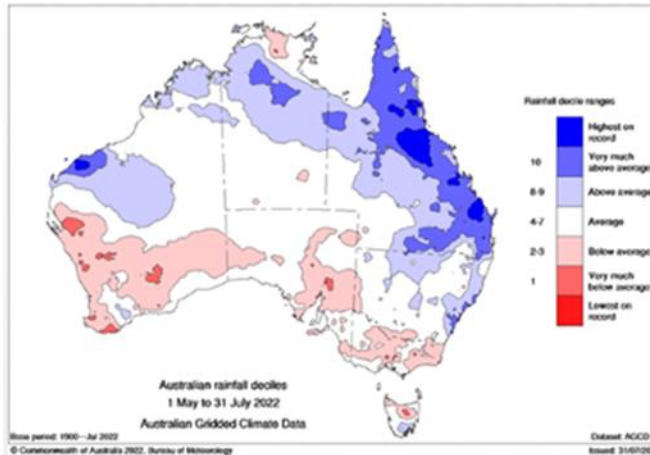
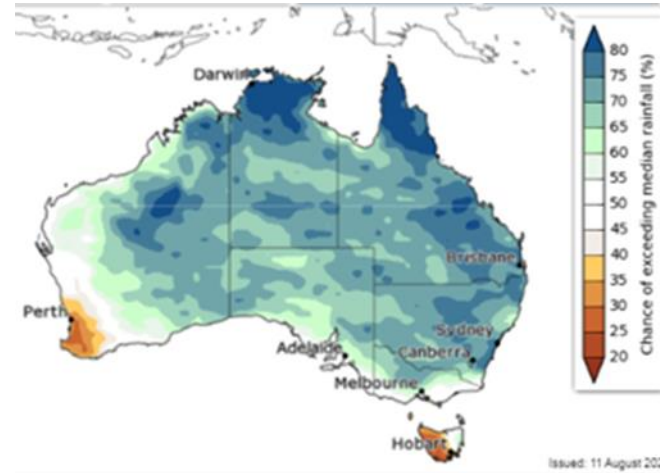
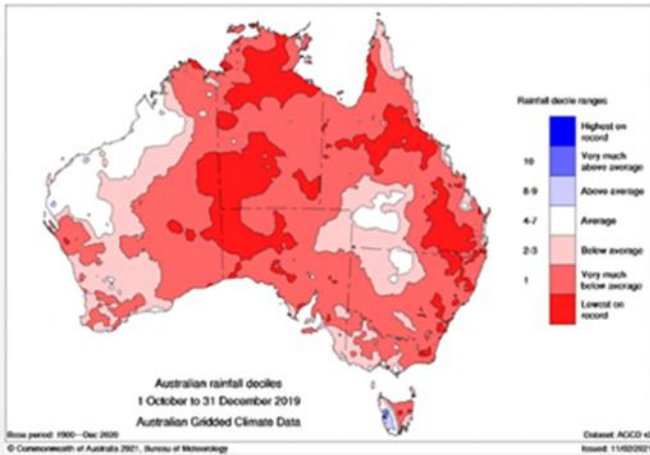


Bureau of Meteorology Climate Information Service

The screenshot shows the Bureau of Meteorology website. The header includes the Australian Government logo, the Bureau of Meteorology name, and navigation links for HOME, ABOUT, MEDIA, CONTACTS, and a search bar. Below the header, there are regional links for NSW, VIC, QLD, WA, SA, TAS, ACT, NT, AUSTRALIA, and ANTARCTICA. The main content area is titled 'Long-range weather and climate' and features a large blue banner with the text 'Climate outlooks – more outlooks' and 'New "Chance of 3-day totals" maps, a...'. Below the banner, there is a list of news items with small images and text: 'Monthly, seasonal, annual and event summaries. Climate reports and summaries', 'Cold fronts bring rain to southern Australia Weekly rainfall report, 15 August 2022', 'A negative Indian Ocean Dipole event under way Tropical Climate Update 9 August 2022', 'Wetter than average September to November likely for the eastern half of Australia, drier for western Tasmania and parts of Western Australia; warmer days likely across the tropics, west coast, Tasmania and southern Victoria, but cooler in the east and central Australia; warmer nights generally likely nationwide. Rainfall and temperature outlooks 18 August 2022', 'La Niña ALERT—chance of La Niña increases Climate Driver Update 16 August 2022', and 'Rainfall deficiencies persist in Tasmania and NT and worsen in south eastern SA and WA Goldfields Drought statement 4 August 2022'. On the left side, there is a vertical navigation menu with categories: Climate, Outlooks & drivers, News & reports, Weather station data, Data services, Maps – history to now, Maps – averages, Climate change, Extremes and records, and About Australian climate. At the bottom, there are sections for 'Latest outlook video' and 'ENSO Outlook'.



Bureau of Meteorology Climate Information Services



ENSO
Outlook

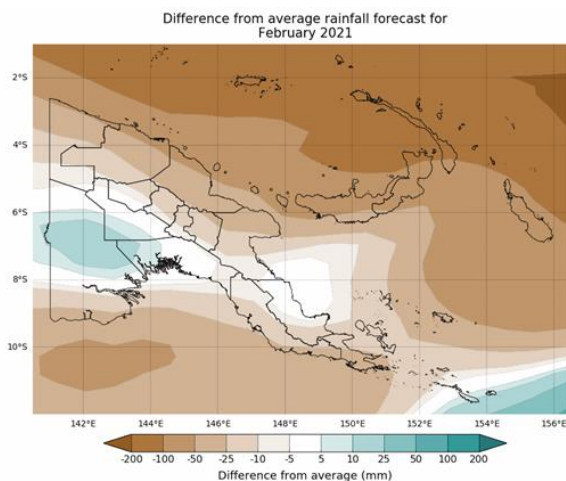
Rainfall Monitoring

Rainfall Outlook

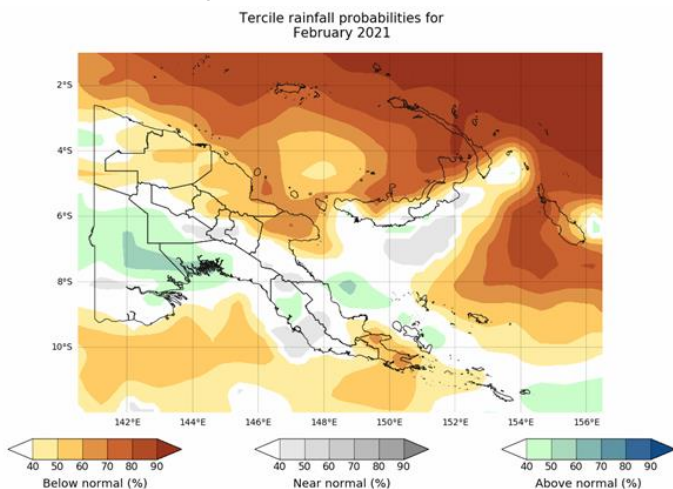


WMO GPC LRFs: National and Regional Products

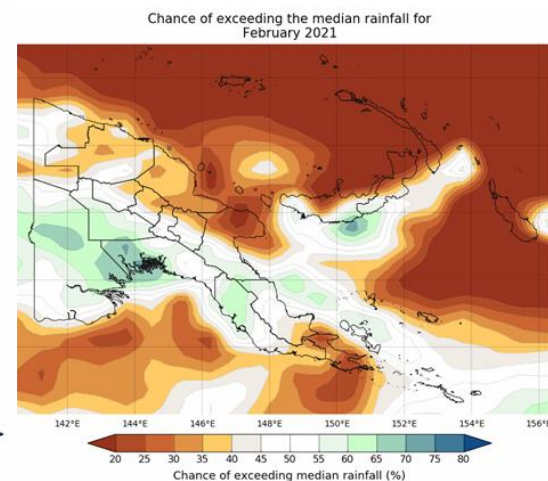
Difference from average rainfall



Tercile rainfall probabilities



Chance of exceeding the median rainfall

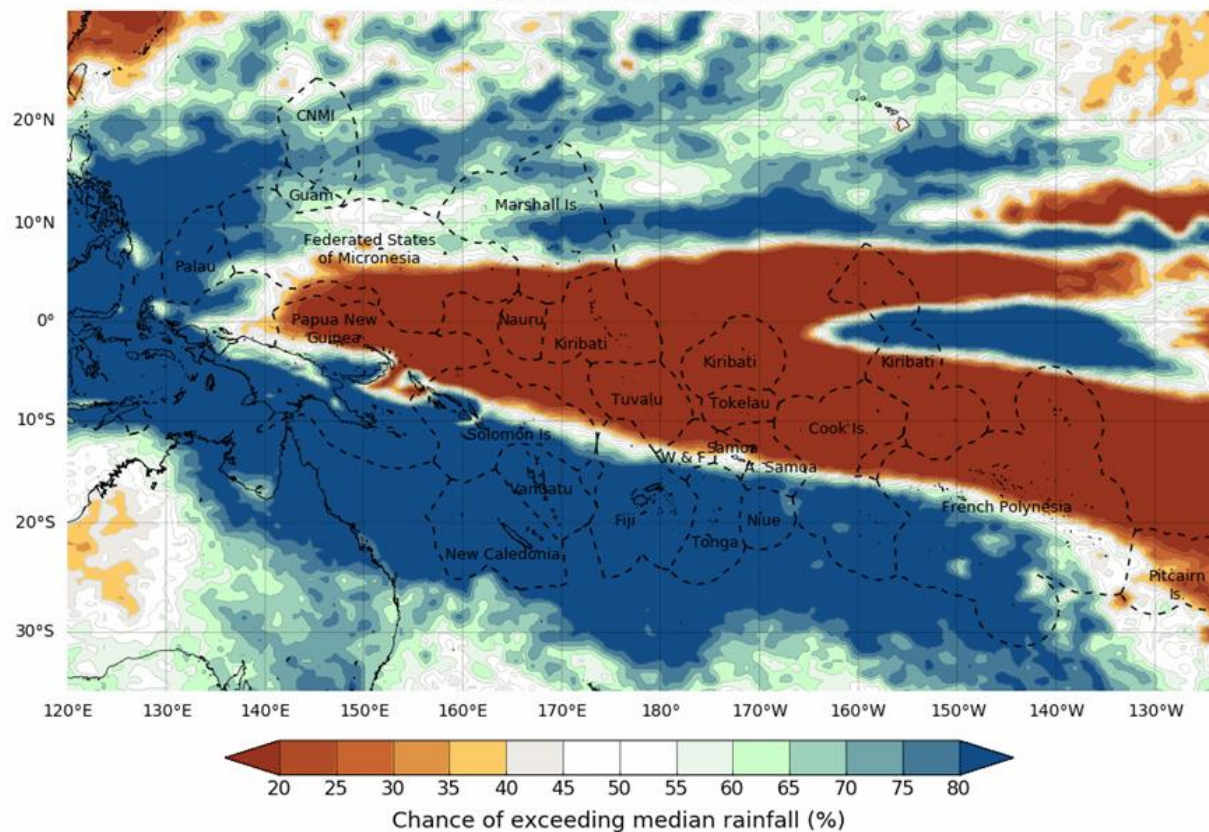
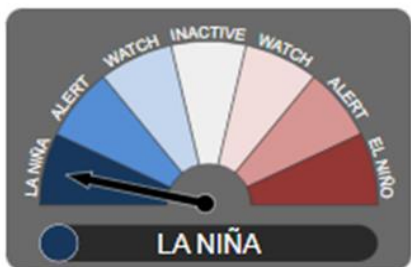


- In addition to global products, WMO GPC LRFs disseminates regional and national climate prediction products.
- Such products are now used by NMHSs in the Pacific, including the PNG NWS, in operations, e.g., for production of Climate Outlooks etc.

