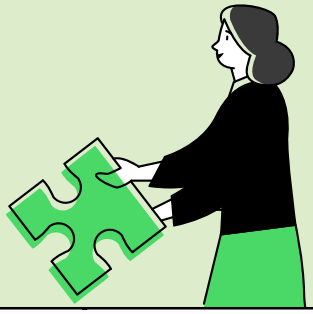


Agromet Bulletin

USER GUIDE

Vanuatu Klaemet blong Redy, Adapt mo Protekt

VAN-KIRAP PROJECT

Vanuatu Klaemet Infomesen blong Redi Adapt mo Protek (Van-KIRAP)

Van-KIRAP (Vanuatu Klaemet Infomesen blong Redi Adapt mo Protek) project, as locally known is the Climate Information Services for Resilient Development (CISRD) Project funded by the Green Climate Fund.

The primary purpose of the CISRD project is to develop and strengthen climate-resilient development in Vanuatu, with emphasis on supporting climate-smart adaptation and disaster risk management policy and planning. The project aims to do this by building institutional and community-based capacity and providing critical resources to facilitate transformational and sustainable change in the application of science- based evidence to inform decision-making for relevant policy development and planning processes. This support will be delivered through the provision of tailored Climate Information Service (CIS) specifically aligned with relevant national strategies for priority sectors, to address information gaps and priority needs of target beneficiaries ('next' and 'end'-users of CIS) at National provincial and local community levels.

In working partnership with Vanuatu Meteorology & Geo-Hazards Department (VMGD), APEC Climate Centre (APCC) through Van-KIRAP project is focused on providing tailored climate tools for the Department of Agriculture and Rural Development (DARD). APCC has further upgraded, and enhanced the Agro-Met Bulletin to meet the sector needs and priorities, primarily in root crop farming.

The Agro-Met Bulletin is the Agriculture Climate tailored seasonal Outlook for the department of Agriculture in Vanuatu. It aims to provide accessible, user friendly and feasible practices that enables climate resilience and high yields for crops in Vanuatu.
Therefore, the purpose of this booklet is to provide to users;

- A guide to navigate through the Agro-Met Bulletin.
- Interpretation of the climate information
- Confidence in making decisions for climate resilience

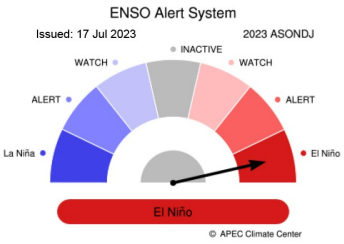
This user-guide-book is also part of capacity building and training to the Agriculture Sector, and stakeholders, and APCC is committed to making this an enjoyable learning process for all Vanuatu farmers.

VANUATU Agromet Bulletin

Vol.7, 20 July 2023

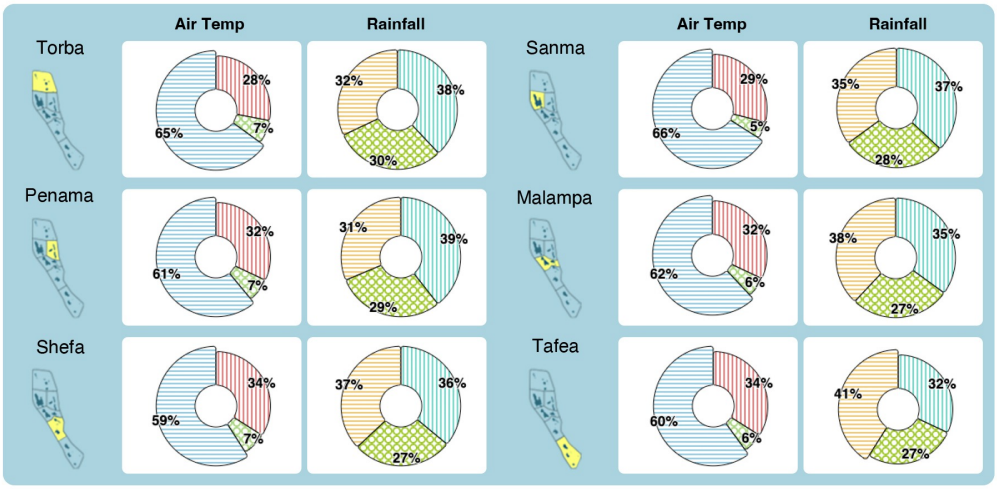
Vanuatu Meteorology & Geo-Hazards Department, Department of Agriculture & Rural Development

Seasonal Forecasts(JUL~SEP)



Air Temp
- Warmer than Normal
- Near Normal
- Cooler than Normal

Rainfall
- Above Normal
- Near Normal
- Below Normal



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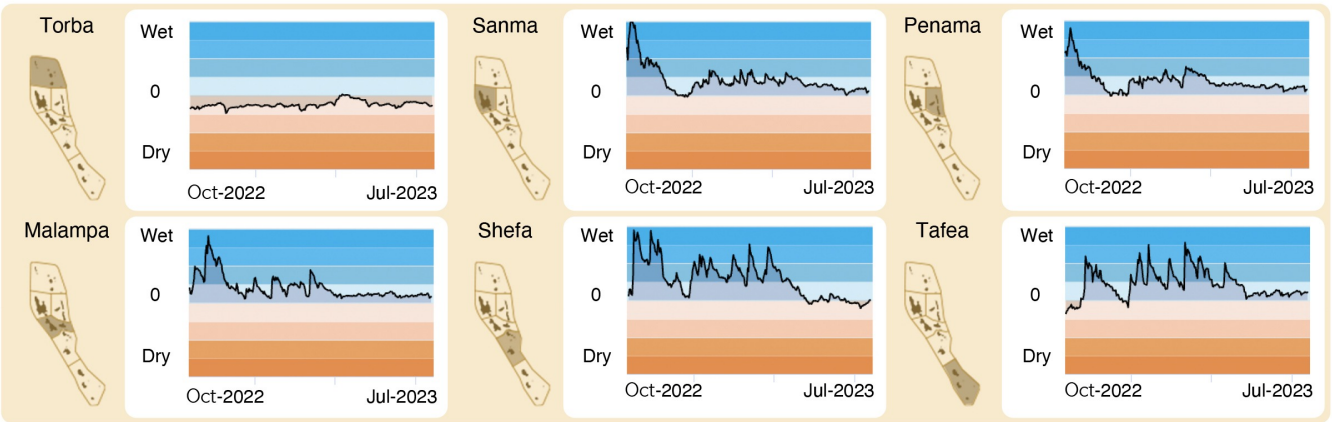
- Torba: Cooler and Wetter climate, Samma : Cooler and Wetter climate, Penama: Cooler and Wetter climate, Malampa: Cooler and Drier climate, Shefa: Cooler and Drier climate, Tafea: Cooler and Drier climate

Drought Monitoring



- Mildly Wet
- Moderately Wet
- Severely Wet
- Extermely Wet
- Midly Drought
- Moderately Drought
- Severely Drought
- Extermely Drought

Moon blog July kasem October 2023

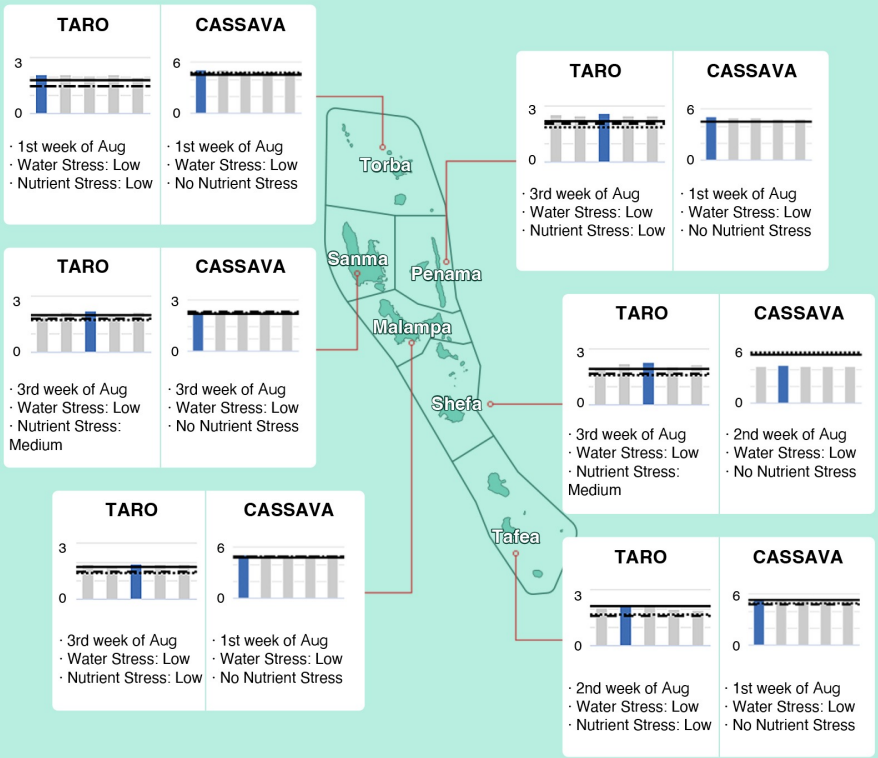
Fes Kwata	Ful Moon	Las Kwata	Niu Moon
26 July	03 July	10 July	18 July
24 August	02 August	08 August	16 August
23 September	29 September	07 September	15 September
22 October	29 October	07 October	15 October

Climate Smart Recommendations for Crop Cultivation

Best Crop Planting Week

Yield(Fresh Weight,t/ha) ····· Past 10-year avg – – Past 5-year avg —— Last year avg

Blue bars indicate the best crop planting week.
Compare the expected yield to monthly yield averages of the past performances (past 10-year, 5-year, and last-year average)



There is recommended weeks for crop planting to the side.
According to the crop model based forecast, planting Taro during the Second week of August in Tafea is projected to highest yield across the country. Yield is higher than last year, higher than the 10-year and 5-year average yield.

