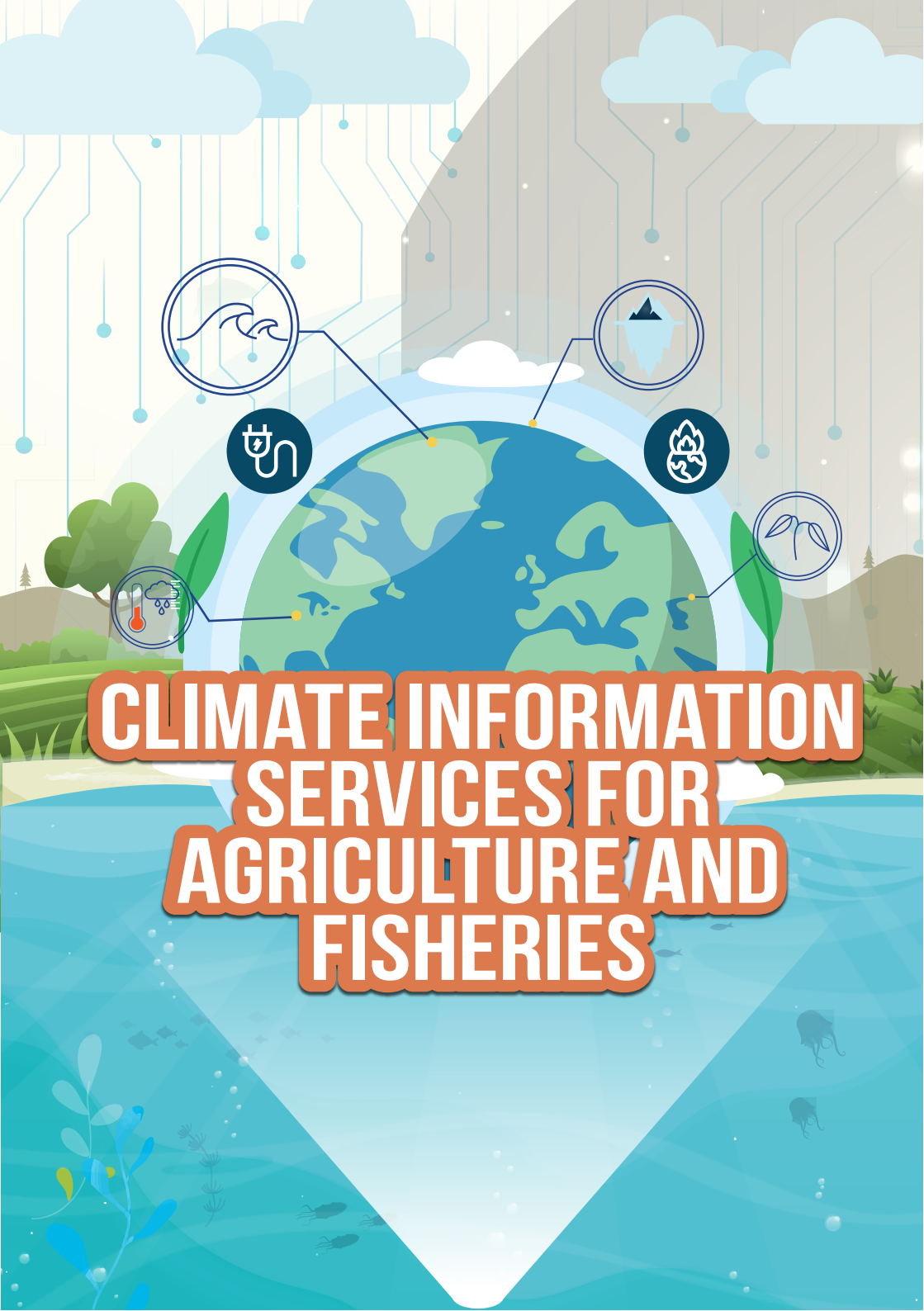