WMO GPC LRFs: Pacific Regional Products



Chance of exceeding the median rainfall for
October to December 2022



Base period: 1981-2018
Model: ACCESS-S2

© Commonwealth of Australia 2022, Australian Bureau of Meteorology

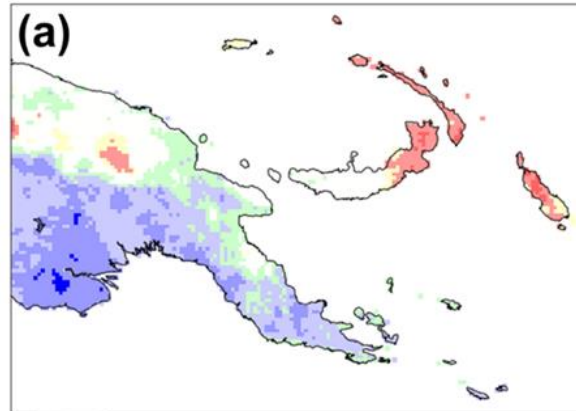
Shapefile data extracted from Flanders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at <http://www.marinerregions.org/>.

Model run: 05/09/2022
Issued: 08/09/2022

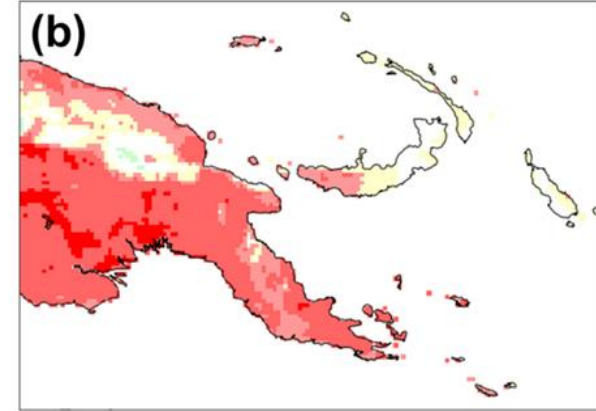
ENSO Impact on Rainfall over PNG

a) La Niña

b) El Niño



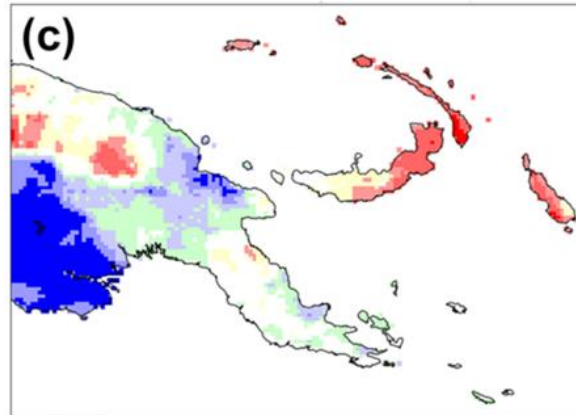
Base period: 1980 to 2020
La Niña years: 1988, 1989, 1995, 1998, 1999, 2000, 2007, 2010, 2011, 2020



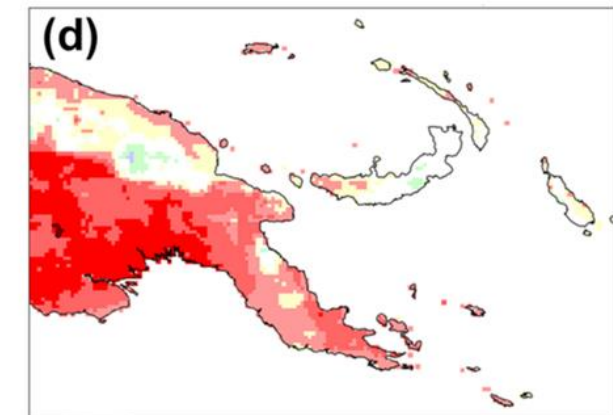
Base period: 1980 to 2020
El Niño years: 1982, 1987, 1991, 1992, 1994, 1997, 2002, 2006, 2015

c) La Niña & "-" IOD

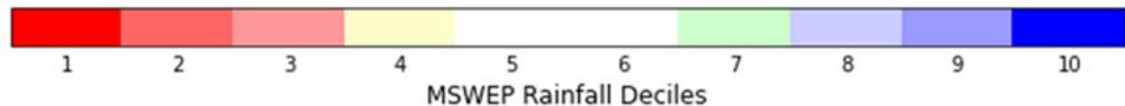
d) El Niño & "+" IOD



Base period: 1980 to 2020
Negative IOD and La Niña years: 1989, 1998, 2010



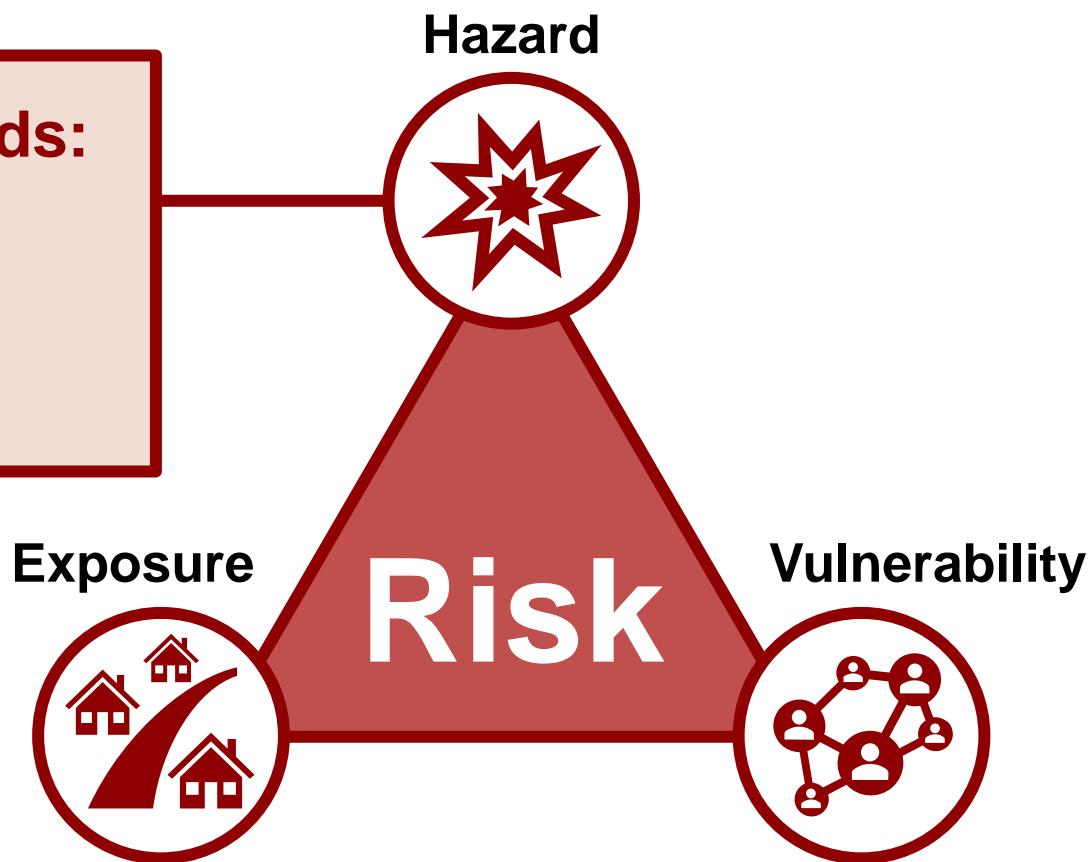
Base period: 1980 to 2020
Positive IOD and El Niño years: 1982, 1994, 1997, 2006, 2015



Climate Risk Assessment

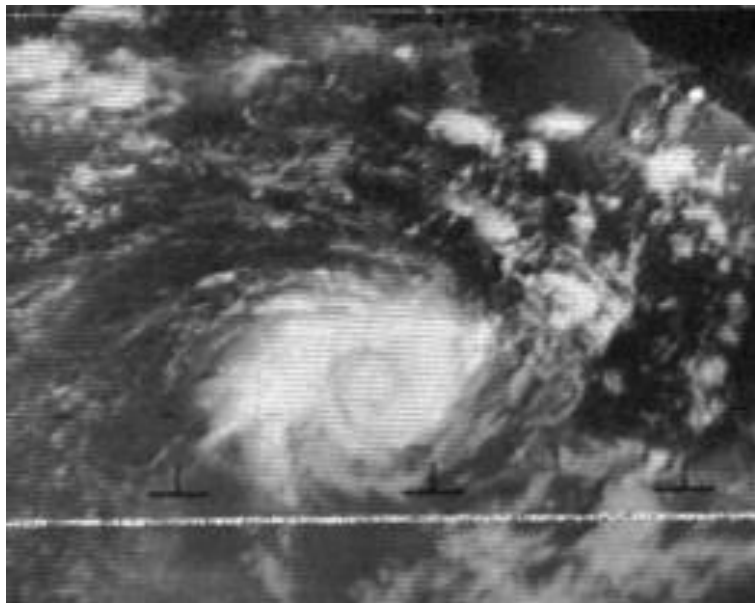
Climate Risk - Hazards:

- Droughts
- Floods
- Tropical Cyclones



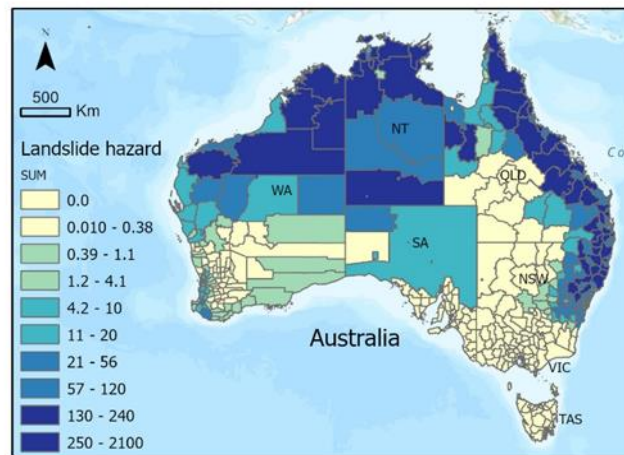
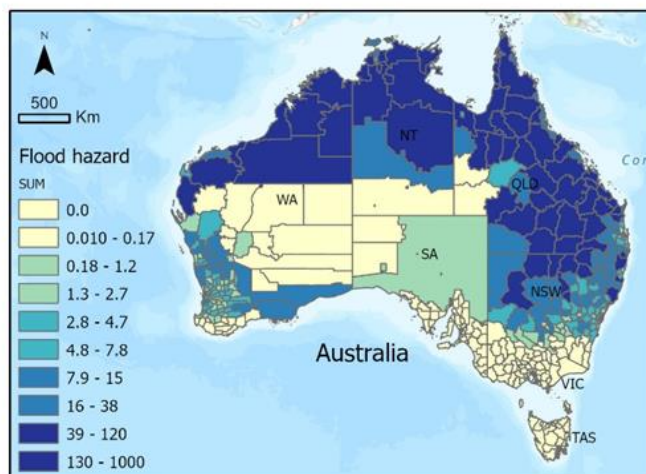
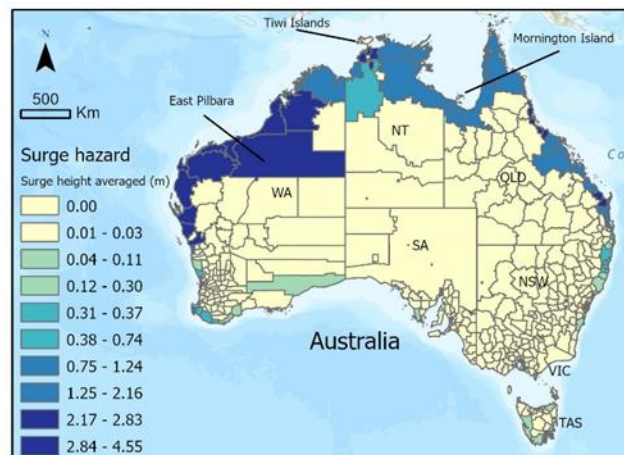
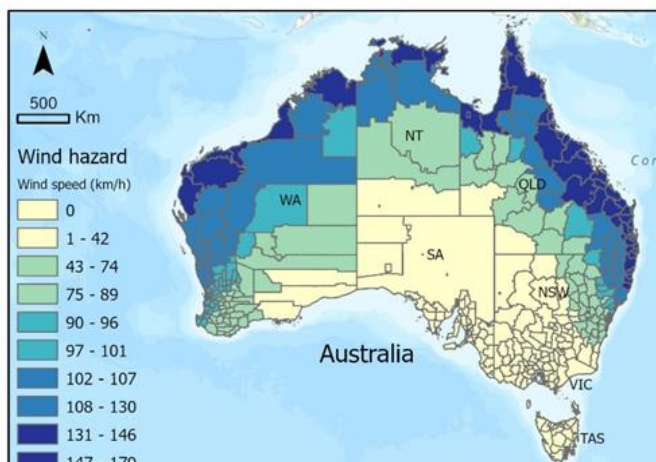
$$\text{Risk} = \text{Hazard} \times \text{Exposure} \times \text{Vulnerability}$$