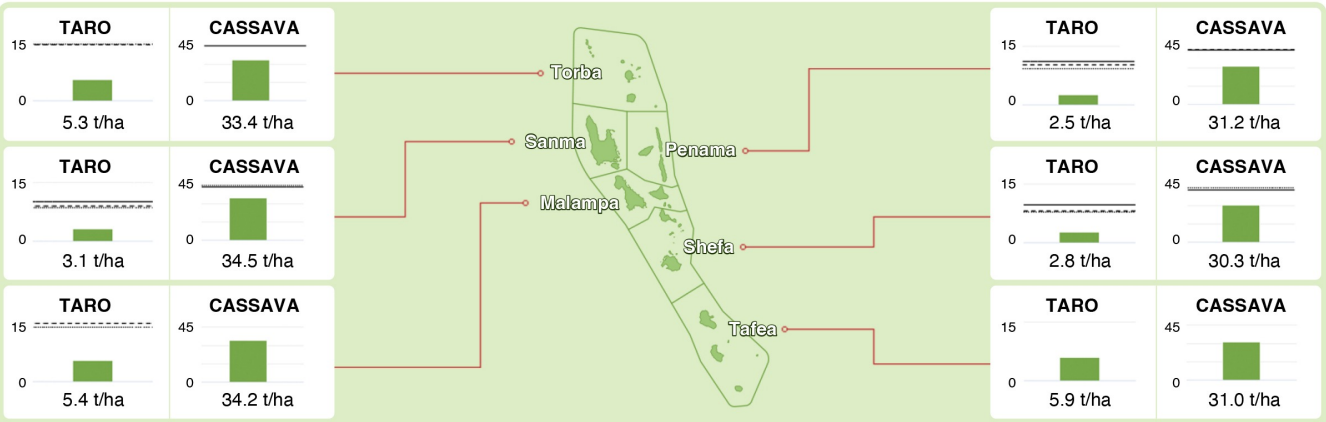
Nutrient Stress during all seasons for all crops
- Do Compost! Incorporate organic matters into the soil (e.g well-rotted manure, compost)
- Apply Mulch! Apply organic mulch around the crop after planting (e.g dried weed and leaves, vetiver grass, straw)

Water Stress during Cool-Dry Season
- Provide Water Source! Use of banana stems cut into cubes and then dig holes besides crop stems and apply cubes for plants to absorb water from banana cubs
- Practice Mucuna-Taro rotation! Establish Mucuna, slash it, then plant directly through the mulch

More information can be found in the decision tree based advisory of OSCAR (address).

Predicted Yield in August

Yield(Flesh Weight, t/ha) ····· Past 10-year avg – – Past 5-year avg —— Last year avg



- Above are the predicted crop yield in August.
- Tafea is projected to highest Taro fresh yield, reaching 5.4 ton/ha. Yield is lower than last year, lower than the 10-year and 5-year average yield.
- Sanma is projected to highest Cassava fresh yield, reaching 34.5 ton/ha. Yield is lower than last year, lower than the 10-year and 5-year average yield.

※ Please note that the crop yield forecasts provided in these Agromet Bulletins are based on crop models, and may differ from actual results due to various factor. While every effort has been made to ensure the accuracy of the forecasts, they are subject to inherent uncertainties and may not always be accurate or reflect actual crop yields. Actual crop yields may differ from the forecasted values due to a variety of factors including but not limited to: disease outbreaks, pest infestation, and management practices. Therefore, this information is intended for guidance purposes only and should not be relied upon as a guarantee of actual crop yields.

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Email: climate@meteo.gov.vu

Supported by APCC SPREP PROE GREEN CLIMATE FUND

Powered by OSCAR

Chapter 1

How to Interpret

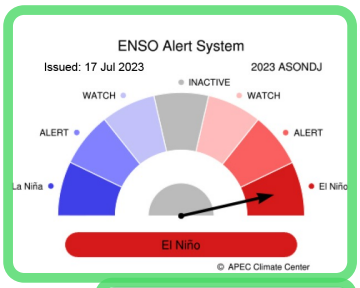
1. Seasonal Forecasts
2. ENSO Alert System
3. EDI
4. Best Crop Planting Week
5. Predicted Yield

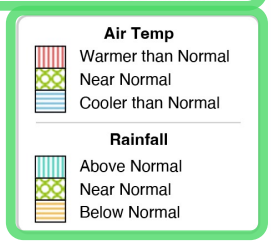
VANUATU Agromet Bulletin

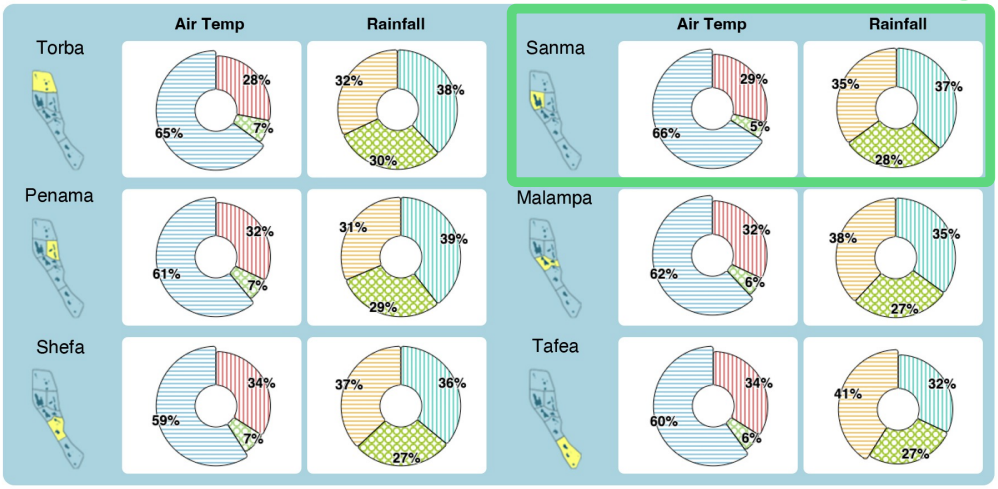
Vol.7, 20 July 2023

Vanuatu Meteorology & Geo-Hazards Department, Department of Agriculture & Rural Development

Seasonal Forecasts(JUL~SEP)







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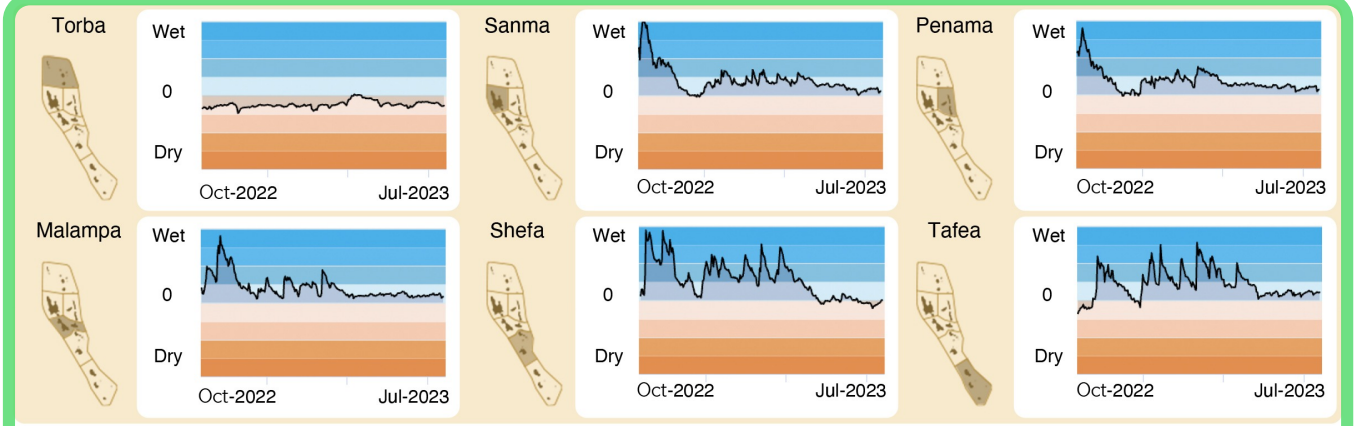

Moon blog July kasem October 2023

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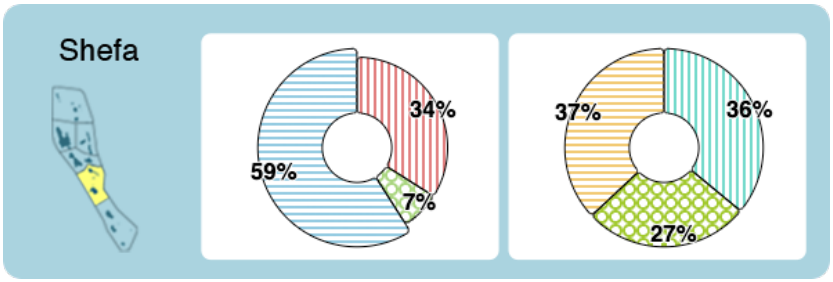
1 Seasonal Forecasts



Air Temp
- Warmer than Normal
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Rainfall
- Above Normal
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- Below Normal

A tercile probability-based seasonal forecast provides **the likelihood of different outcomes (below-normal, near-normal, or above-normal) for a specific variable (such as air temperature or rainfall) during a particular season based on historical data and statistical models**.

To create a tercile-based forecast, historical climate data is analyzed to identify patterns and relationships between the variable of interest. Statistical models are developed to estimate the likelihood of different outcomes for the upcoming season. APCC further improves the accuracy and reliability of the forecast by using a multi-model ensemble approach. Instead of relying on a single model, APCC combines the predictions from multiple models, compensating for individual model's weaknesses. The combined predictions creates a distribution, representing the likelihood of each category occurring. In other words, it shows the probability of the air temperature falling into each tercile category.

For example, as you can see in the graph, **in Shefa province**, we have **59%** chance of having **cooler than normal air temperature**, and 37**%** chance of having **below normal rainfall compared to average years**. The comparison we are providing here is to the Vanuatu's 20-year hindcast average, specifically from 1991 to 2010.

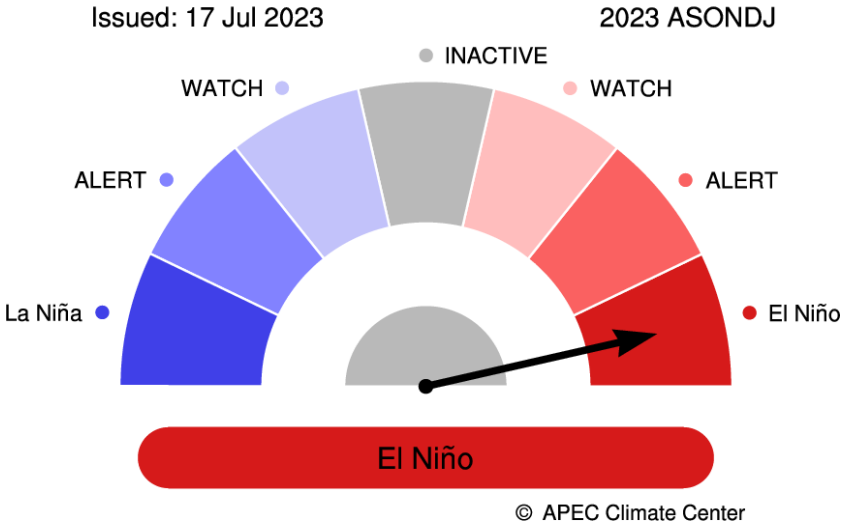
“

Tercile probability seasonal forecast allows us to know in advance how the climate conditions will be different from average years, allowing us to prepare in advance and coordinate agronomic practices accordingly.

”

If you have understood, we can proceed with interpreting your province.