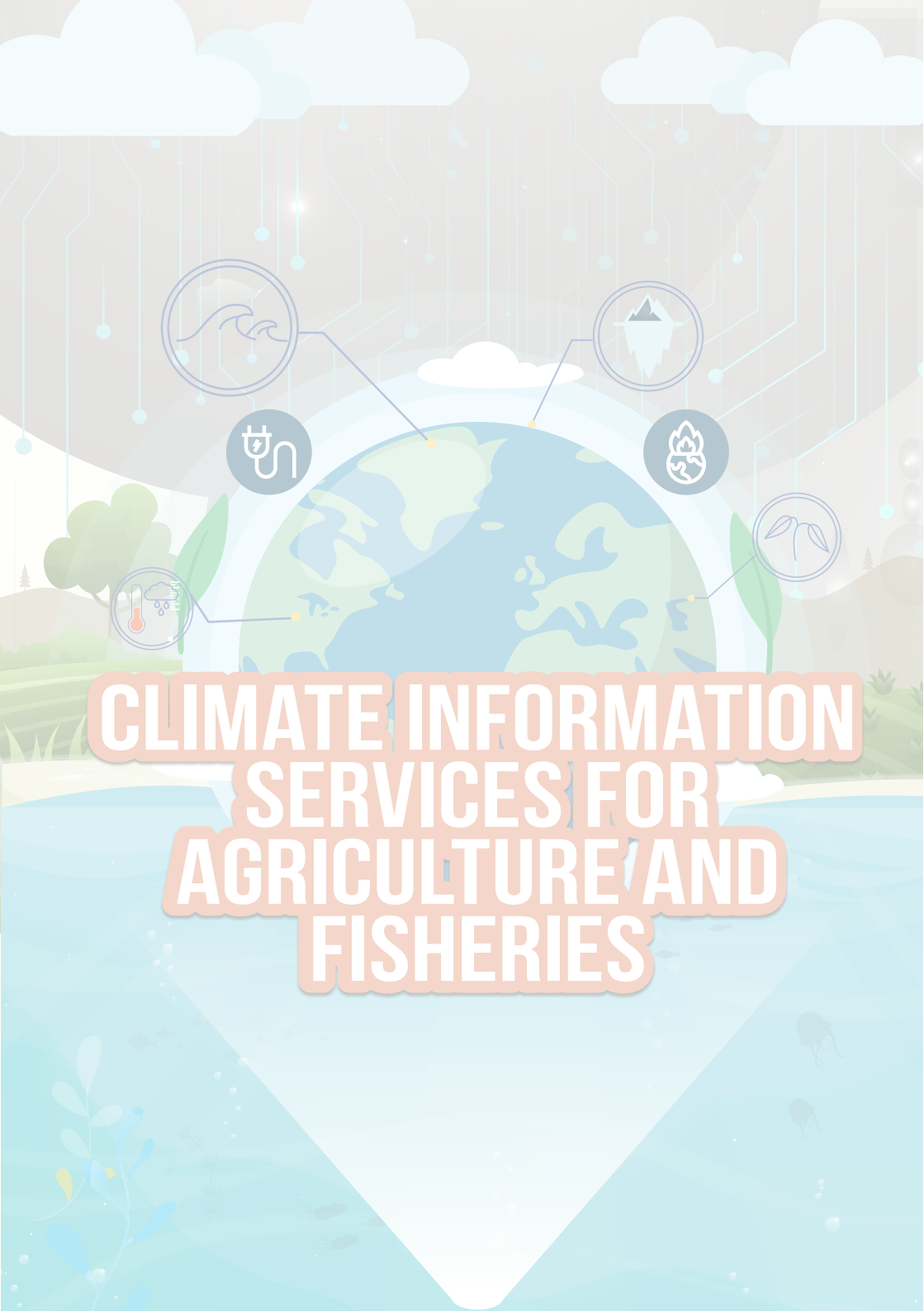