Climate Risk Assessment: Tropical Cyclones

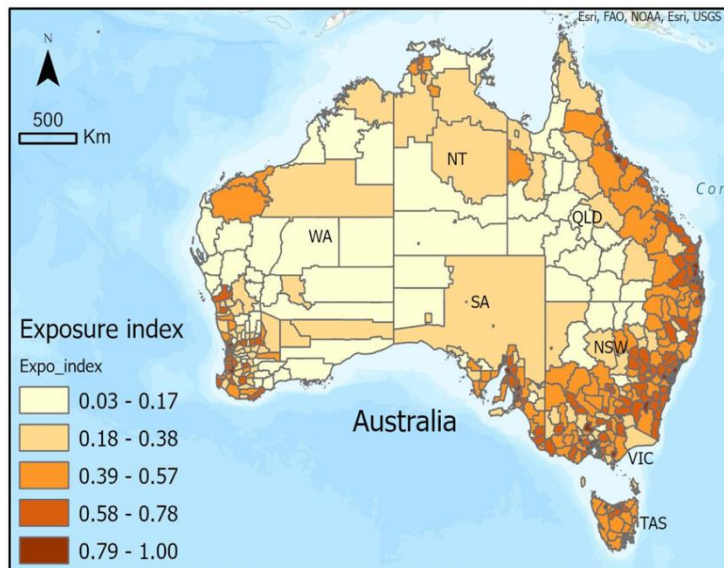


TC ***Tracy*** devastated the city of Darwin, Australia, in December 1974; killed 71 people and destroyed 80 % of the city.

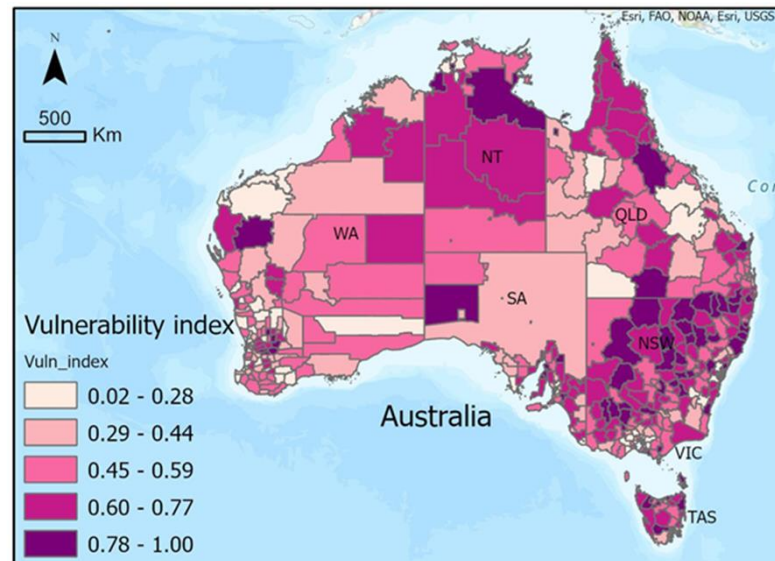
Climate Risk Assessment: Tropical Cyclones – Hazards



Climate Risk Assessment: Tropical Cyclones - Exposure and Vulnerability

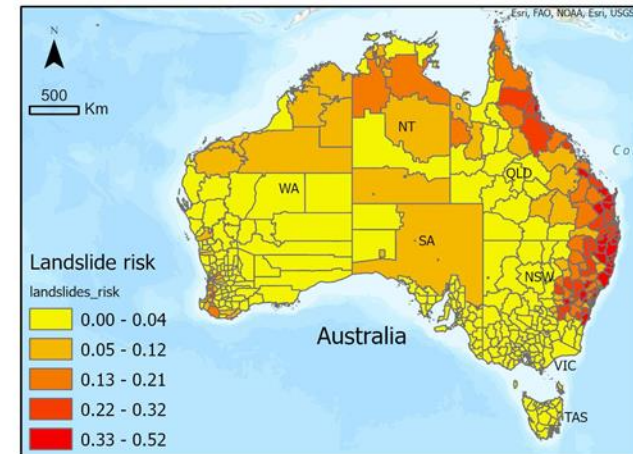
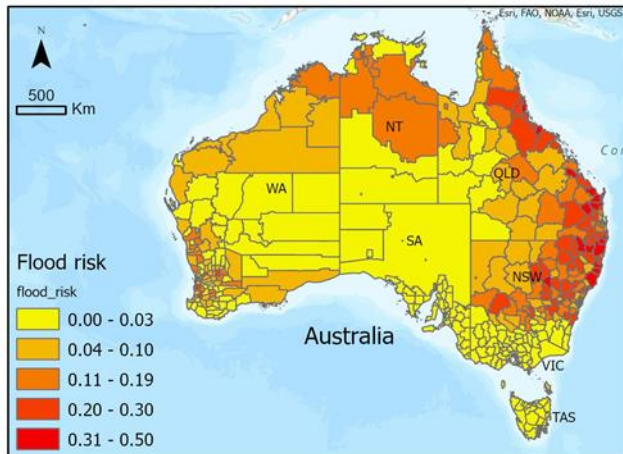
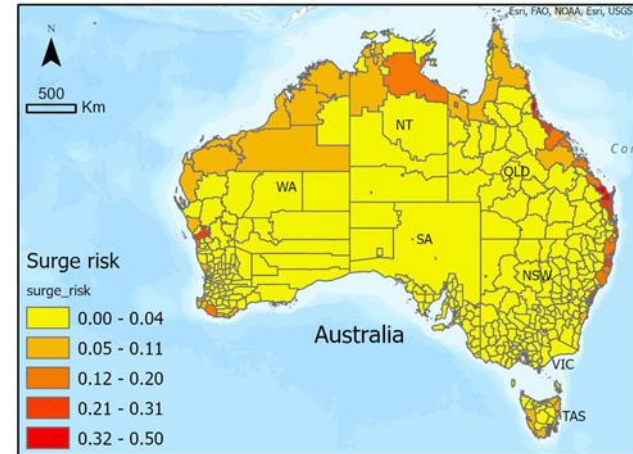
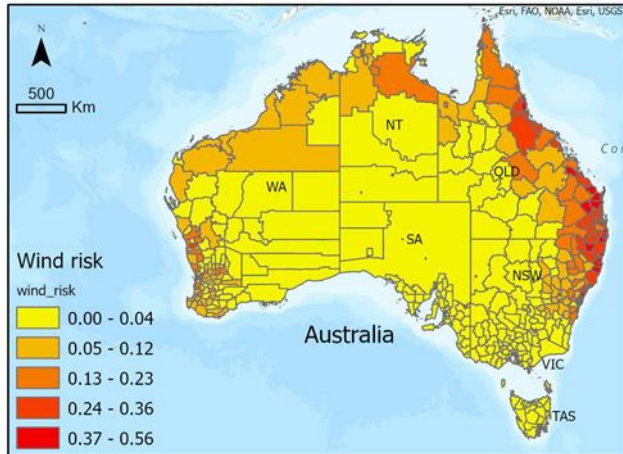


Exposure index map based on population, hospital, substation, and powerline density



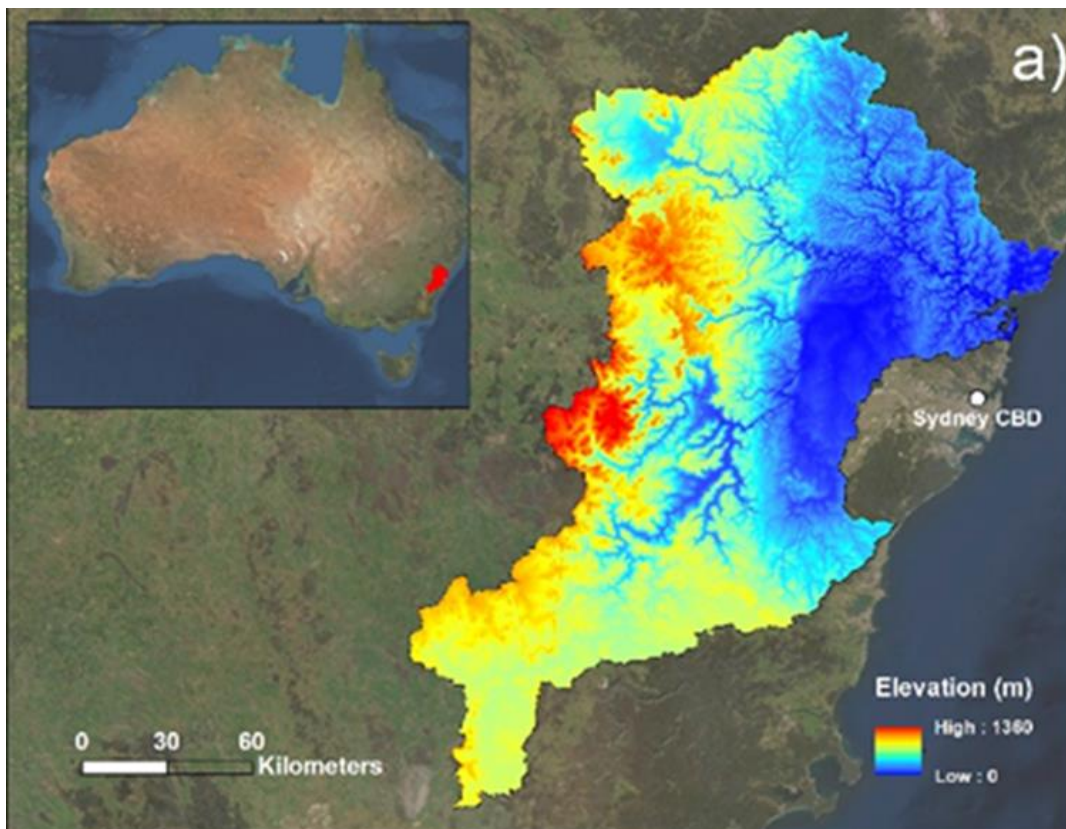
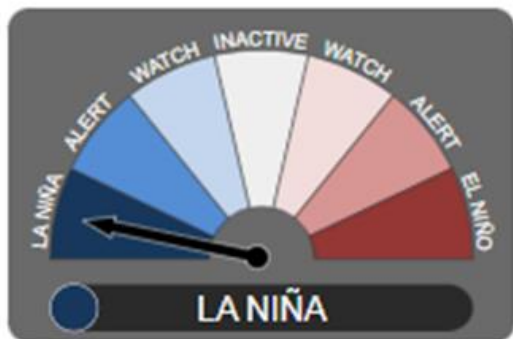
Vulnerability index map based on IRSD (Index of Relative Socioeconomic Disadvantage), vulnerable age groups etc.