2 ENSO Alert System



The APCC ENSO Alert System consists for three stages of El Niño alerts and three stages of La Niña alerts. The movement of the needle on the watch indicates the intensity of La Niña or El Niño, with stronger occurences as it approaches the respective ends. The "Inactive" stage indicates the absence of any ongoing La Niña and El Niño events

Ⓥ Description

– The APCC ENSO Alert suggests "El Niño", In June 2023, above normal sea surface temperature anomallies spanned the equatorial Pacific. The Niño 3.4 index is expected to be above 1.4 ˚C for August 2023 – January 2024. The probability for El Niño conditions is expected to be above 97% for the same period.
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This section will provide a brief summary of the current ENSO status and activity. It aims to offer a concise overview of the ongoing El Niño -Southern Oscillation (ENSO) conditions and their impact on Vanuatu.

“

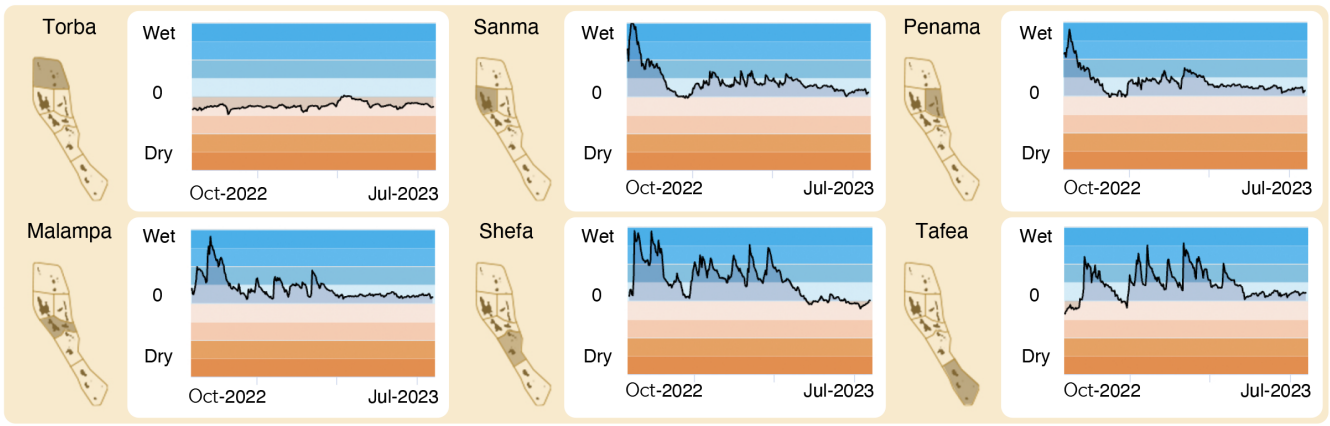
El Niño and La Niña have contrasting effects on Vanuatu:

1. **El Niño**: During El Niño events, Vanuatu experiences **drier conditions and reduced rainfall**. This can lead to **droughts, water scarcity, and negative impacts on agriculture**.

2. **La Niña**: In contrast, La Niña brings **increased rainfall** to Vanuatu. This can result in **above average precipitation, potential flooding, and heightened risk of tropical cyclones**.

”

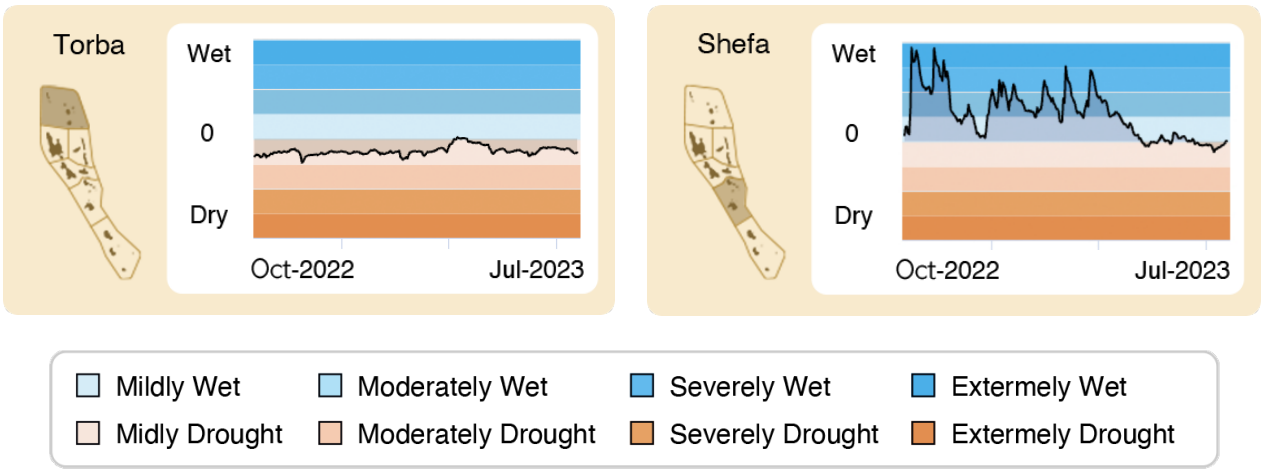
3 EDI



The Effective Drought Index (EDI) is a valuable tool for **assessing and monitoring drought conditions**. By utilizing daily precipitation data, it calculates various parameters that collectively offer insights into the onset, intensity, and duration of a drought event. The proximity of the graph point to each end reflects the intensity of the drought: the closer it is to the bottom end, the more severe the drought, while the closer to the top end suggests wetter conditions.

V Examples

For each region, we will be providing EDI summary and brief countermeasures for each situation. **On the OSCAR Website, you have the option to choose the planting date and view the comprehensive EDI graph, encompassing a longer period.**



4 Climate Smart Recommendations for Crop Cultivation

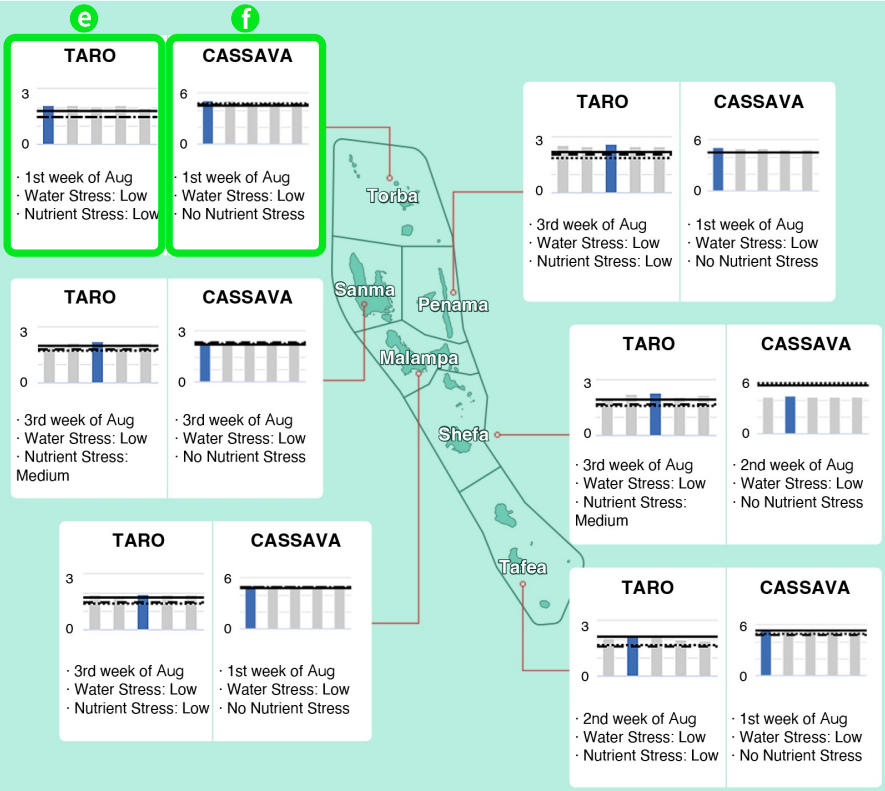
Best Crop Planting Week

Blue bars indicate the best crop planting week.
Compare the expected yield to monthly yield averages of the past performances (past 10-year, 5-year, and last-year average)

Yield(Fresh Weight,t/ha) ····· Past 10-year avg – – Past 5-year avg —— Last year avg

a b c d

e f



There is recommended weeks for crop planting to the side.
According to the crop model based forecast, planting Taro during the Second week of August in Tafea is projected to highest yield across the country. Yield is higher than last year, higher than the 10-year and 5-year average yield.

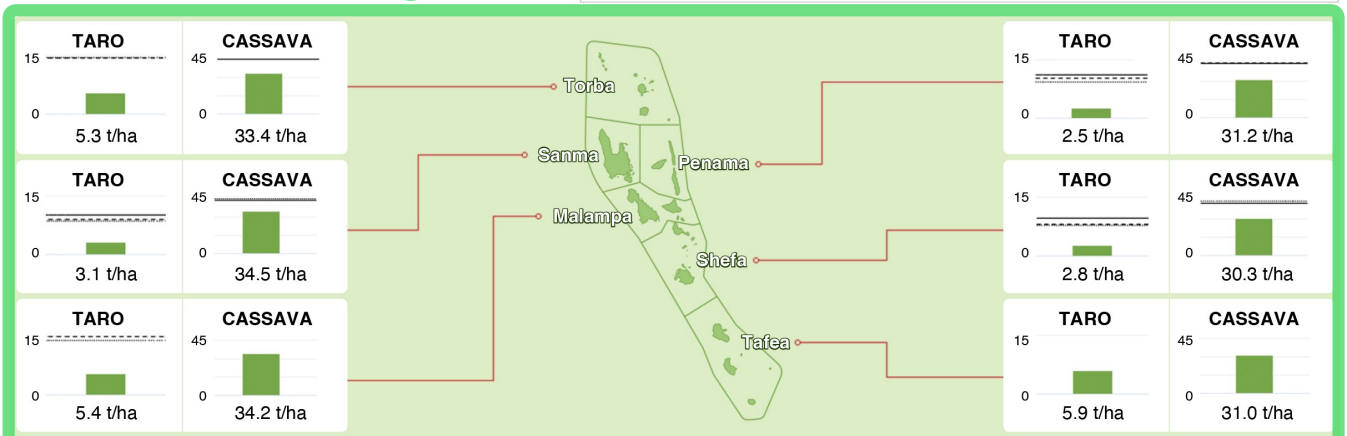
Nutrient Stress during all seasons for all crops
- Do Compost! Incorporate organic matters into the soil (e.g well-rotted manure, compost)
- Apply Mulch! Apply organic mulch around the crop after planting (e.g dried weed and leaves, vetiver grass, straw)

Water Stress during Cool-Dry Season
- Provide Water Source! Use of banana stems cut into cubes and then dig holes besides crop stems and apply cubes for plants to absorb water from banana cubs
- Practice Mucuna-Taro rotation! Establish Mucuna, slash it, then plant directly through the mulch

More information can be found in the decision tree based advisory of OSCAR (address).