CLIMATE INFORMATION
SERVICES FOR
AGRICULTURE AND
FISHERIES

Published by:
People in Need Philippines
Blk. 2, Lot 11, Silvervcreek, Puli, Carmen
Cagayan de oro City, Philippines

With contributions from:
Philippine Atmospheric, Geophysical and Astronomical Services Administration
Department of Agriculture-Adaptation and Mitigation Initiative in Agriculture

Disclaimer: This publication was made possible through the financial support of the Government of Japan, provided via the Ministry of Foreign Affairs, as part of a project implemented by the Food and Agriculture Organization of the United Nations (FAO) Philippines. The views and content expressed herein are solely those of the author and do not necessarily reflect the positions of the Government of Japan, and FAO.


CLIMATE INFORMATION SERVICES FOR AGRICULTURE AND FISHERIES

People in Need

People in Need (PIN) is an international non-profit organization providing humanitarian and development assistance and has operated in over 40 countries worldwide since 1992. PIN began in the Philippines serving communities affected by Super Typhoon Yolanda in 2013. Ever since then, our actions in the Philippines have focused on sustainable livelihood, social cohesion, women and youth empowerment, renewable energy, health, disaster resilience, and good governance.

For online version and other PIN publications,

SCAN ME!

Like and follow us!

www.philippines.peopleinneed.net
People in Need Philippines

TABLE OF CONTENTS

Natural Hazards

Geophysical

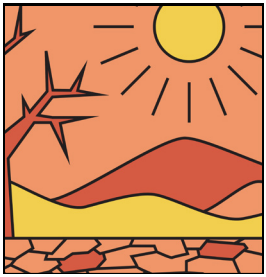
- Earthquakes
- Volcanic Activity

Hydrological

- Flooding
- Landslides
- Tsunamis
- Avalanche

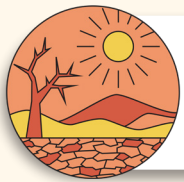
Meteorological

- Winter Storms
- Lightning
- Winds
- Tornados
- Heat Waves
- Cold Waves
- Hurricanes
- Hails



Climatological

- Earthquakes
- Volcanic Activity

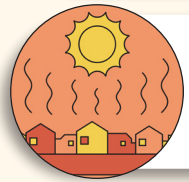


Drought

Caused by extended periods of below-average rainfall. They can be exacerbated by high temperatures that increase evaporation rates, poor water management practices, and deforestation.

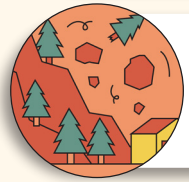
Flood

These can result from prolonged heavy rainfall, melting snow, storm surges from cyclones or a combination of these factors. Human actions, like deforestation and poor urban planning, can also exacerbate flooding.



Heat Wave

Caused by high-pressure systems trapping warm air in an area. Human-induced climate change is also believed to intensify and prolong heatwaves.



Landslide

The movement of rock, debris, or earth down a slope due to gravity. They can be triggered by factors such as heavy rainfall, earthquakes, volcanic activity, and human activities like construction

Severe Storm

Form over warm ocean waters when the atmosphere's conditions favor their development. The warm water heats the air above, causing it to rise and create a low-pressure system, which then draws in more air, leading to the formation of cyclones.

Storm Surge

A storm surge is an abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide. This surge is primarily caused by a storm's winds pushing water onshore

Strong Winds

A strong wind hazard, often exceeding 50-60 mph, refers to damaging winds, potentially originating from thunderstorms or other severe weather events, that can cause significant damage and pose risks to life and property.

Source: NOAA National Severe Storms Laboratory
National Hurricane Center

INTRODUCTION

Global warming has intensified the frequency and severity of extreme weather events, including typhoons, heavy rainfall, flooding, and droughts (ADB, 2009). These climate-related disasters have far-reaching consequences, affecting millions worldwide by threatening food and water security, disrupting agricultural supply chains, and endangering coastal communities (World Bank et al., 2016).

Super Typhoon Rai (Odette), which struck the Philippines in December 2021, inflicted extensive damage on the agriculture sector. Government assessments indicated that the typhoon resulted in approximately $215 million in damage to agricultural assets and land, including the destruction of more than 1 million acres of farmland. Additionally, the fishing industry suffered losses estimated at $78 million. In total, these losses impacted the livelihoods and food security of approximately 390,000 individuals.

The agricultural and fisheries sectors, which serve as the backbone of food security and rural economies, are among the hardest hit by climate-induced disasters. Smallholder farmers and fisherfolk, who rely heavily on predictable weather patterns for their livelihood face mounting challenges due to erratic climate conditionsreduction strategies.

The lack of accessible, accurate, and timely weather and climate information further exacerbates their vulnerability, leading to misinformed decisions that impact production, income, and overall food security. Providing understandable and reliable weather forecasts can significantly enhance decision-making, enabling farmers and fisherfolk to mitigate risks and safeguard their livelihoods.

Strengthening climate resilience through improved forecasting systems, education, and sustainable agricultural practices is essential to protecting livelihoods, minimizing economic losses, and fostering long-term food sustainability in vulnerable regions.

ABOUT THE PROJECT

The Philippines is one of the most disaster-prone countries in the world, frequently affected by typhoons, floods, landslides, and droughts. With climate change driving more frequent and intense events, local communities are facing increasing challenges to their livelihoods and resilience.

As part of the Food and Agriculture Organization of the United Nations-led initiative *Restoring Livelihoods and Enhancing Resilience for Farmers and Fisherfolk Affected by Typhoon*, People in Need is implementing Output 2 of the project. This component focuses on establishing Community Information Systems (CIS) and Early Warning Systems (EWS) to better prepare and protect farming and fishing communities. The overall project is funded by the Government of Japan through its Ministry of Foreign Affairs, in response to the widespread damage caused by Typhoon Rai (Odette) in December 2021.