Climate Risk Assessment: Tropical Cyclones – Risk

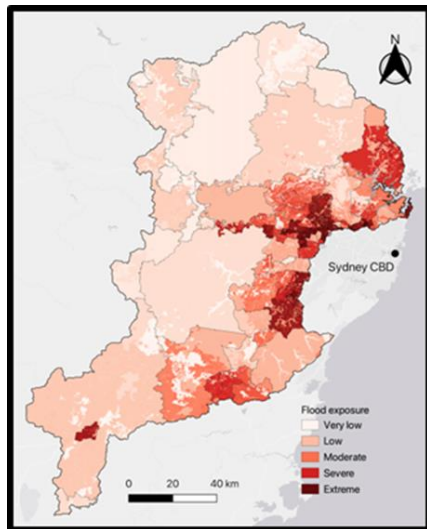


Tropical Cyclone Risk: Wind, Storm Surge, Flood, Land Slides

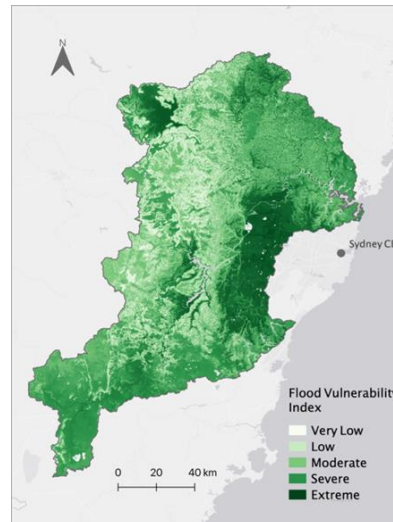
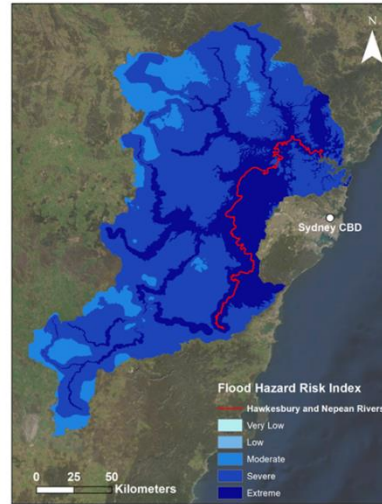
Climate Risk Assessment: Floods



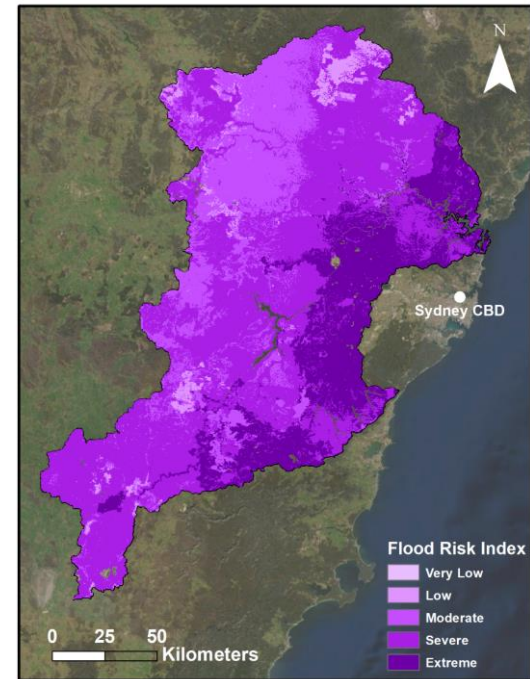
Climate Risk Assessment:



Maps of the flood hazard, exposure and vulnerability



Flood Risk



Flood Risk – Hazards, Exposure and Vulnerability

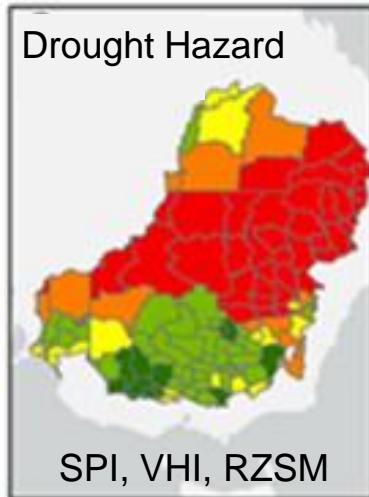
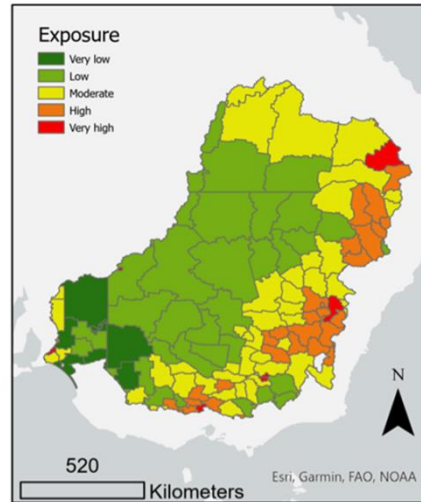
Climate Risk Assessment: Drought



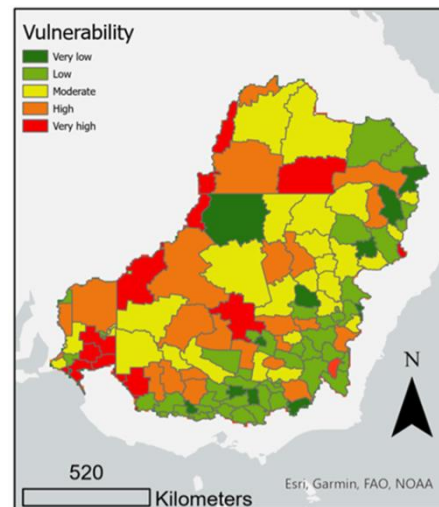
- A region of agricultural significance in south-eastern Australia is the Murray Darling Basin (MDB)
- Contributes to approximately 40% of national agricultural production
- The Millennium Drought (1997-2009) and the 2017-2019 drought

Climate Risk Assessment:

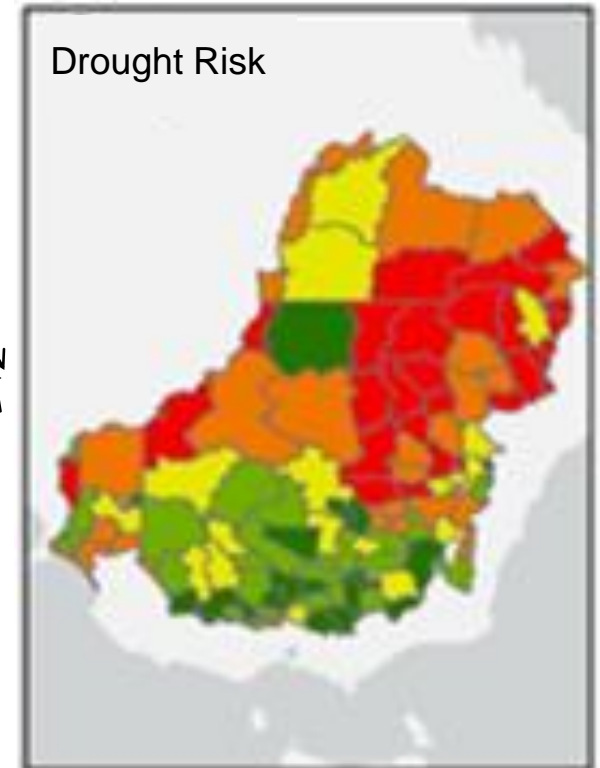
Drought exposure (population density, land use, and elevation) of the MDB LGAs.



Drought vulnerability (agricultural occupation, Socio-Economic Indexes for Areas (SEIFA) etc.) of the MDB LGAs.



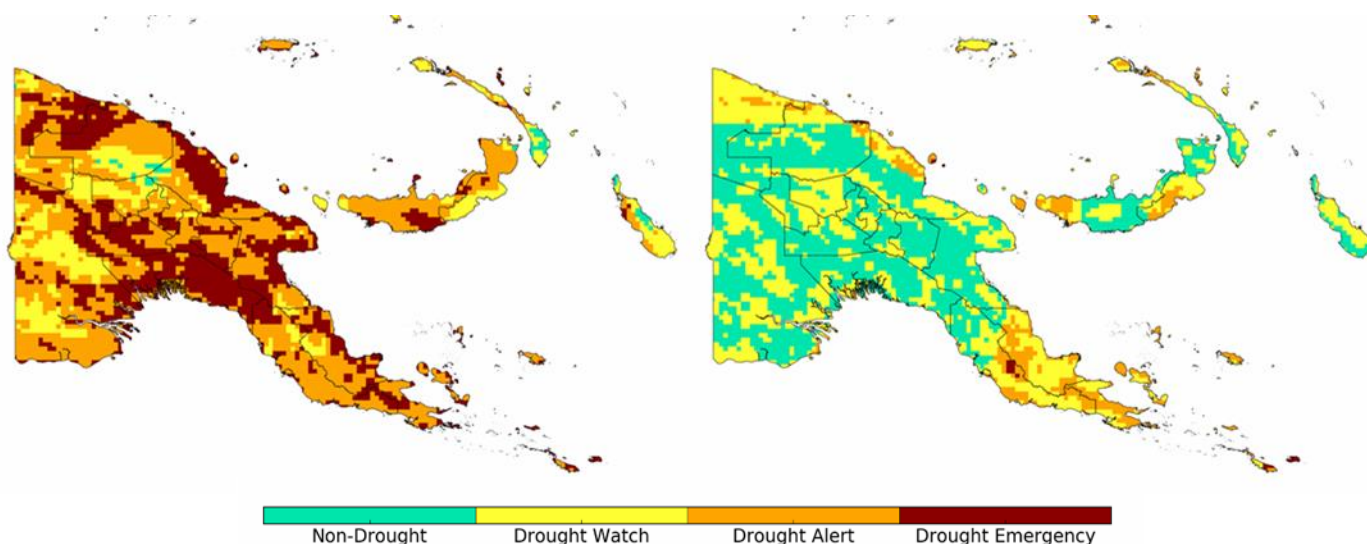
Drought Risk



Drought Risk in the Murray-Darling Basin in September 2019 based on hazard, exposure and vulnerability.

CREWS PNG

The CREWS-PNG project developed drought monitoring and early warning system (EWS) for Papua New Guinea.



Enables better strategic decision making for agriculture, water management, and other climate-sensitive sectors.

Climate Hazards in PNG



- Papua New Guinea (PNG) is a country in the Southwest Pacific with over 9 million people; agriculture provides a subsistence livelihood for 85% of the population.
- PNG, the largest of the Pacific Island Countries, faces multiple climate-related challenges.
- Hydro-meteorological natural disasters, as well as gradual shifts in climatic and oceanic conditions, already pose significant risks to PNG disrupting daily life, causing damage to assets and infrastructure, destroying livelihoods, and killing or injuring people.

The 2015-2016 Drought in PNG

Staple sweet potato crops in the highlands were severely damaged by frosts in August 2015 which also destroyed wild plants that are usually eaten as a supplement source of food.

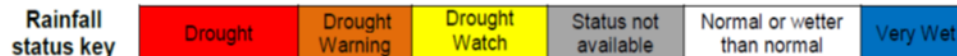
Sweet potatoes gardens completely destroyed by frost in a village garden near Sirunki in Enga Province.



Climate Information Services in PNG



| | 12-month period January to December 2020 | 9-month period April to December 2020 | 6-month period July to December 2020 | 3-month period October to December 2020 |
|--------------|---|--|---|---|
| Goroka | | | | |
| Madang | | | | |
| Wewak | | | | Very Wet |
| Nadzab | | | | Very Wet |
| Vanimo | | | | |
| Kavieng | Drought | Drought | Drought Watch | Drought Watch |
| Momote | Drought | Drought | Drought | |
| Port Moresby | | | | |
| Misima | | | | |



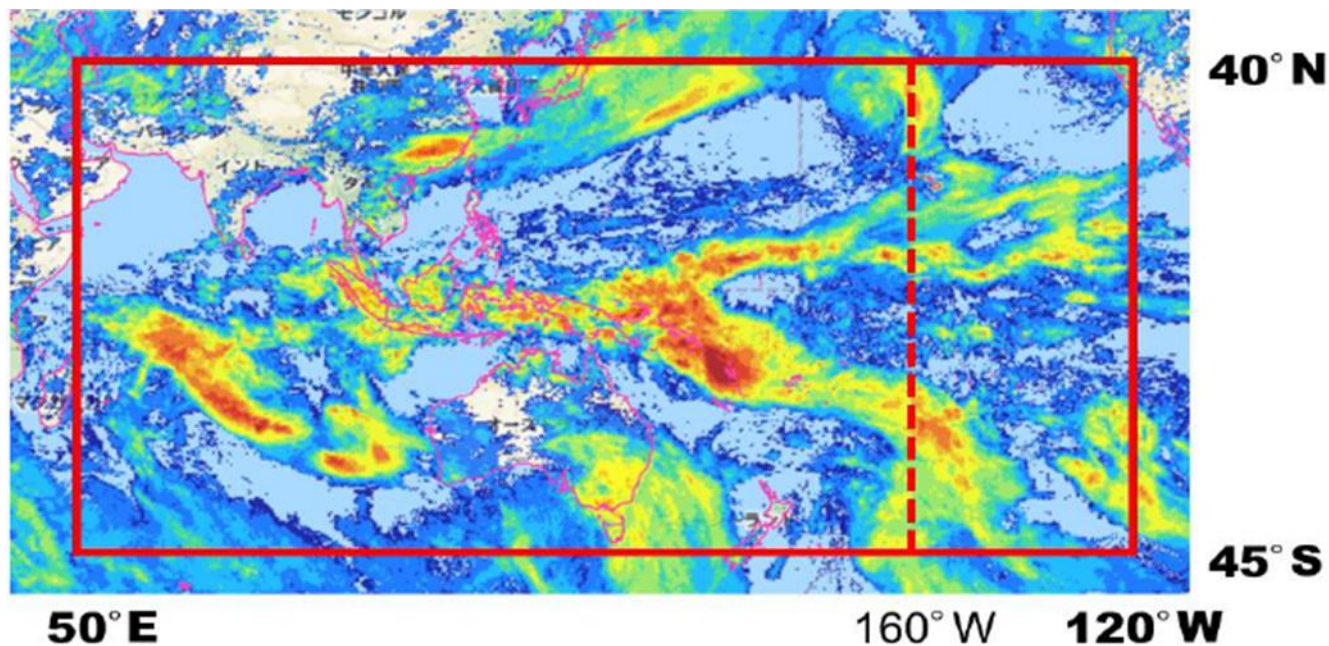
Rainfall observations: 13 weather and climate stations and 7 rain gauge stations; inadequate to accurately capture the complex spatial distribution and variability of rainfall across the country.