Predicted Yield in August 5

Yield(Flesh Weight, t/ha) ····· Past 10-year avg – – Past 5-year avg —— Last year avg



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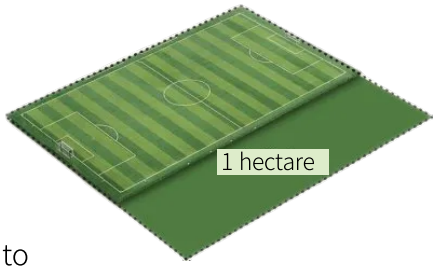
4 Best Crop Planting Week

In this part, "Best crop planting week" refers to the specific week for optimal planting for Cassava and Taro. This optimal week may vary by province. this information is relevant to the upcoming month.

a	b	c	d
Yield(t/ha)	····· Past 10-year avg	– – Past 5-year avg	—— Last year avg

a **Yield**(t/ha) :"ton/ha (ton per hectare)" is a unit of measurement used to determine the amount of crop yield per hectare of land. A hectare is a unit of measurement commonly used for land area, about a size of standard soccer field. it would be roughly equal to one hectare.

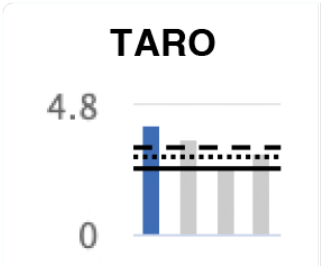


b ····· Past 10-year avg : Past 10-year average yield refers to the typical dry weight of corm or tuber produced per hectare during 2012- 2022. The average weight of matured corms or tubers, which were harvested and dried each August over a period of 10 years, corresponds to plants that were planted 8 or 9 months prior.

c – – Past 5-year avg : Past 5-year average yield refers to the typical dry weight of corm or tuber produced per hectare during 2018-2022. The average weight of matured corms or tubers, which were harvested and dried each August over a period of 5 years, corresponds to plants that were planted 8 or 9 months prior.

d —— Last year avg : Last year average yield refers to the average dry weight of corm or tuber. (e.g It refers to the weight of corms that were planted in August 2022 and harvested approximately around April 2023)

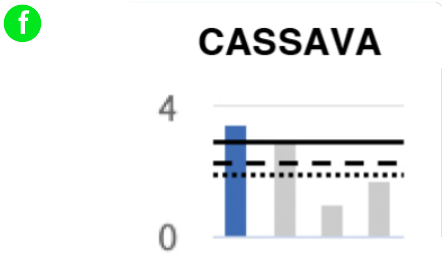
e



Taro, in this context, specifically refers to the Tarapatan variety.

To interperet the graph, the blue bar represents the best planting week, while the dotted line (·····) represents the 10-year average (b), the dashed line (– –) represents the 5-year average (c), and the solid line (——) represents the previous year (d)

f



Cassava in this context, specifically refers to the Tagape variety.

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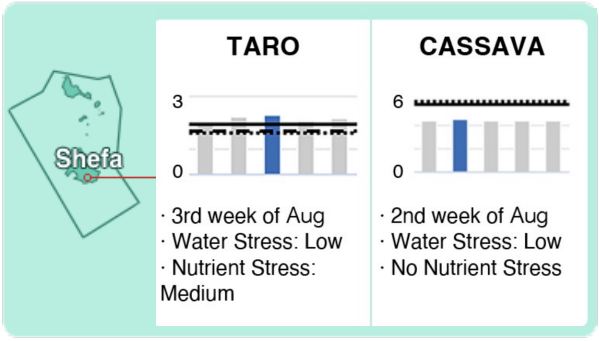
Case 1

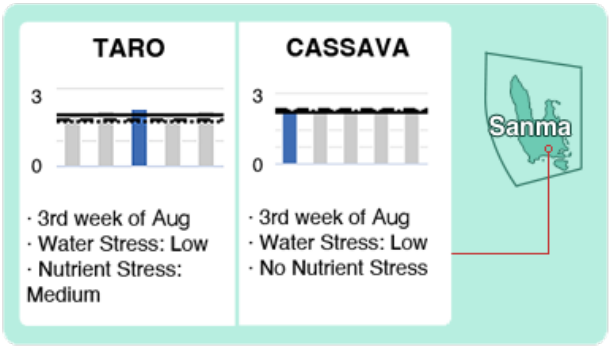


You can find the data corresponding to each province on the map. In this case, in **Shefa**,

[Taro] The blue bar represents **the optimal planting week.** Tarapatan variety is ideally planted in **the 3rd week of August**. The highest yield will be obtained after planting 8 or 9 months. **It exceeds the averages of the past 5, 10 years and last year. Low water stress and medium nutrient stress may be potential issues.**

[Cassava] Meanwhile, Tagape variety is recommended to be planted in **the 2st week of August**. The largest harvest will be obtained after 9 months. **However, this yield is predicted to be lower than the averages of the past 5, 10 years and last year. There might not have nutrient stress, but have low water stress.**

Case 2



In this case, in **Sanma**,

[Taro] Tarapatan variety is ideally planted in **the 3rd week of August**. The highest yield will be obtained after planting 8 or 9 months. **It exceeds the averages of the past 10, 5 years and last year. Low water stress and Medium nutrient stress.**

[Cassava] Tagape variety is recommended to be planted in **the 1st week of August.** The highest harvest will be obtained after 9 months. **This yield is lower than the averages of the past 5 and 10 years but surpasses that of last year.**

There is recommended weeks for crop planting to the side.
According to the crop model based forecast, planting Taro during the Second week of August in Tafea is projected to highest yield across the country. Yield is higher than last year, higher than the 10-year and 5-year average yield.

Nutrient Stress during all seasons for all crops
- Do Compost! Incorporate organic matters into the soil (e.g well-rotted manure, compost)

•••

Description

This section provides **an overall summary** of the results obtained through model forecast. The graph represents the potential yield upon harvest in April 2024 (after 8-9 months) when planting takes place in August 2023.

The recommendations are as follows:

- managaing water stress, which is deficiency of water.
- managing nutrient stress, indicating nitrogen deficiency.

Practice

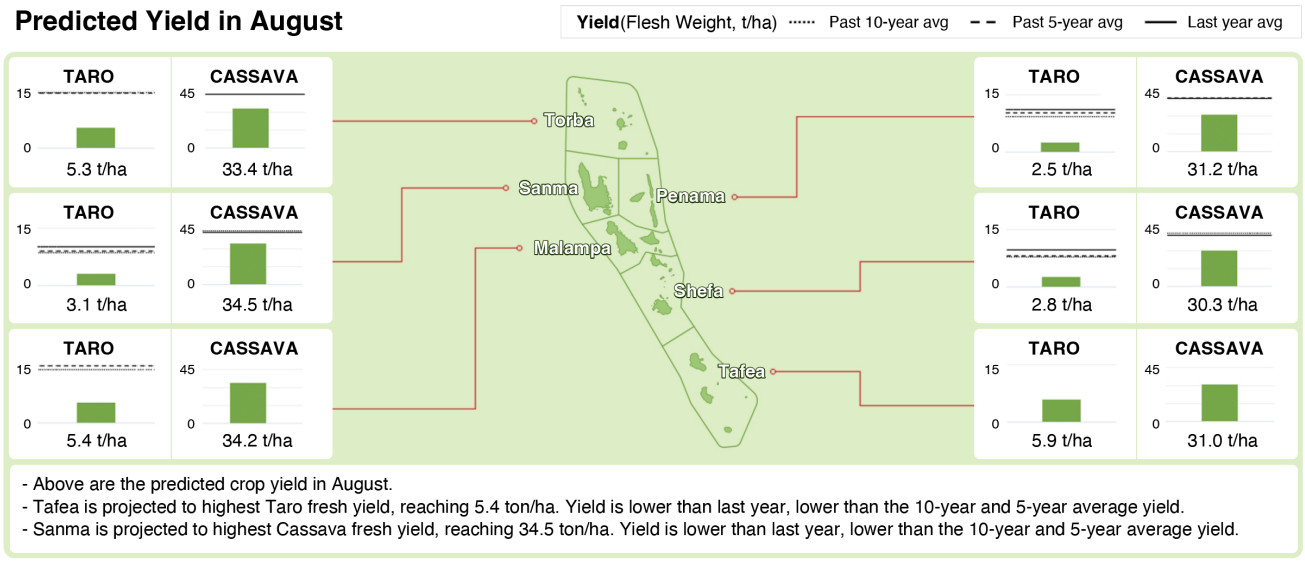
(Example)

Hello. I am **Pakoa** from **Port Vila, Shefa** province.
I am planning to plant **Tagape** in August. Referring to the Agromet Bulletin issued in July, it indicates that the best planting week for the highest yield is during **the 2nd week of August**, with the harvest expected after 8 months. Therefore, I have decided to carefully choose the planting days and avoid rainy periods.

Hello. I am _____ from _____, _____ province. I am planning to plant **(Tagape/Tarapatan)** in August. Referring to the Agromet Bulletin issued in July, it indicates that the best planting week for the highest yield is during the _____, with the harvest expected after 8 months. Therefore, I have decided to carefully choose the planting days and avoid rainy periods.

(Your Story)

5 Predicted Yield [in August]



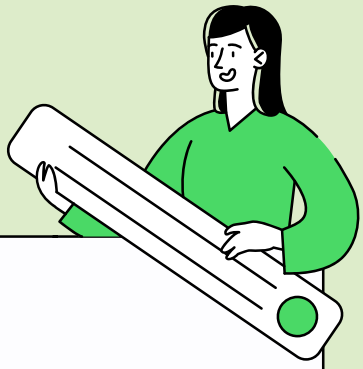
'Predicted Yield' refers to **the yield forecast for August 2023, which is issued in July 2023.** In this graph, you can observe **the yield projection for taro and cassava, representing the potential yield of Tarapatan and Tagabe, which may have been planted approximately 7-8 months ago.**

The green bar represents the predicted yield for the upcoming month by province. And the dotted line (·····) represents the 10-year average, the dashed line (– –) represents the 5-year average, and the solid line (——) represents the previous year.

Practice

In the case of **Taro**, the highest yield **5.9 t/ha** is observed in **Tafea**, whereas the lowest yield **2.5 t/ha** is recorded in **Penama** during the following month.

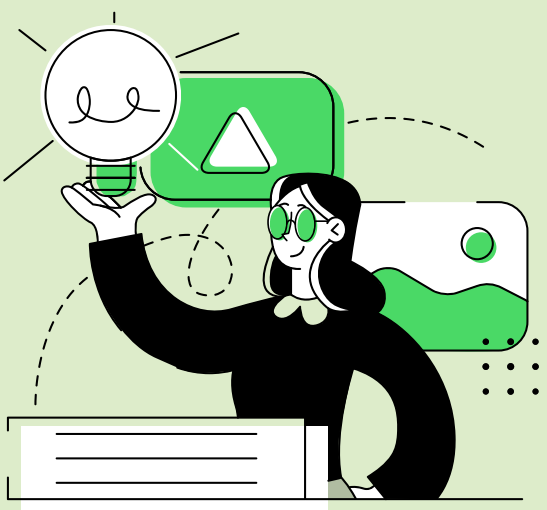
Regarding **Cassava**, _____ exhibits the highest yield _____ t/ha, while the yield of _____ is comparatively lower (**34.2 t/ha**). And the yield in _____ is predicted the lowest _____ t/ha.