WMO SWCEM



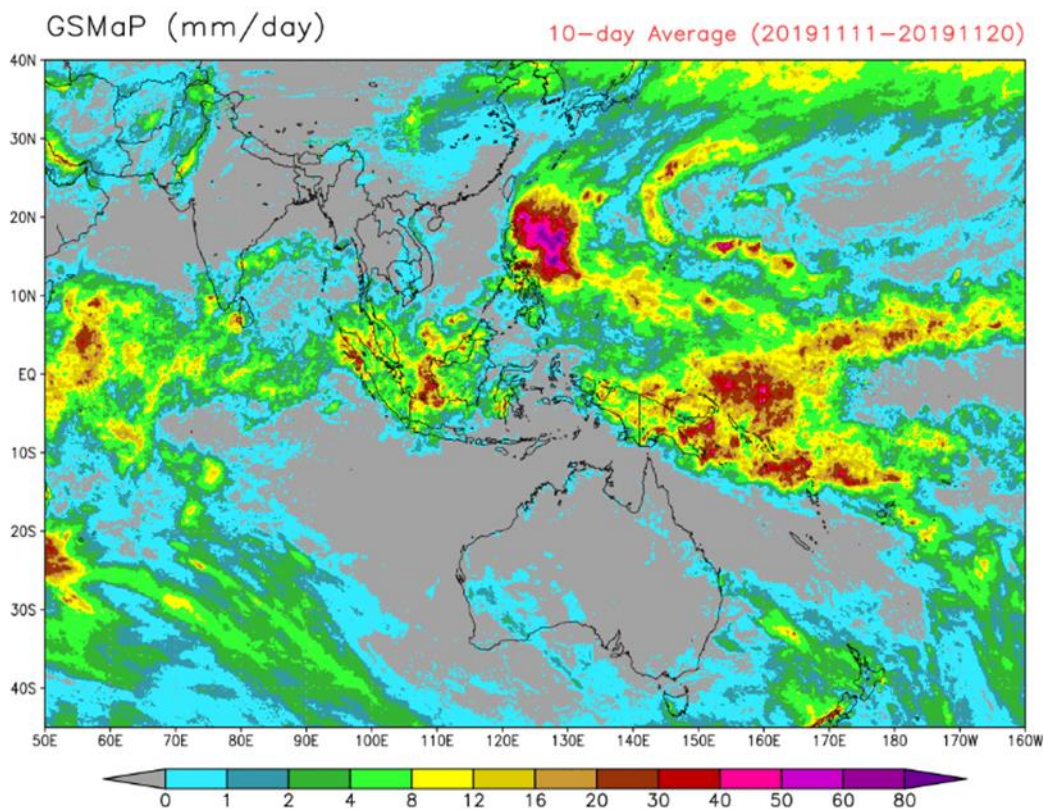
- CREWS-PNG was implemented in partnership with the World Meteorological Organization's (WMO) Space-based Weather and Climate Extremes Monitoring (SWCEM).
- WMO established the SWCEM flagship initiative, recognizing needs to better utilize and improve monitoring of weather and climate extremes from space to complement surface-based observations.

SWCEM Implementation in Asia-Pacific



SWCEM in Asia-Pacific - monitoring drought and heavy precipitation, implemented in geographical domain 40°N to 45°S; 50°E to 120°W.

SWCEM Operational Products



JAXA and NOAA

Mean precipitation estimates

- hourly
- daily (00-23UTC)
- pentad (5-day)
- weekly (Monday– Sunday)
- 10-days
- monthly

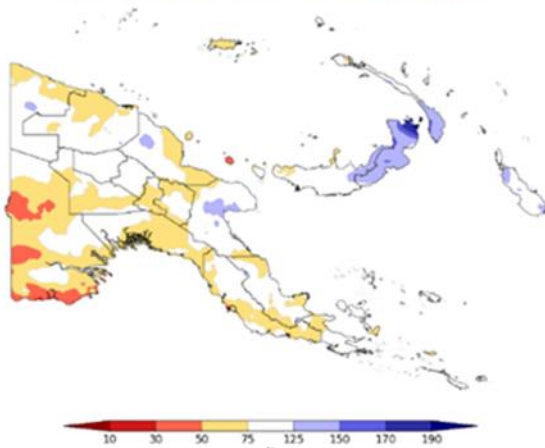
Statistics:

- Climate normal
- 90th ~ 99th Percentiles
- Percentage of rainy days (≥ 1 mm/day) in a month

Indices: SPI, NDVI, VHI

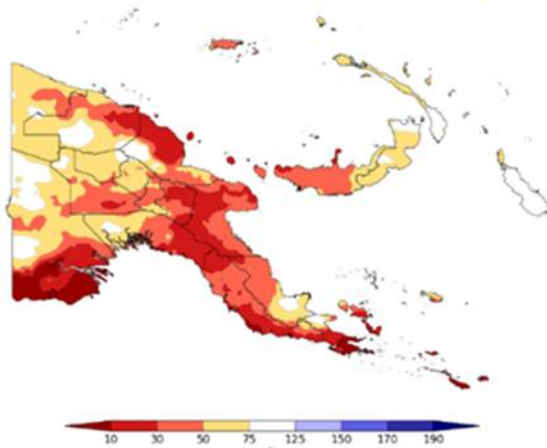
Drought Monitoring Using SWCEM Products: PNG

3-month total rainfall % of normal ending June 2015



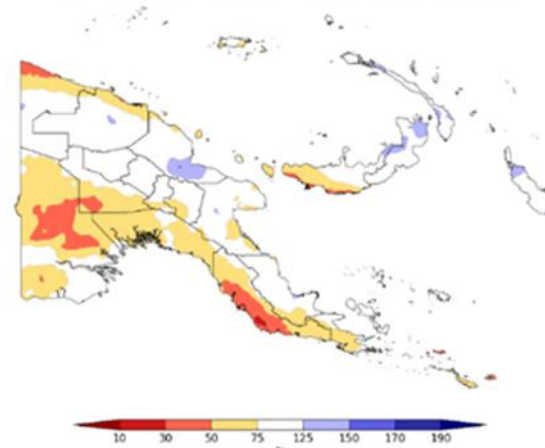
a

3-month total rainfall % of normal ending August 2015



b

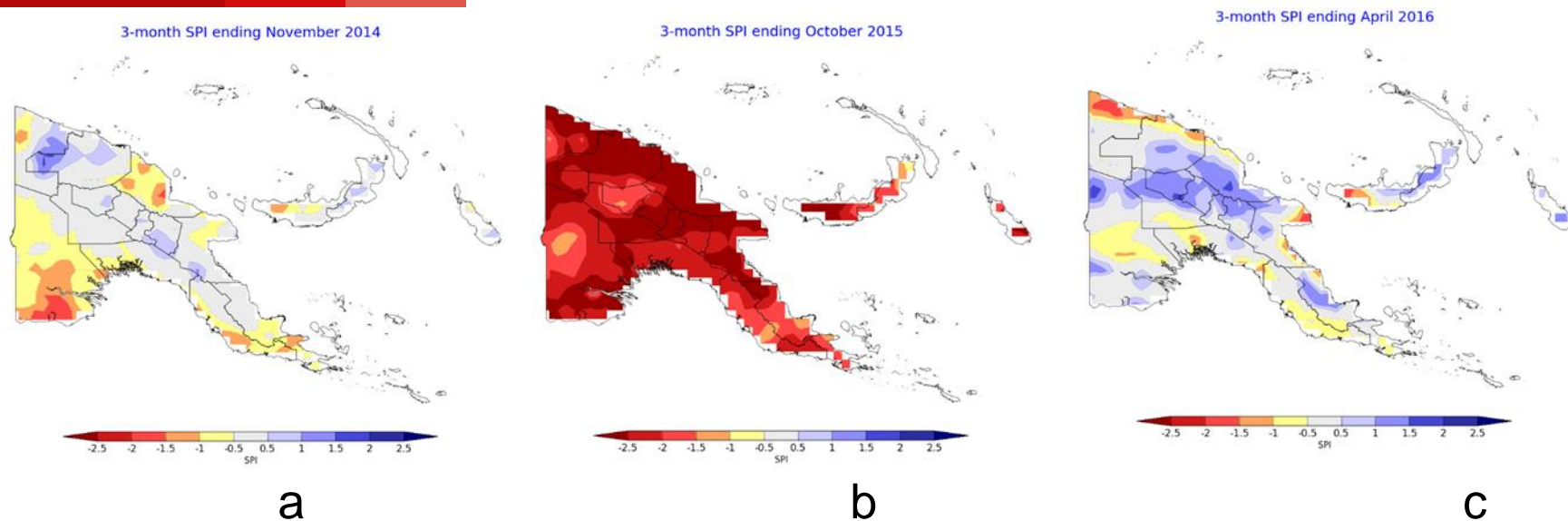
3-month total rainfall % of normal ending February 2016



c

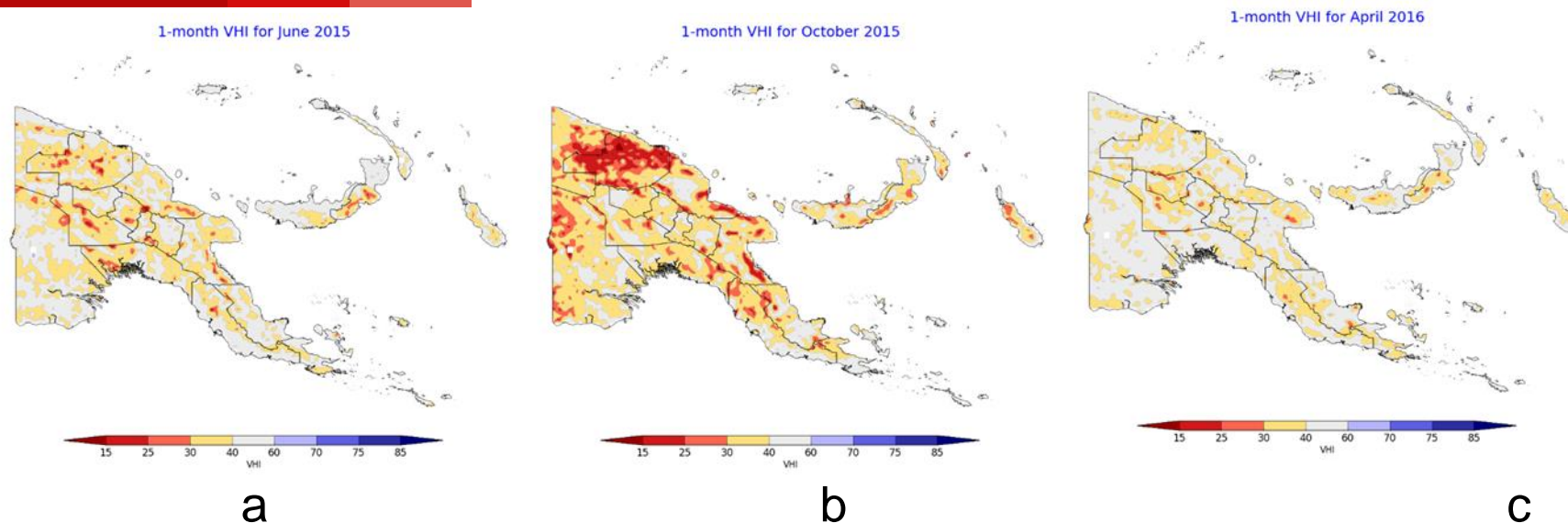
3-month rainfall percentages of normal depicting (a) onset of meteorological drought conditions in PNG in June 2015, (b) peak of drought in August 2015 and (c) easing of drought in February 2016.

Drought Monitoring Using SWCEM Products: PNG



3-month SPI showing the progression of drought event in PNG: (a) November 2014 - initial signs of dry conditions towards the southeast of the mainland; (b) October 2015 - widespread severely dry conditions; (c) April 2016 - the easing of dry conditions.

Drought Monitoring Using SWCEM Products: PNG

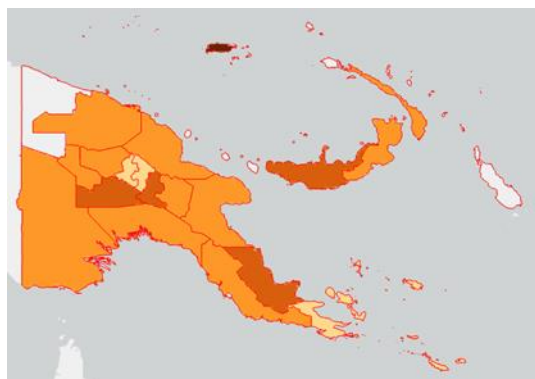


1-month VHI values showing the progression of the 2015-2016 drought event in PNG: (a) June 2015 - the beginning of below-average vegetation health; (b) October 2015 - widespread areas of poor vegetation health; (c) April 2016 - easing of poor vegetation health.

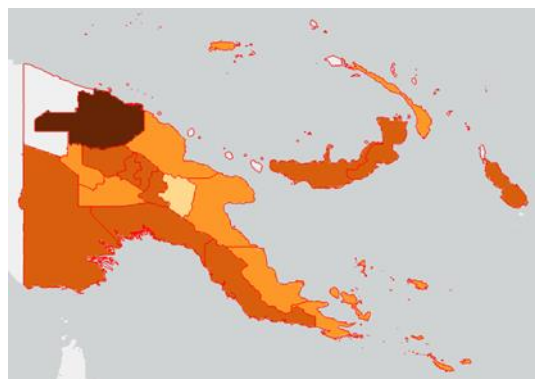
CREWS PNG: Drought Risk Assessment

Drought Hazards Index (DHI) Inputs

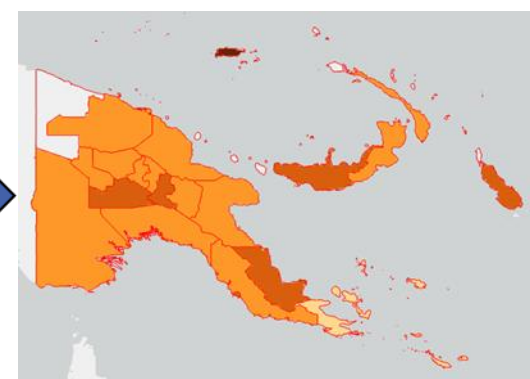
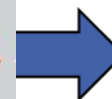
DHI



SWCEM: SPI



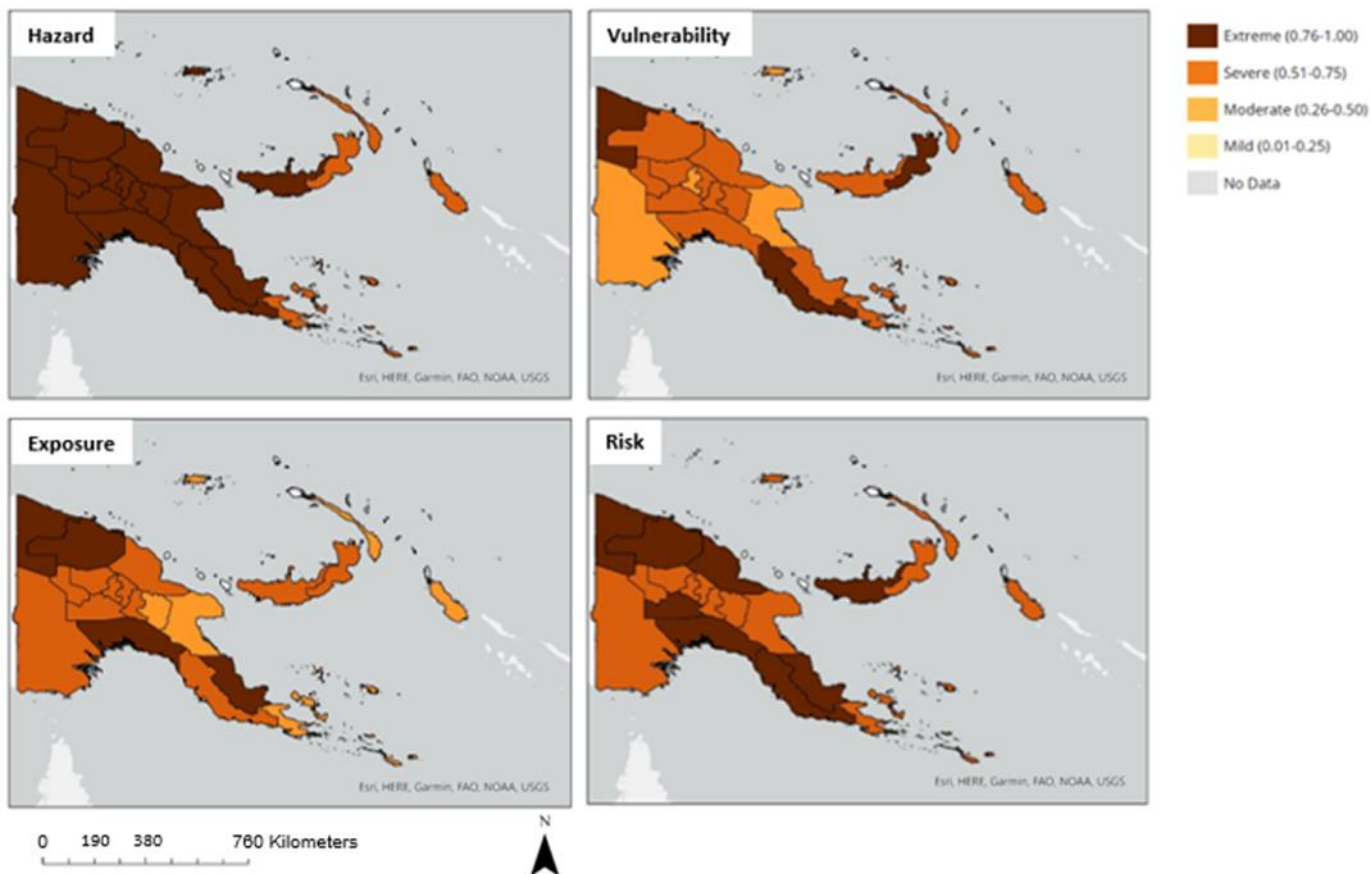
SWCEM: VHI



SPI + VHI => DHI

Drought Risk Assessment: SWCEM satellite-derived products – SPI and VHI - are combined using GIS, to produce maps of Drought Hazard Index (DHI) for PNG at the provincial level.

CREWS PNG: Drought Risk Assessment



CREWS CLIMATE RISK & EARLY WARNING SYSTEMS

Drought risk maps of 22 PNG provinces for 2015.

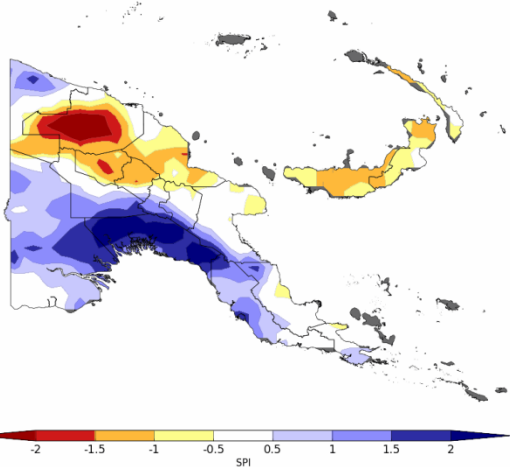
CREWS PNG: Drought EWS

Monitoring Inputs

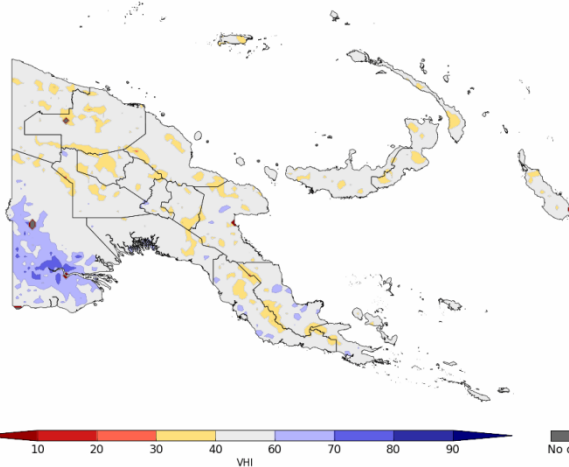


Forecasting Inputs

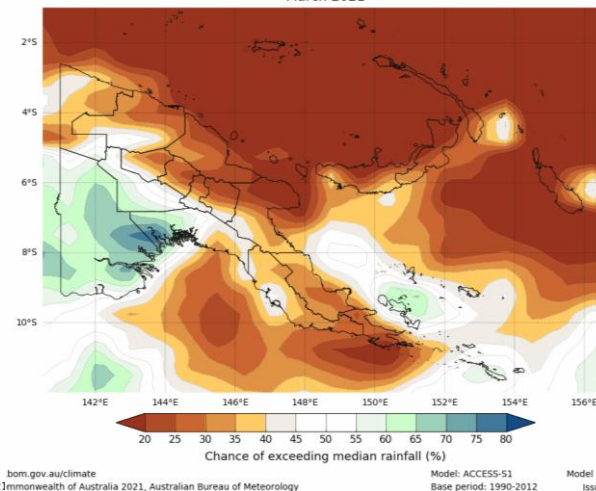
3-month SPI ending January 2021



3-month VHI for January 2021



Chance of exceeding the median rainfall for March 2021



SWCEM: SPI

SWCEM: VHI

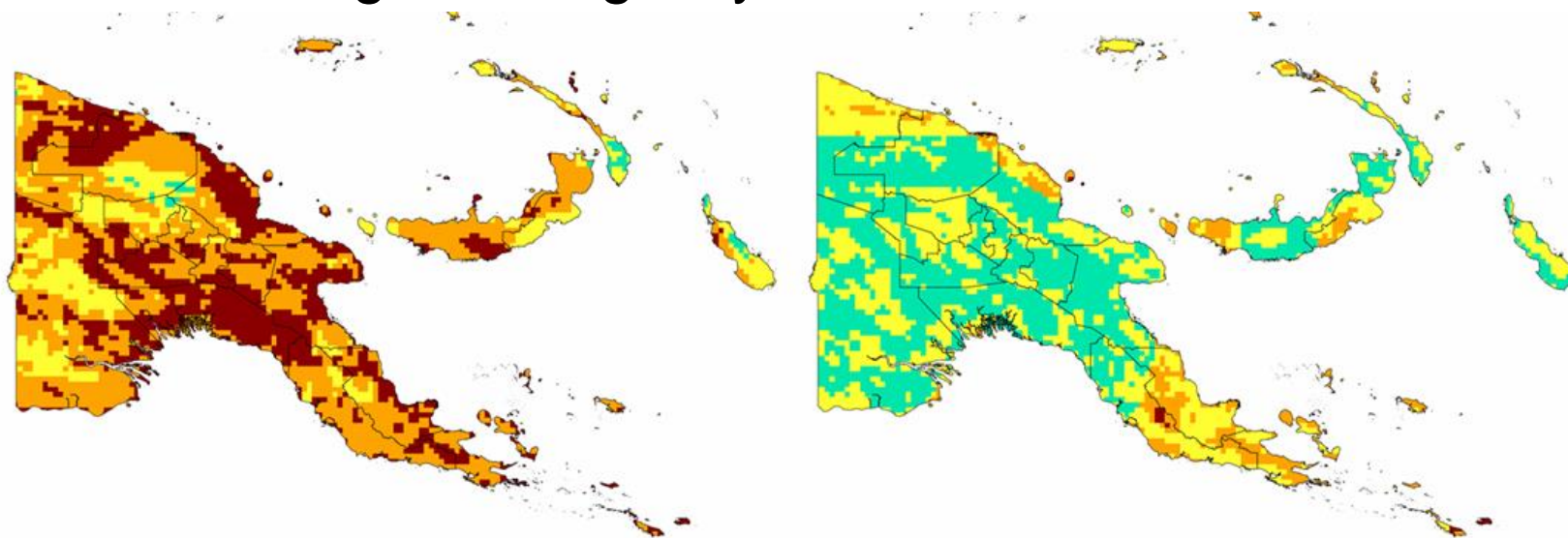
WMO GPC LRFs: Rain



Drought EWS: SWCEM satellite-derived products - monitoring component and ACCESS-S S2S products – forecasting component