Chapter 2

Background Knowledge

1. APCC Seasonal Forecast
2. Deterministic vs Probabilistic Forecast
3. APCC Probabilistic Forecast Method
4. APCC PMME (Ensemble)
5. Interpretation of Probability Forecasts
6. ENSO(El Niño Southern Oscillation) Overview
7. APCC ENSO Calculation Method
8. ENSO Alert Syetem
9. Effective Drought Index
10. Undertaking Field Trials
11. Best Planting Week



Introduction

The APEC Climate Center (APCC) is domestically and internationally leading the climate prediction technology development to increase the accuracy and reliability of climate prediction information by using state-of-the-art technologies, while at the same time conducting research and development (R&D) on the analysis and prediction technology for global climate change. APCC was established by the endorsement of 21 APEC members in 2005 as a worldwide climate prediction institute serving as a hub for climate information in the Asia-Pacific region.

APCC produces and provides accurate and reliable climate prediction information based on analysis using a Multi-Model Ensemble (MME) scheme. For the MME system, APCC collects climate prediction data from the 15 leading climate prediction centers and institutes in 11 economies.

Vision and Goals

Becoming a world-class climate prediction research institute serving as a hub for climate information in the Asia-Pacific region

Mission

Production and provision of high-quality climate prediction information and extreme climate monitoring and analysis

Development of climate prediction technology and its utilization plan

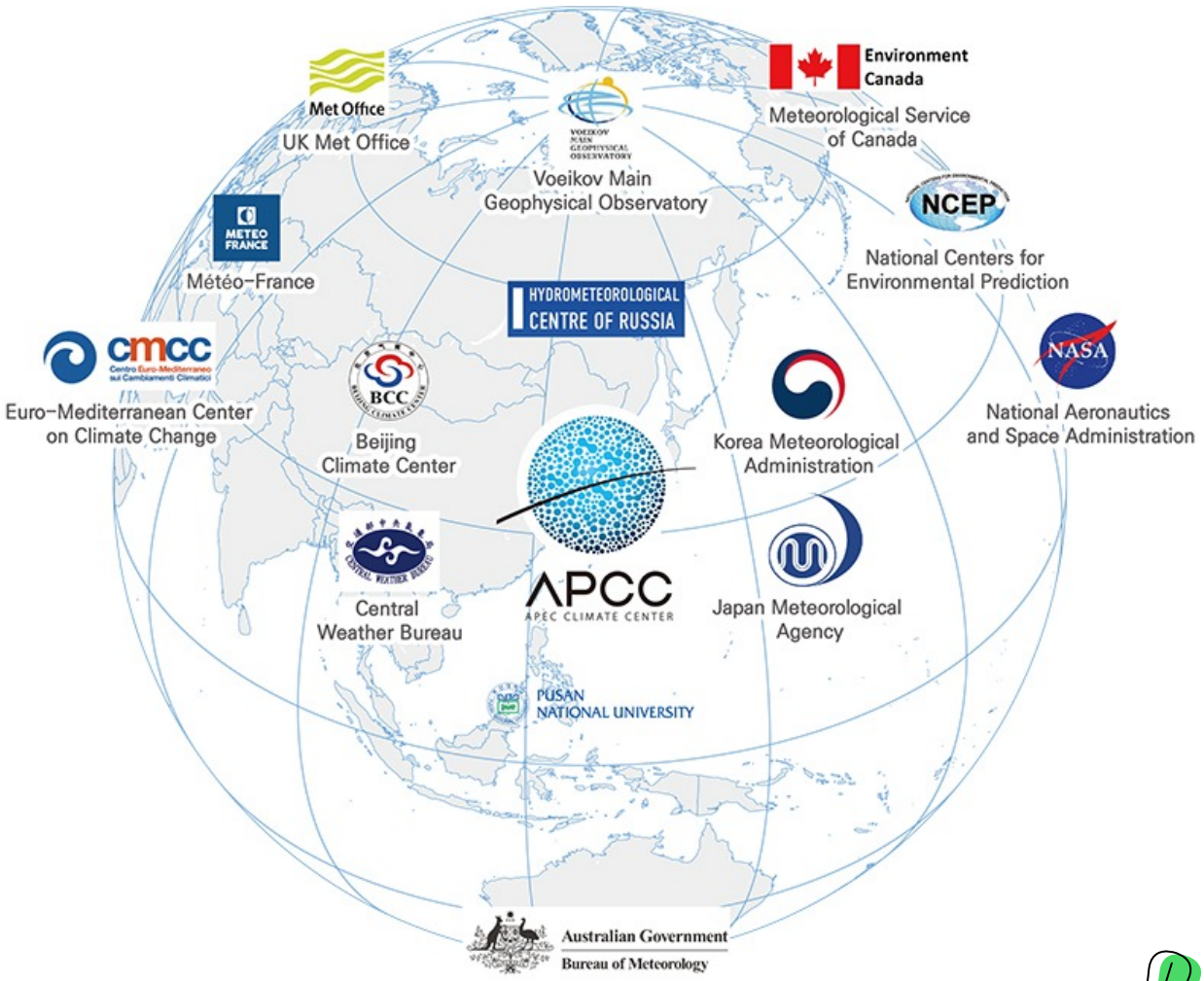
Support for training and capacity improvement in the area of climate prediction and utilization

Cooperation with domestic stakeholders and international organizations such as APEC

1. APCC Seasonal Forecast

The APCC seasonal forecast is based on multi-model ensemble (MME) prediction system and disseminated to APEC member economics around 15th of every month. Currently, 15 operational centers and research institutes from 11 countries around the world participate in the APCC MME operational prediction system by routinely providing their predictions in the form of ensembles of global forecast fields.

The APCC's real-time operational forecasts are issued in both deterministic (based on ensemble mean) and probabilistic (based on full set of ensemble members) forms and more detailed description of the methods is as follows.



2. Deterministic vs Probabilistic Forecast

1) Deterministic MME Forecast

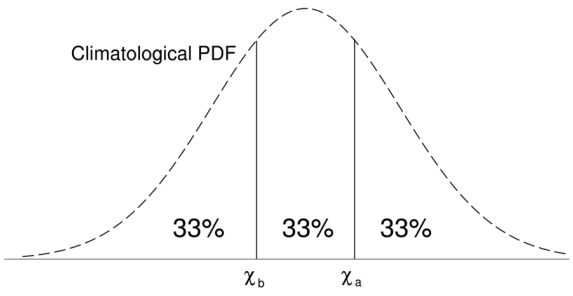
The deterministic forecast is based on a simple average of bias-corrected ensemble means from each model with equal weight to create a multi-model forecast. The ensemble mean anomaly forecasts for each individual model is calculated by their own climatology from the hindcasts.

2) Probabilistic MME Forecast

The probabilistic forecast is based on an uncalibrated MME with model weights being proportional to the square root of ensemble size, and a Gaussian fitting method for the estimation of the tercile-based categorical probabilities, that is, the probability of below-normal (BN), near-normal (NN), and above-normal (AN) categories with respect to climatology. The procedure for the probabilistic forecast consists of following two steps.

3. APCC Probabilistic Forecast Method

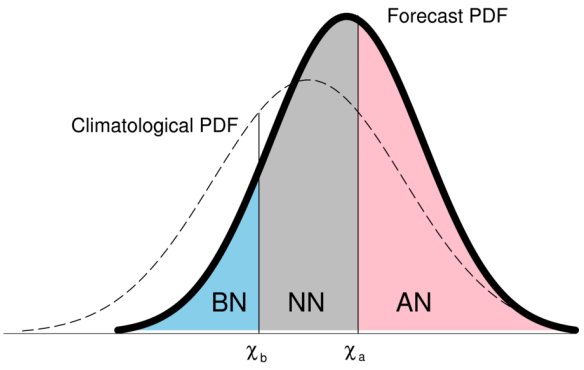
Estimation of individual model probabilities: The upper and lower terciles are determined separately for each model using their mean and standard deviation of hindcasts. Then, the forecast probability for each category is estimated as a portion of the cumulative probability of their forecast sample associated with the category.



The upper tercile: $\chi_a = \mu + 0.43\sigma$

The lower tercile: $\chi_b = \mu - 0.43\sigma$

where μ and σ are the mean and standard deviation of the hindcast sample, respectively



AN: probability for above normal condition
NN: probability for near normal condition
BN: probability for below normal condition

(APCC Web: https://www.apcc21.org/)

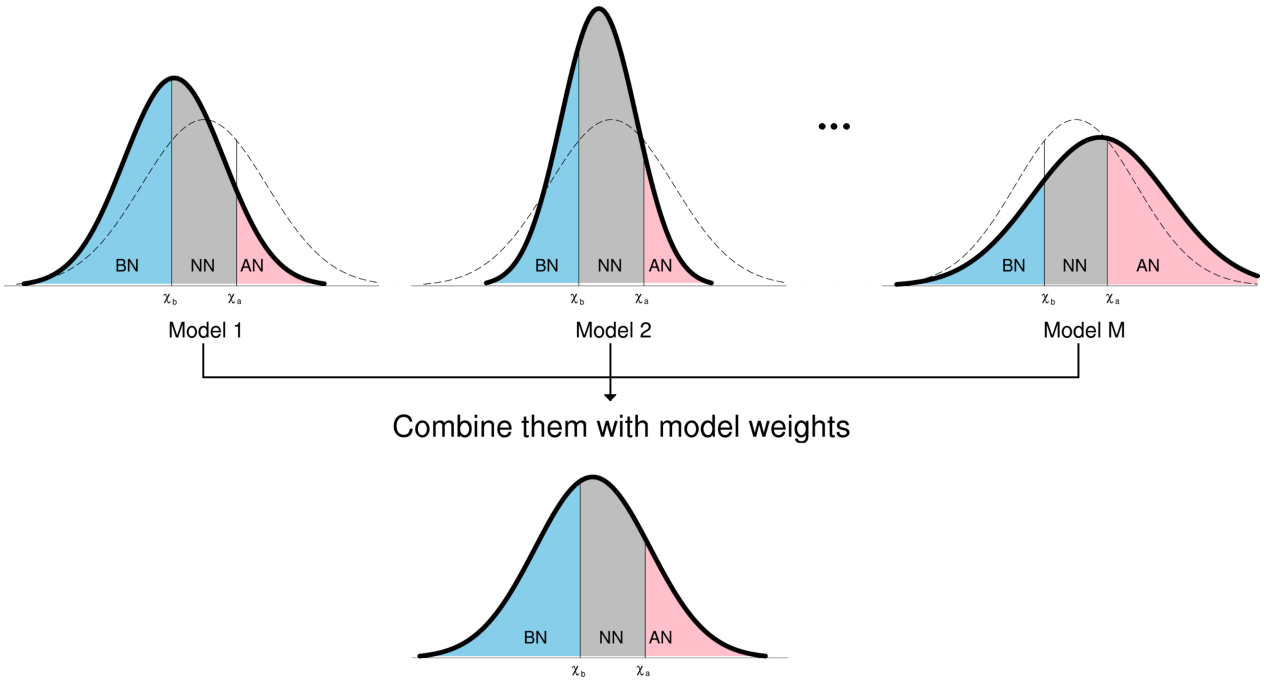
The detailed information about individual models currently utilized in APCC MME is as follows. Please note that the models used each month may vary slightly depending on their update status.

Name	Modeling Center	Ensemble (H/F)	Lead
SCoPS	APEC Climate Center	10/10	6
BCC_CSM1.1m	Beijing Climate Center	24/24	6
ACCESS-S2	Bureau of Meteorology	3/11	3
CMCC-SPS3.5	Centro Euro-Mediterraneo sui Cambiamenti Climatici	40/50	5
TCWB1Tv1.1	Taiwan Centeral Weather Bureau	30/30	6
CanSPISv2.1	Environment and Climate Change Canada	10/10	11
SL-AV	Hydrometeorological Research Center for Russia	11/41	3
MRI-CPS3	Japan Meteorology Agence	10/50	6
GloSea6GC3.2	Korea Meteorological Administration	28/84	6
Sys8	Meteo France	25/51	5
MGOAM-2	Voeikov Main Geophysical Observatory	6/10	3
GEOS-S2S-2.1	National Aeronautics and Space Administration	4/10	8
CFSv2	NCEP/NWS/NOAA	20/20	6
CGCM v2.0	Pusan National University	35/35	6
GloSea6	United Kingdom Meteorological Office	28/42	5

Individual models for APCC MME

4. APCC PMME (Ensemble)

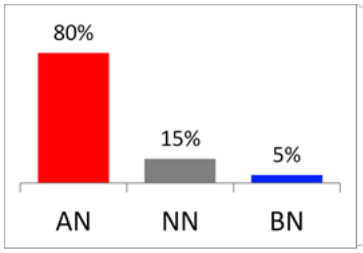
Multi-model combination: The forecast probabilities for each model are averaged together with model weights being inversely proportional to the random errors in the forecast probability associated with the standard error of the ensemble mean (i.e., proportional to the square root of ensemble size) to create a probabilistic multi-model ensemble forecast. For each grid point, probability forecasts in the dominant category being statistically significant at 5% level based on Pearson's chi-square test are displayed in colors.



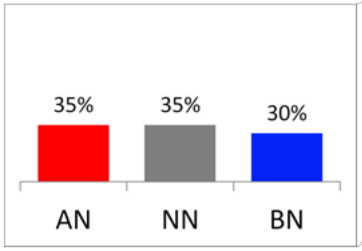
(APCC Web: https://www.apcc21.org/)

5. Interpretation of Probability Forecasts

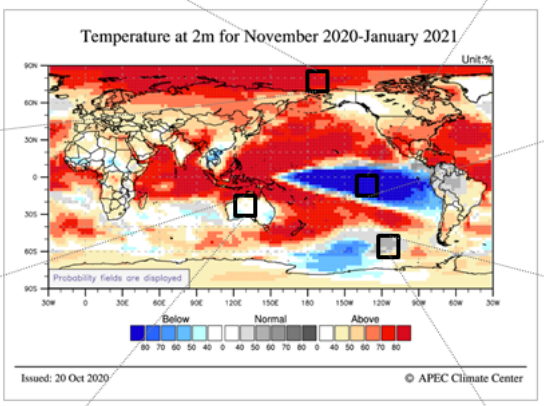
The colors displayed on the map represent the integrated probabilities of the third quartile, indicating the dominant category with the highest probability at that location among the quartiles. For temperature, if the probability of being higher than average is predicted to be the highest among the quartiles, it is represented in red. If the probability of being similar to the average is predicted to be the highest, it is represented in gray. If the probability of being lower than average is predicted to be the highest, it is represented in blue. The probability value corresponds to the probability of the respective category represented by the color at that location. If the difference in prediction probabilities between each category is not statistically significant, it is interpreted as uncertain and displayed in white.

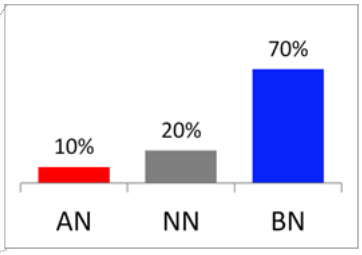


The probability of temperatures being higher than average is predicted to be 80%

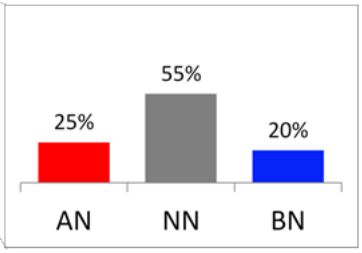


The difference in prediction probabilities between each category is not statistically significant





The probability of temperatures being lower than average is predicted to be 70%



The probability of temperatures being similar to average is predicted to be 55%

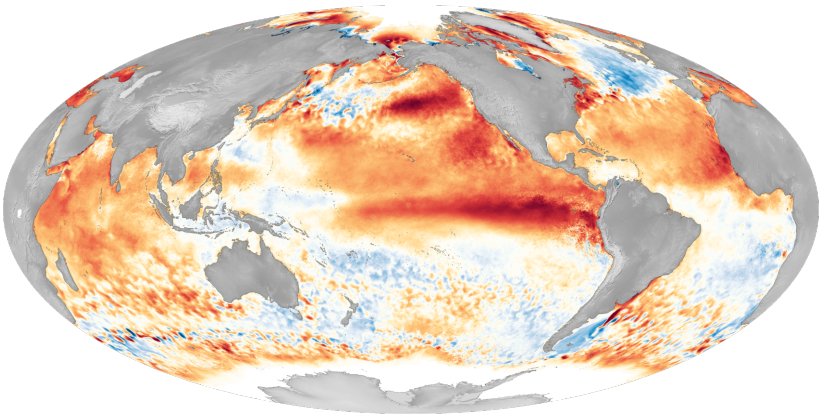
(APCC Web: https://www.apcc21.org/)

6. ENSO(El Niño Southern Oscillation) Overview

The connection between Earth's oceans and atmosphere has a direct impact on the weather and climate conditions we experience. El Niño and La Niña, together called the **El Niño Southern Oscillation (ENSO)**, are episodic departures from expected sea surface temperatures (SSTs) in the equatorial Pacific Ocean. These warmer or cooler than normal ocean temperatures, anywhere from 1°C to 3°C, compared to normal, can affect weather patterns around the world by influencing high and low pressure systems, winds, and precipitation. ENSO may bring much needed moisture to a region while causing extremes of too much or too little water in others.

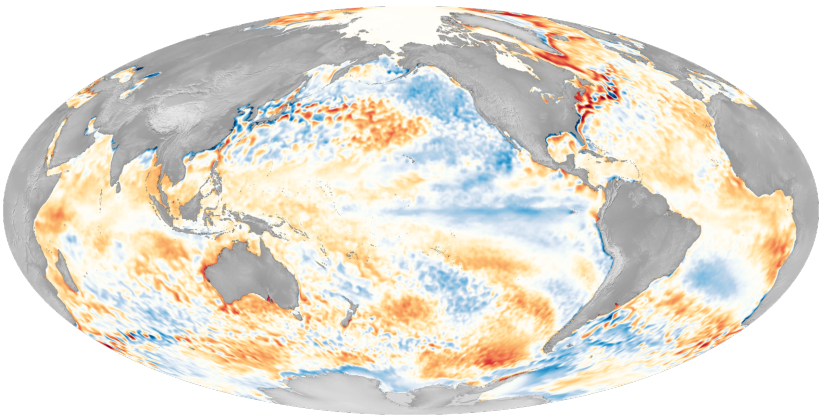
This oscillating warming and cooling pattern, referred to as the ENSO cycle, directly affects rainfall distribution in the tropics and can have a strong influence on weather across the world. El Niño and La Niña are the extreme phases of the ENSO cycle; between these two phases is a third phase called ENSO-neutral.

El Niño: A warming of the ocean surface, or above-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean. Over Indonesia, rainfall tends to become reduced while rainfall increases over the central and eastern tropical Pacific Ocean. The low-level surface winds, which normally blow from east to west along the equator ("easterly winds"), instead weaken or, in some cases, start blowing the other direction (from west to east or "westerly winds"). In general, the warmer the ocean temperature anomalies, the stronger the El Niño (and vice-versa).



Very strong El Niño in 2016 – large 'red tongue' in equatorial Pacific
(NOAA/NESDIS)

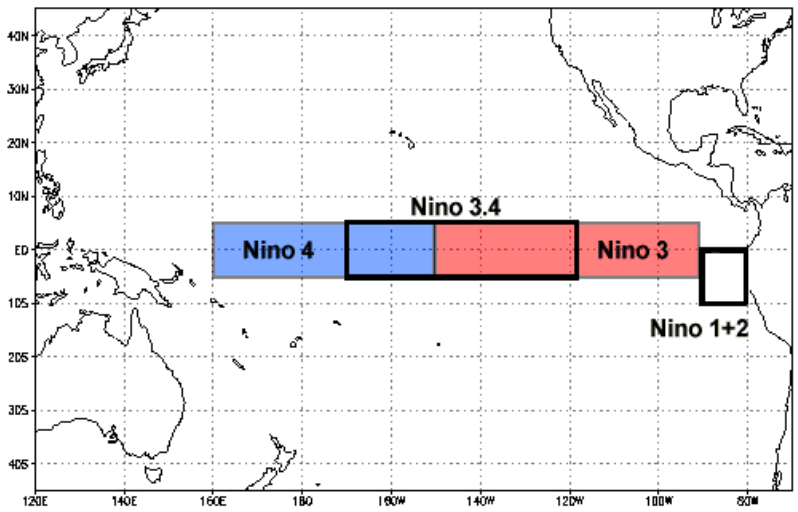
La Niña: A cooling of the ocean surface, or below-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean. Over Indonesia, rainfall tends to increase while rainfall decreases over the central and eastern tropical Pacific Ocean. The normal easterly winds along the equator become even stronger. In general, the cooler the ocean temperature anomalies, the stronger the La Niña (and vice-versa).



La Niña event – large blue area in equatorial Pacific
(NOAA/NESDIS)

Neutral: Neither El Niño or La Niña. Often tropical Pacific SSTs are generally close to average. However, there are some instances when the ocean can look like it is in an El Niño or La Niña state, but the atmosphere is not playing along (or vice versa).

The highlighted region in the below image indicates regions monitored for sea surface temperatures(SST) to determine the current phase of the El Niño -Southern Oscillation (ENSO).