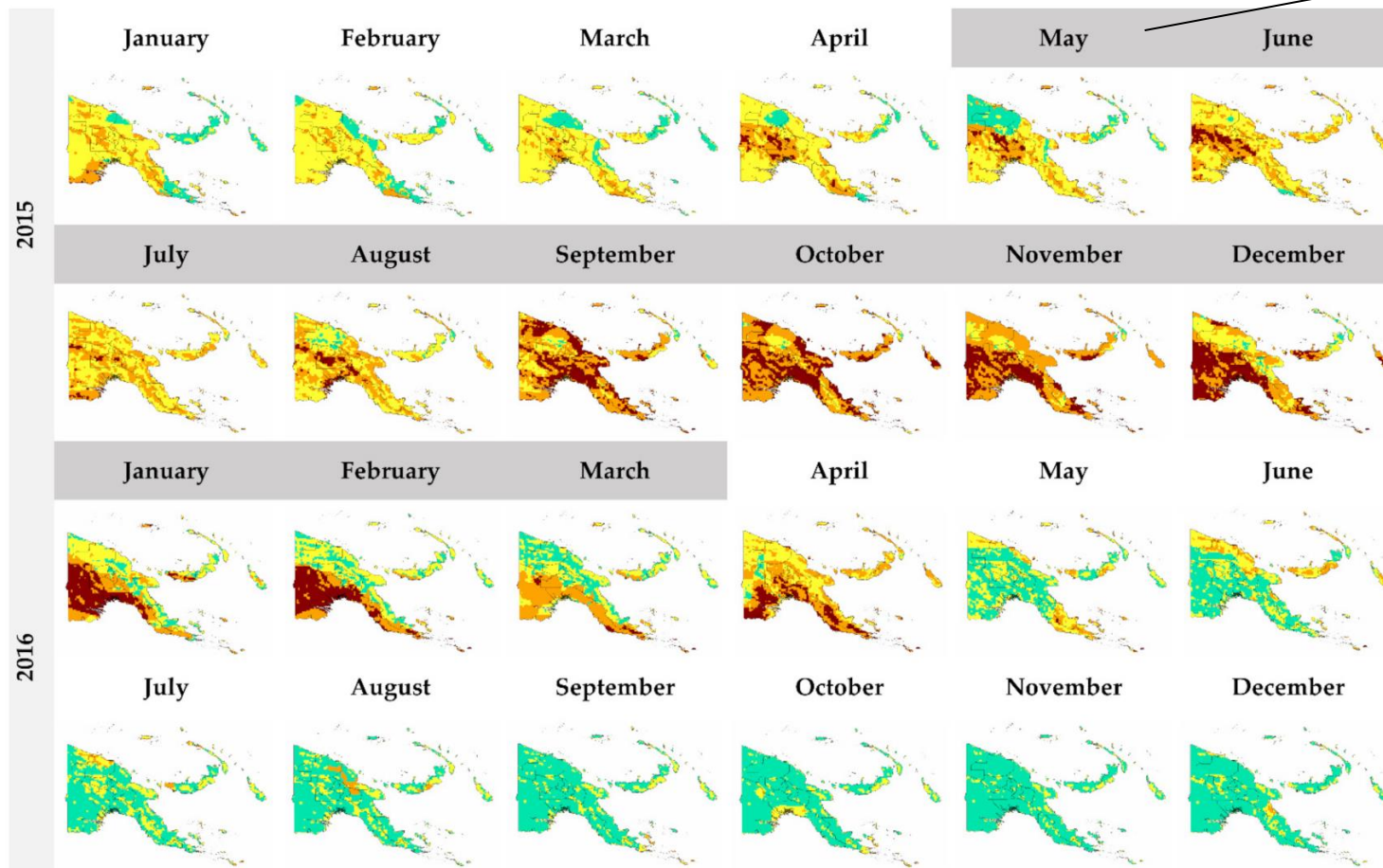
CREWS PNG: Drought EWS

The CREWS project developed drought EWS for PNG. It generates maps of staged drought early warning - Watch, Alert and Drought Emergency.



CREWS PNG: Drought EWS

El Niño



CREWS PNG Operational Product: Drought Update

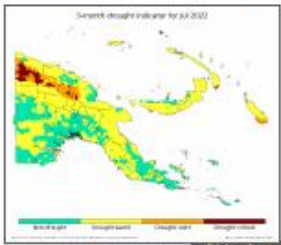
July 2022 Drought Update

Issued July 12

Key messages
Drought Watch remains active across most provinces in the country due to rainfall deficiency in the past few months. East New Britain, West Sepik and Central were **most at risk** in June.

Drought Early Warning Status

Derived from observed rainfall and vegetation health; and forecasted rainfall.



- Rainfall over the last month was notably below average for most provinces except Central Gulf, Milne Bay and Western.
- Rainfall over the last three months was below average across most provinces in the country, except Milne Bay, northern parts of Klunga and Gulf.
- Vegetation health conditions indicate some mild vegetation stress present over East & West Sepik, New Ireland, patches in Western province and parts of the PNG Highlands.
- At the 6-month timescale, South Bougainville and parts of New Ireland and West Sepik remain drought affected.
- Despite a wet forecast for most PNG provinces in the coming months, below average April-June rainfall is contributing to a Drought Watch status for most provinces.

[3-month timescale provincial summary \(detailed status table here\)](#)

● Drought Watch
All provinces except Gulf, Milne Bay, Oro and Western

● Drought Alert
None


● Drought Critical
None

Drought Risk Status

An indication of past drought risk based on drought hazard, exposure and vulnerability.

- East New Britain, West Sepik and Central are still at a high-risk level due to less rainfall experienced over the past two to three months. The provinces should be closely monitored.
- Most provinces are at a severe risk whilst Milne Bay, Manus, NCD and Western are at moderate risk level.


April 2022



May 2022



June 2022



● June 2022 Provinces in Severe
Bougainville, East Sepik, Madang, Morobe, New Ireland, Northern (Oro), West New Britain, Gulf, Western Highlands, Southern Highlands, Jiwaka, Hela, Enga, Chimbu, Eastern Highlands, NCD

● June 2022 Provinces in Extreme
East New Britain, West Sepik and Central

Climate Context

A summary of the relevant climate drivers affecting PNG over the coming months

- ACCESS-S outlooks suggest a wet outlook over most parts of the country in August, except parts of East Sepik and West Sepik showing drier conditions.
- La Niña is over but cooler than average sea surface temperature remains in the Central and Eastern Pacific which may induce a weak La Niña like effect. There is around 50% chances of La Niña reforming later in the year.
- The IOD has been exceeding negative IOD values for the last five weeks. Development of a moderate to strong negative IOD during the next two months is likely.

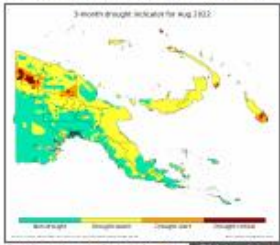
August 2022 Drought Update

Issued August 15

Key messages
Drought Watch is active for most provinces across the country which is due to rainfall deficiencies in the last few months. Majority of the provinces are **at severe drought risk** whilst Chimbu, Gulf, Hela, Manus, Milne Bay New Ireland, Northern and Western Highlands are **at moderate risk** in July.

Drought Early Warning Status

Derived from observed rainfall and vegetation health; and forecasted rainfall.



- Rainfall over the last month was notably below average in the Islands region including Bougainville, northern parts of East and West Sepik, Enga, Western Highlands, Morobe, Oro and Milne Bay Provinces.
- Rainfall over the last three months was below average across most provinces in the country, except Gulf, Southern Highlands, Hela and northern parts of Klunga.
- Vegetation health conditions indicate some mild vegetation stress present over East & West Sepik, Madang and Hela provinces.
- At the 6-month timescale, South Bougainville and parts of New Ireland province remain drought affected.
- Despite a wet forecast in the coming months, below average rainfall in the past months is contributing to a drought watch.

[3-month timescale provincial summary \(detailed status table here\)](#)

● Drought Watch
Bougainville, East New Britain, Manus, Milne Bay, Morobe, NCD, New Ireland and West New Britain

● Drought Alert
None


● Drought Critical
None

Drought Risk Status


An indication of past drought risk based on drought hazard, exposure and vulnerability.

- Bougainville, Central, East New Britain, East Sepik, Enga, Jiwaka, Madang, Morobe, NCD, Southern Highlands and West New Britain provinces are all at severe risk levels. The provinces will continue to be monitored.
- Chimbu, Gulf, Hela, Manus, Milne Bay, New Ireland, Northern and Western Highlands provinces are at moderate risk level.


May 2022



June 2022



July 2022



● July 2022 Provinces in Severe
Bougainville, Central, East New Britain, East Sepik, Enga, Jiwaka, Madang, Morobe, NCD, Southern Highlands, West New Britain

● July 2022 Provinces in Extreme
None

Climate Context

A summary of the relevant climate drivers affecting PNG over the coming months

- ACCESS-S outlooks suggest a wet outlook over most parts of the country in September, except Kavieng, Manus and south Bougainville showing drier conditions.
- La Niña is not present, however cooler than average sea surface temperatures in Central & Eastern Pacific persist which may result in weak La Niña conditions. The chances of La Niña reforming in the coming months is at 50%.
- A negative IOD is underway. The IOD continues to exceed negative IOD values over at least the last eight weeks.

CREWS: Translating Warnings to Impacts

- Workshops with stakeholders: the need for translation of warnings into actionable impacts.
- The communication and dissemination of early warnings are identified as an area which required improvement.
- Limitations in early warning communication may lead to misunderstandings of messages within local communities.
- In the case of Early Warning Systems, this is directly relevant to the usability and the actionability of warnings.

CREWS: Translating Warnings to Impacts - Trust

- Trust in warnings directly affects actionability.
- Medium of warning communication affects trust placed in warnings' actionability.
- Mediums used for warning communication need to be diverse and must minimise population “blind spots”, such as those without mobile phones or radios.
- Language of warning affects accessibility and actionability.