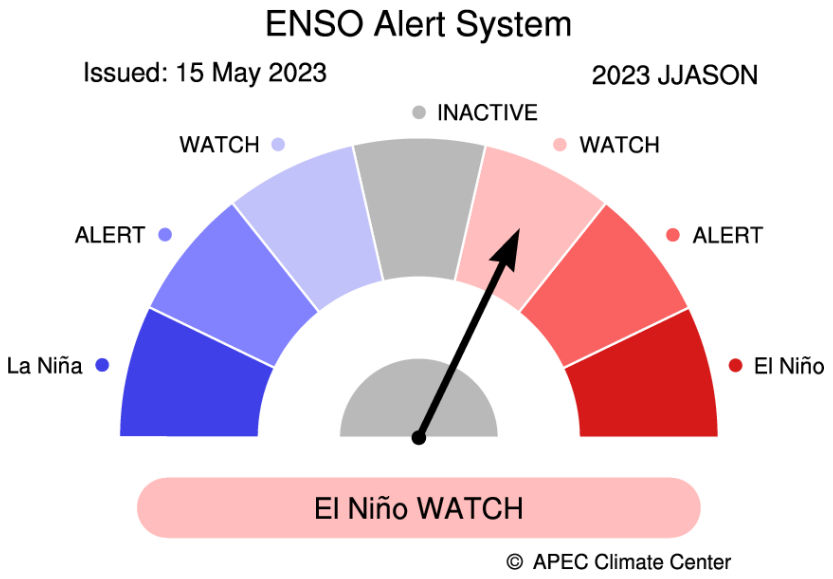


7. APCC ENSO Calculation Method

El Niño	El Niño Alert	El Niño Watch	Incactive	La Niña Watch	La Niña Alert	La Niña

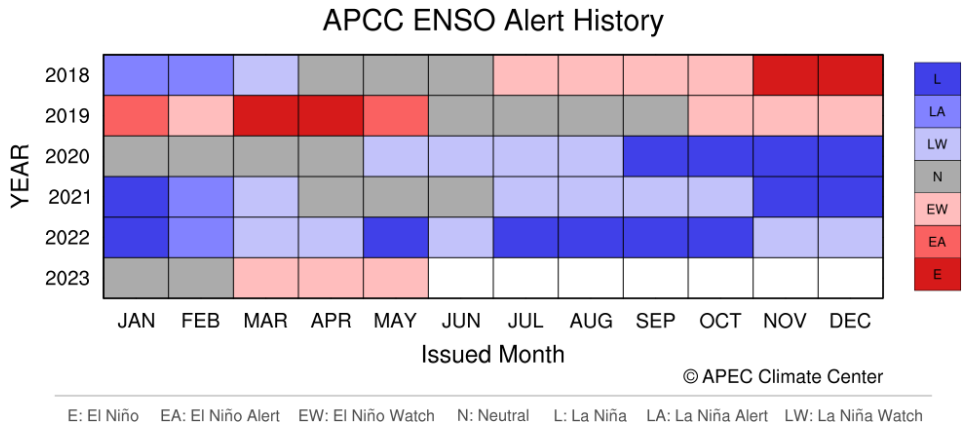
El Niño	Issued when El Niño is nearly developed and expected to persist in the next 3 months. All of the following criteria need to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C in the latest 2 months, and ONI greater than or equal to 0.5 °C in the latest month
	Prediction	ONI greater than or equal to 0.5°C for the next 3 months
El Niño Alert	Issued when conditions are favorable for the development of El Niño within the next 3-4 months with chance greater than or equal to 60%. All of the following criteria need to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C in the latest 2 months, and ONI greater than or equal to 0.5 °C in the latest month
	Prediction	ONI greater than or equal to 0.5°C for the next 2 months, or chance of El Niño development greater than or equal to 60% for the next 3 months
El Niño Watch	Issued when conditions are favorable for the development of El Niño within the next 3-4 months with chance greater than or equal to 50%. One of the following criteria needs to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C and ONI between -0.5°C and 0.5°C in the latest month
	Prediction	SSTA greater than or equal to 0.5°C for 2 months out of the next 4 months, or chance3) of El Niño development greater than or equal to 50% for the next 3 months
Incactive	No favorable conditions to exceed El Niño/La Niña warning criteria within the next 3-5 months	

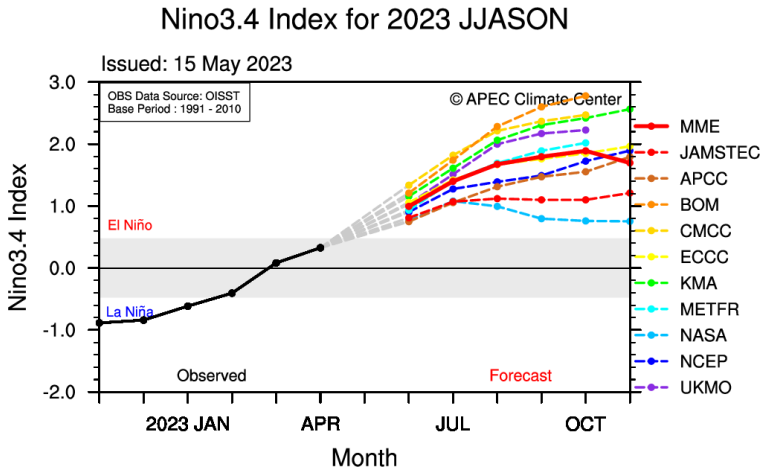
La Niña Watch	Issued when El Niño is nearly developed and expected to persist in the next 3 months. All of the following criteria need to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C in the latest 2 months, and ONI greater than or equal to 0.5 °C in the latest month
	Prediction	ONI greater than or equal to 0.5°C for the next 3 months
La Niña Alert	Issued when conditions are favorable for the development of El Niño within the next 3-4 months with chance greater than or equal to 60%. All of the following criteria need to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C in the latest 2 months, and ONI greater than or equal to 0.5 °C in the latest month
	Prediction	ONI greater than or equal to 0.5°C for the next 2 months, or chance of El Niño development greater than or equal to 60% for the next 3 months
La Niña	Issued when conditions are favorable for the development of El Niño within the next 3-4 months with chance greater than or equal to 50%. One of the following criteria needs to be satisfied :	
	Observation	SSTA greater than or equal to 0.5°C and ONI between -0.5°C and 0.5°C in the latest month
	Prediction	SSTA greater than or equal to 0.5°C for 2 months out of the next 4 months, or chance of El Niño development greater than or equal to 50% for the next 3 months

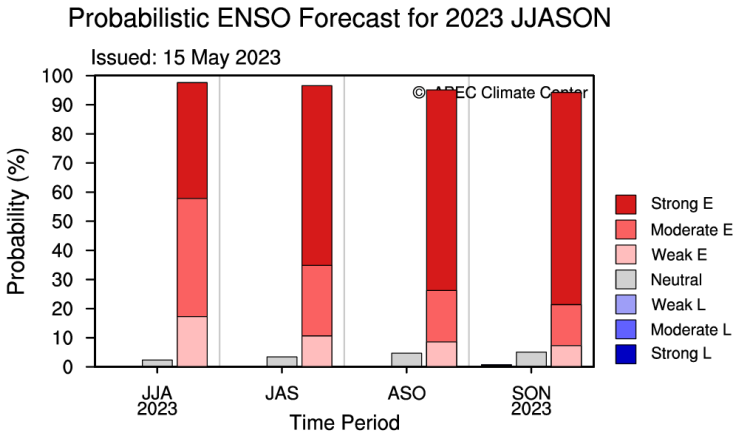


8. ENSO Alert Syetem

You can find Sea Surface Temperature Outlook on APCC website, including ENSO forecast, accumulated data and the detailed Niño Index values utilized in the ENSO forecast.



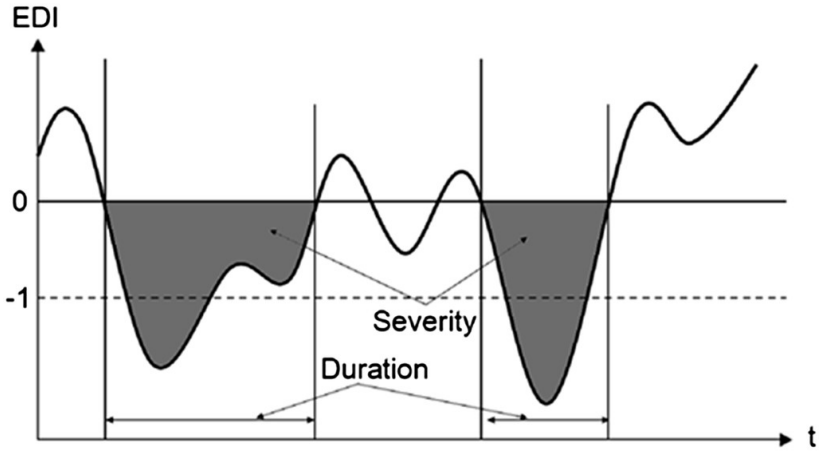




* ENSO Intensity based on 3M Mean Nino3.4 SST Anomaly (Category Boundaries: +/-1.5, 1.0, 0.5°C)

9. Effective Drought Index

The Effective Drought Index (EDI) is a valuable tool for assessing and monitoring drought conditions. By utilizing daily precipitation data, it calculates various parameters that collectively offer insights into the onset, intensity, and duration of a drought event. The proximity of the graph point to each end reflects the intensity of the drought: the closer it is to the bottom end, the more severe the drought, while the closer to the top end suggests wetter conditions.



“

The Effective Drought Index (EDI) is a valuable tool used for various purposes related to drought management. Here are some common applications and ways to apply the EDI:

1. Drought monitoring: The EDI helps in monitoring and assessing drought conditions over time. Regularly tracking the EDI values allows you to gauge the severity and duration of drought events, helping you understand the overall drought situation in specific area.

2. Water Management: The EDI assists in making informed decisions regarding water resource management. By considering the EDI values, water managers can allocate water resources effectively, prioritize water usage, and plan for water conservation measures during drought periods. It hleps ensure sustainable water management practices and mitigates the adverse effects of drought on water availability.

3. Agriculture and Crop Planning: Farmers can utilize the EDI to guide agricultural practices and crop planning. By understanding the EDI values, farmers can make informed decisions about irrigation, crop selection, and timing of planting or harvesting. It helps optimize agricultural activities and minimize the impact of drought on crop yields.