CREWS: Gender-Specific Inclusions

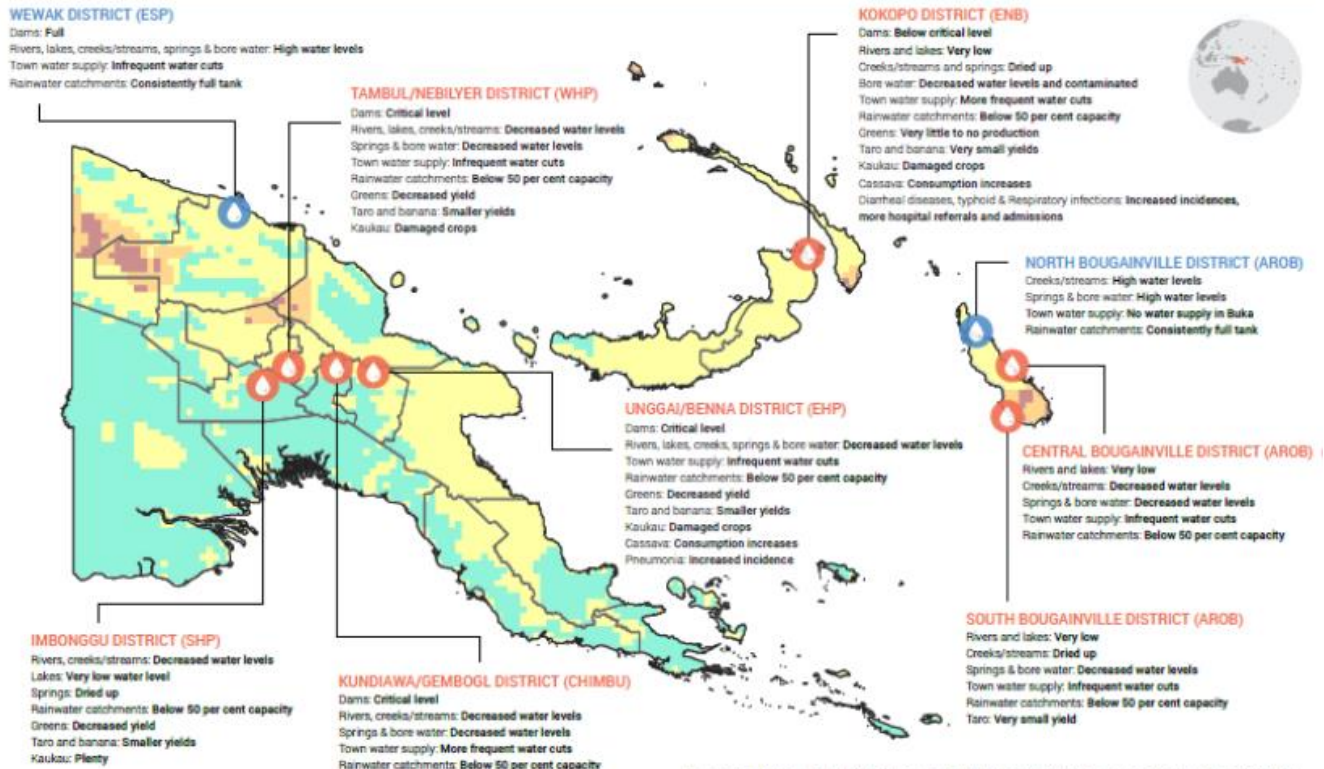
- Gender-based divisions are prevalent in Pacific Island societies.
- In Papua New Guinea, women undertake 80% of subsistence agriculture, making their inclusion vital from a food security perspective.
- Women have been identified to be unique and trusted disseminators of response and recovery in times of disaster.

PNG Disaster Management Team



PAPUA NEW GUINEA Drought risk: water, food crop status

As of 25 August 2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Sources: PNG NWS (CREWS), humanitarian partners. Feedback: dmt.ug@pna.gov.pg <https://response-ref@wfp.int/papua-new-guinea>



PNG Disaster Management Team



PAPUA NEW GUINEA

Drought risk affecting electrical power supply

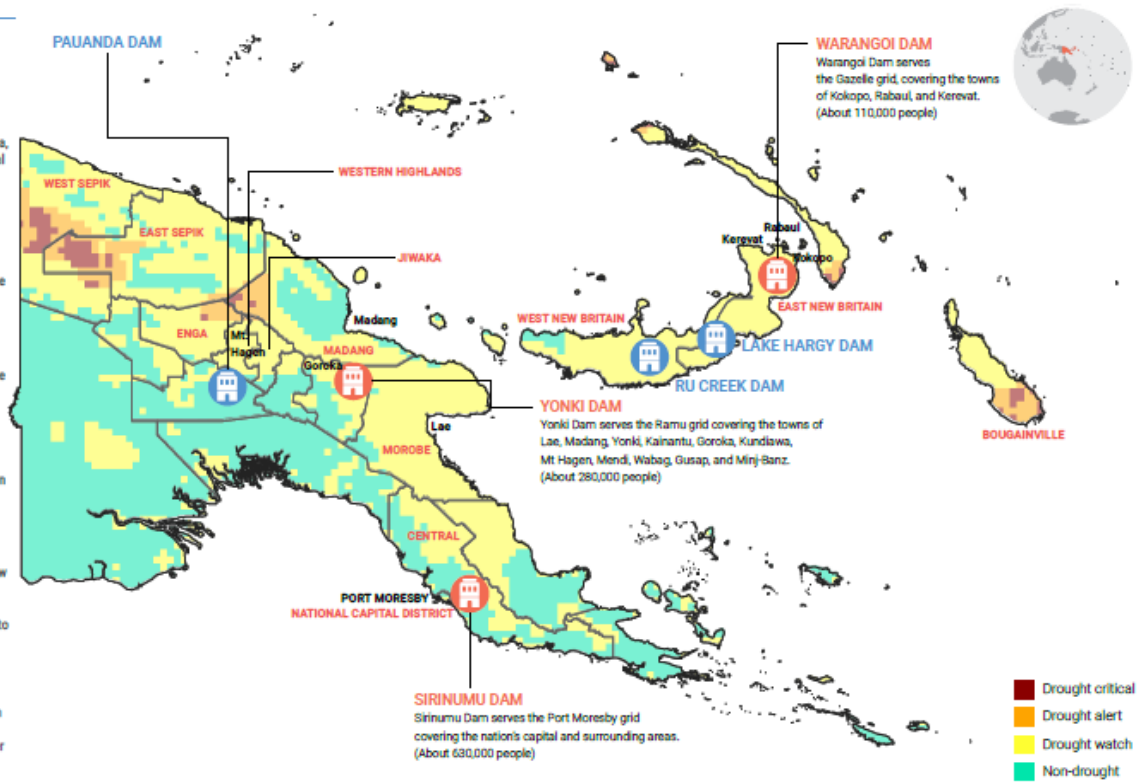
As of 9 September 2022

Overview

The National Weather Service have advised that the current drought conditions in much of the country are expected to continue until the end of September or early October. Provinces at severe drought risk include Bougainville, Central, East New Britain, East Sepik, Enga, Jiwaka, Madang, Morobe, National Capital District, Western Highlands, West New Britain, and West Sepik. As the country approaches the wet season at the end of the year, much of the country is expected to receive above-average rainfall influenced by a La Niña event. However, the New Guinea Islands region tends to be drier during La Niña events and so chances of drought continuing in New Britain, New Ireland, Manus, and Bougainville is relatively high.

As of 5 September, the water level at three of the country's six dams are at critically low levels. Hydroelectric power accounts for 40% of the country's current power supply. The national power company is carrying out heavy load shedding on all three grids – which service about 1 million people – due to the low water levels and has urged customers to restrict the consumption of water and electricity.

According to the provincial disaster offices in Eastern Highlands and East New Britain, the drought is also affecting agricultural yields for greens. Further protraction of the drought will likely lead to greater reliance on cassava as a food source. Water sources in the Rabaul district of East New Britain are being rehabilitated to supply water to affected areas. World Vision and IOM have been in contact with the East New Britain provincial disaster centre to provide water containers for affected residents.



The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations. Sources: PNG Power, PNG NWS (CREWS), humanitarian partners. Feedback: dmt.pg@png.gov.pg <https://response.reliefweb.int/papua-new-guinea>



PNG Disaster Management Team

2022 NEW GUINEA ISLAND DROUGHT CONTINGENCY PLAN

Potential population risk of drought:

- East New Britain
408,286
- Oro 231,652
- Milne Bay
343,808

Overview

People targeted for DMT multi-sectoral support

50,000 people

Funding required [USD]

Phases 1&2 \$7.8 million

Phase 3 \$12.8 million

Total \$20.6 million

Key planning figures

Potential population risk of drought
(Estimated 2022 population based on 2011 census and World Bank annual population growth rate of 2.0%)

People most likely to require multi-sector humanitarian assistance
(Based on 2015-2016 drought response 25% of overall estimated population of people most likely to require multi-sector humanitarian assistance)

| Province | HH | POP | M | W | HH | POP | M | F |
|------------------|----------------|----------------|-------------------------|----------------|---------------|----------------|----------------|----------------|
| East New Britain | 72,685 | 408,286 | 209,832 | 198,454 | 18,171 | 102,071 | 52,458 | 49,613 |
| Oro | 42,495 | 231,652 | 118,907 | 112,745 | 10,624 | 57,913 | 29,727 | 28,186 |
| Milne Bay | 68,711 | 343,808 | 176,477 | 167,331 | 17,178 | 85,952 | 44,119 | 41,833 |
| TOTAL | 183,891 | 983,745 | 505,216 | 478,530 | 45,973 | 245,936 | 126,304 | 119,632 |
| | | | TOTAL DMT target | | 9,434 | 50,000 | 25,665 | 24,335 |

Bay



PNG Disaster Management Team

Purpose

This plan identifies areas of action to support the Government of Papua New Guinea to better prepare for and respond to possible drought event forecasted to occur in East New Britain, Oro, and Milne Bay provinces in 2022. It will be updated periodically to reflect possible changes in advice and on the ground assessments.



PNG Disaster Management Team

Early Warning / Early Action Strategy

The DMT proposed a phased approach to accommodate early warning and early actions to monitor and mitigate the potential impacts of drought on vulnerable populations in at-risk areas. The phase of action will be designated by the DMT chairs based on the technical advice of the National Disaster Centre, National Weather Service, and other relevant agencies. The cluster system will be used to implement the action plan.

| LEVEL | STATUS | TRIGGER | OBJECTIVE |
|-------|----------|--|--|
| ONE | WATCH | Possible drought event identified and currently under watch status | To better position communities to deal with drought-related impacts |
| TWO | WARNING | Drought alert has been issued by relevant authorities | Address threats to well-being and livelihoods by building community resilience |
| THREE | DECLARED | Drought event is declared by relevant authorities | Saving lives with direct interventions |

Recommendations



Assisting Most Vulnerable Countries with Climate Change Adaptation

Climate Risk and Early Warning Systems (CREWS) International Initiative helps SIDS and LDCs with climate change adaptation.

Strengthening Observing System

Space-based observations are integral part of the global observing system; they provide valuable information on a global scale and complement surface-based observations (this is particularly important for SIDS and LDCs).

Incorporating space-based observations to enhance drought monitoring is recommended to strengthen capacity of Meteorological Services.

Recommendations



Strengthening Predictive System

Accelerate uptake of sub-seasonal to seasonal (S2S) climate forecasts by operational Meteorological Services and Regional Climate Centres. This will strengthen capacity in forecasting risk of climate hazards, including drought.

Communication

Enhancing capacities of countries in communication and dissemination of early warnings and impact-based forecasts is important.

Dissemination of global, regional and national climate information via reliable and sustainable channels such as WMO GPC LRFs.

Recommendations



Early Warning – Early Action

Translating early warnings into actionable impacts is vital to ensure they are relevant to, useful for and trusted by local communities.

Strengthening cooperation between providers of Early Warning information and key stakeholders including the Disaster Management Team. This enhances efficiency of Early Warning and Early Actions to monitor and proactively mitigate the potential impacts of drought on vulnerable populations in at-risk areas.

Early Warning and Early Action

UN unveils ambitious target to adapt to climate change and more extreme weather



“ We must boost the power of prediction for everyone and build their capacity to act. On this World Meteorological Day, let us recognize the **value of early warnings and early action** as critical tools to reduce disaster risk and support climate adaptation. ”

António Guterres
Secretary-General of the United Nations

WORLD METEOROLOGICAL ORGANIZATION

CREWS and WMO SWCEM are important contributors to the UN target:

"Early warning systems must protect everyone within five years".



We invite Asia-Pacific countries to work with us on future CREWS and COSPPac projects to help protect populations from climate hazards and build resilience implementing Early Warning Systems.



Climate and Oceans Support Program in the Pacific

Thank you



For further information please visit www.crews-initiative.org or contact us at crewsinfo@wmo.int

 @CREWSinitiative