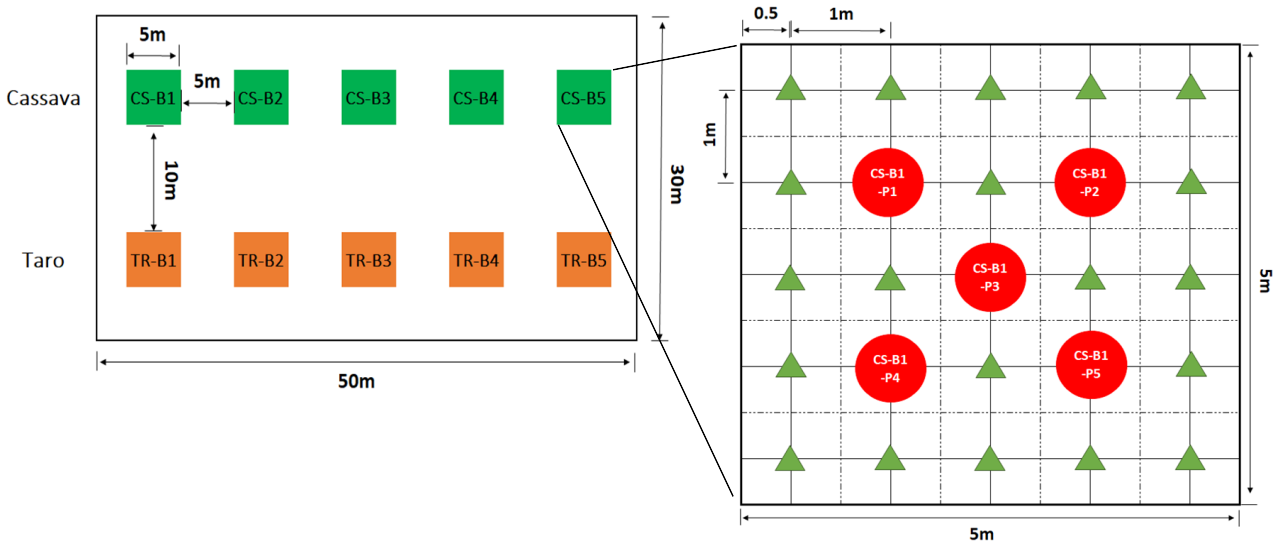
4. Policy and Planning: Government agencies and policy makers can incorporate the EDI into drought mitigation and response strategies. The index provides valuable information for policy development, resource allocation, and long-term planning to enhance resilience against drought events.

”

10. Undertaking Field Trials

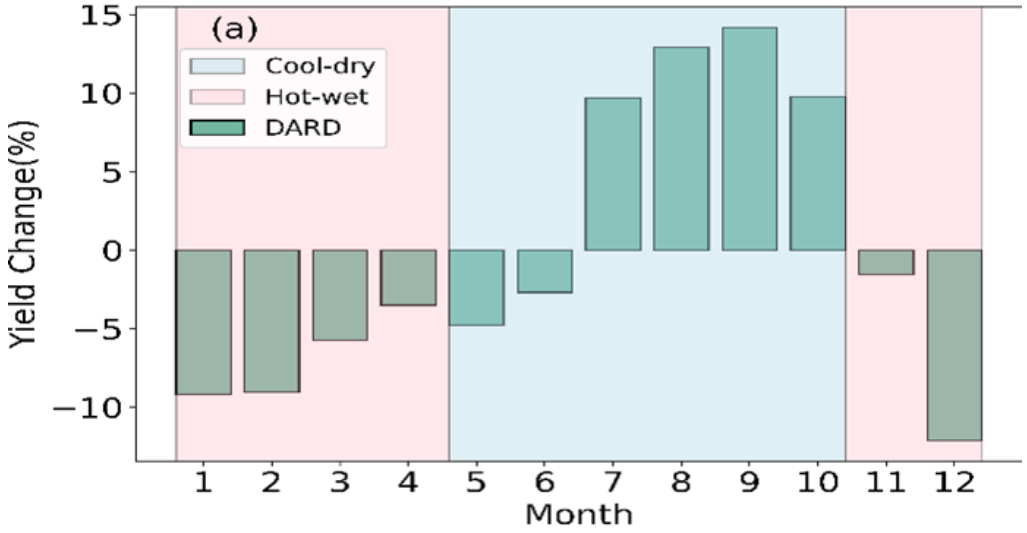
APCC and DARD and designed and conducted two experimental field trials in Port villa(DARD) and Luganville (VARTC) to identify local genotype of Cassava (Tagape) and Taro (Tarapatan) for the purpose of issuing seasonal crop outlook via OSCAR system.

Crop	Site	Planting	Harvest	Data collection	Report
Cassava (8 Months)	DARD	Feb-23, 2022	Oct-22, 2022	·Growing data · Destructive data	Biweekly(*.pdf) Excel (*.xlsx) Photo (*.jpg)
	VARTC	Apr-13,2022	Dec-12, 2022		
Taro (9 Months)	DARD VARTC	Mar-11,2022	Dec-10, 2022	· Growing data · Destructive data	



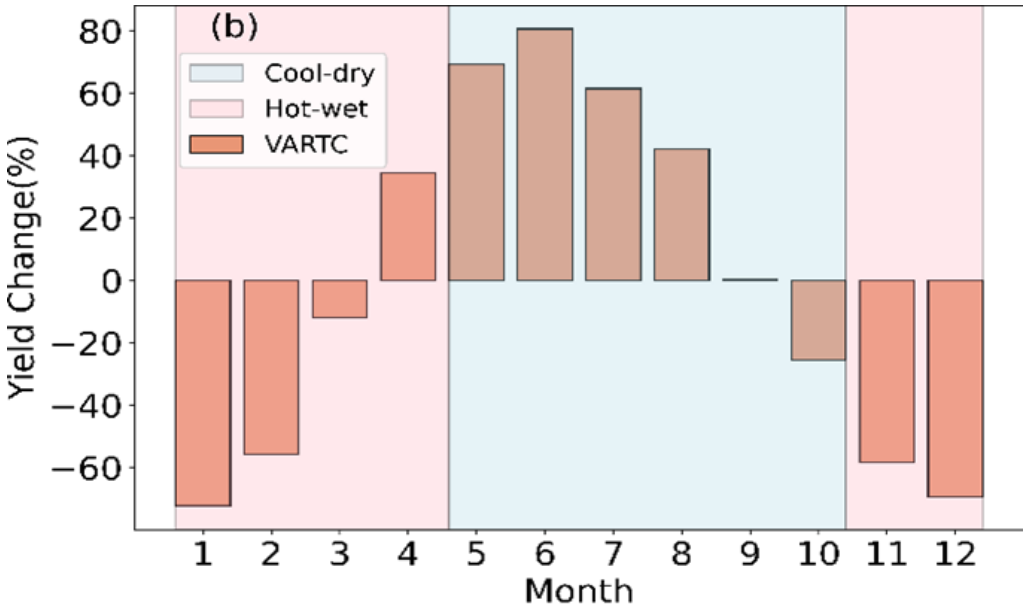
Bi-weekly, local data collectors reported APCC on growing photo data, by observing data. Once bi-weekly reports are received, APCC analyzed growing trends and captured unusual trends or unhealthy plants. From these field trials, we currently are collecting two types of crop data by genotype parameters:

11. Best Planting Week



In DARD, Port Vila, Taro has the potential to yield higher than usual during the cool-dry season, which spans from July to October.

in VARTC, Lugavile, Taro tends to yield more during the months of April to August. The optimal planting month in Lugavile is slightly earlier compared to Port Vila.



In the VARTC site, Higher nitrogen stress levels were found to be associated with decreased yields. This can be attributed to the early death of Taro plants caused by nitrogen stress during the establishment growth phase, occurring before 70 days after planting.

The application of organic compost or nitrogen fertilizers would be helpful for yield before 70 DAP specially for the establishment phases.

Weeding and tillage

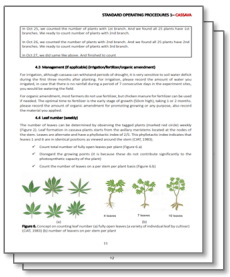
Measuring field

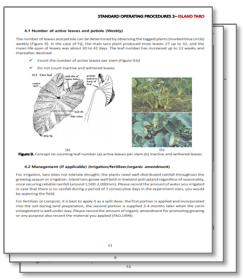
Preperation

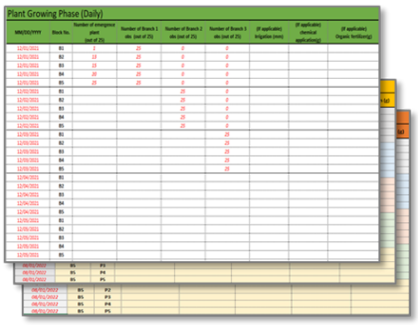
Step 1

Before Start

Developmet of SOPs*



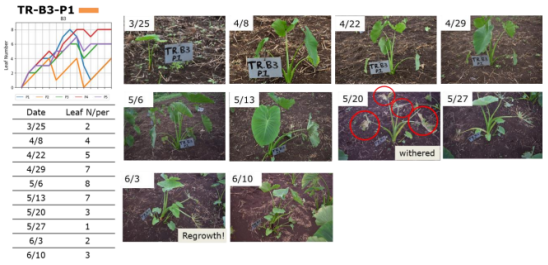




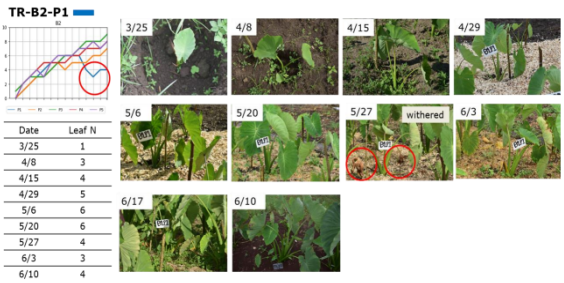
* Standard Operating Procedures

Step 2

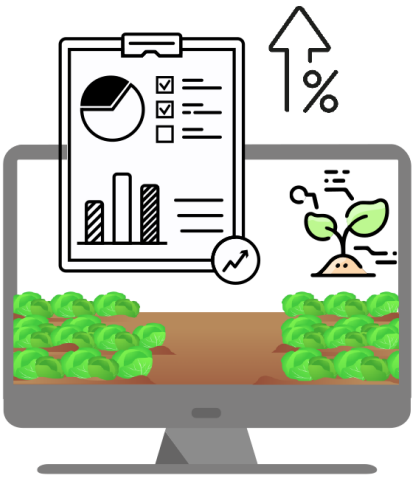
Planting



Date	Leaf N/per
3/25	2
4/8	4
4/22	5
4/29	7
5/6	8
5/13	7
5/20	3
5/27	1
6/3	2
6/10	3



Date	Leaf N
3/25	1
4/8	3
4/15	4
4/29	5
5/6	6
5/20	6
5/27	4
6/3	3
6/10	4



Monitoring

Step 3

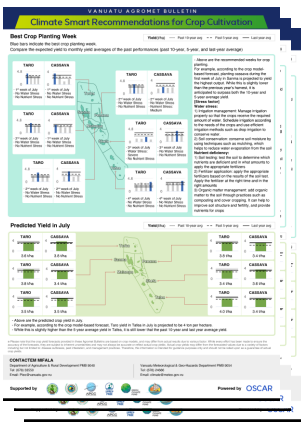
Modelling

Step 5

OSCAR

Step 4

Harvesting



Agromet Bulletin

Contributing Partners

“

GREEN CLIMATE FUND

APCC APEC CLIMATE CENTER

SPREP PROE

”

This user guide aims to empower farmers by providing them with valuable insights and practical guidance to effectively interpret and utilize the agromet bulletin, ultimately enhancing their agricultural practices and fostering sustainable growth

APEC Climate Center