Output 2: Capacity Building and CIS/EWS Establishment in 12 Priority Municipalities in the Provinces of Bohol, Southern Leyte and Surigao del Norte, Philippines

- **Strengthen Capacities on CIS:** Enhance understanding and skills related to CIS.
- **Localization of CIS:** Equip participants with tools to tailor climate information to local contexts.

- **Capacity Building for Local Champions:** Prepare participants to take leadership roles in climate monitoring and advisory services.
- **Community Empowerment:** Foster skills in using climate data for informed decision-making.
- **Development of Practical Solutions:** Enable the creation of localized strategies for agricultural and fishery resilience.

Onsite Mentoring for Data Management

Enhance Local Capacity in Data Management: Equip participants with hands-on skills in downloading, organizing, and archiving weather data using AWS to ensure efficient and accurate climate information handling at the local level.

Enable Advisory Creation for Community Resilience: Train participants to utilize localized CIS data for developing actionable and timely advisories tailored to the needs of their farming and fishing communities

Stakeholders Planning Meeting

Establish clear roles, responsibilities, and accountability mechanisms among stakeholders, ensuring the effective implementation of policies, and the development of a comprehensive framework for monitoring and evaluation of climate information services (CIS) at the local level.

MODULE 1:
What are Climate Information Services?

Objective

Climate Information Services Climate Information Services may be defined as services that provide climate information that will assist individuals and organizations in their decision-making. It involves timely production, translation and delivery of useful climate data, information and knowledge for decision-making and climate-smart policy and planning.

Climate information services provide science-based and user-specific information in managing risks and exploiting opportunities created by climate variability and change.

Discussion:

1. What are Climate Information Services and Focused Areas
2. CIS and SDGs
3. What are the Types of CIS and their uses

Focused areas of CIS

Forecasting forthcoming seasons to inform decision-making

Projecting long-term trends to guide policy-making and strategic planning

Monitoring and predicting climate-related hazards for disaster risk management.

CIS and Sustainable Development Goals

The majority of the 17 SDGs identified under Agenda 2030 and many of their 169 targets and activities are weather and climate sensitive. CIS is crucial to the 2030 agenda's ambition to 'leave no one behind'.

Goal 1 - End poverty in all its forms everywhere

Climate forecasts help farmers and fishers make informed decisions, reducing vulnerability to climate impacts and improving productivity and livelihoods.

Goal 2 - End hunger, achieve food security, and promote sustainable agriculture

Climate forecasts support food security by enhancing crop yields and ensuring sustainable agriculture.

Goal 6 - Ensure sustainable water and sanitation management

Seasonal forecasts improve water allocation for agriculture and fisheries, supporting efficient resource use.

Goal 9 - Build resilient infrastructure and foster innovation

Climate monitoring aids in disaster-proofing agricultural infrastructure, ensuring resilience against extreme weather.

Goal 13 - Take urgent action to combat climate change

Early warning systems help farmers and fishers prepare for extreme weather events, reducing losses and improving resilience.

Goal 14 - Conserve and sustainably use oceans and marine resources

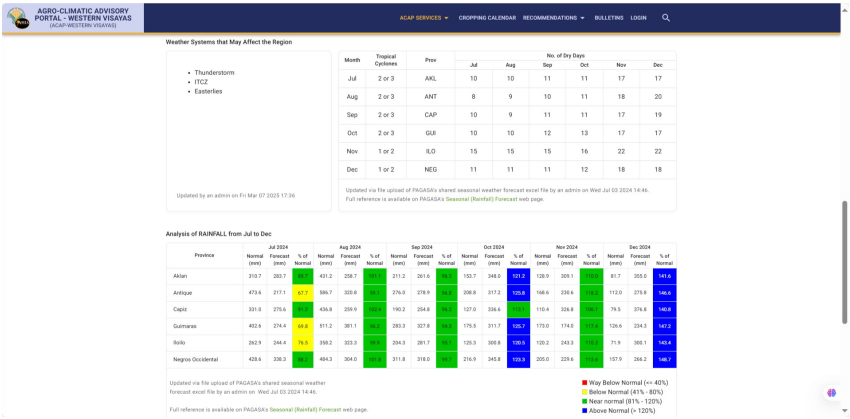
Climate data supports the protection of marine ecosystems, ensuring the sustainability of fisheries and coastal livelihoods.

3 Types of Climate Information Services (CIS)

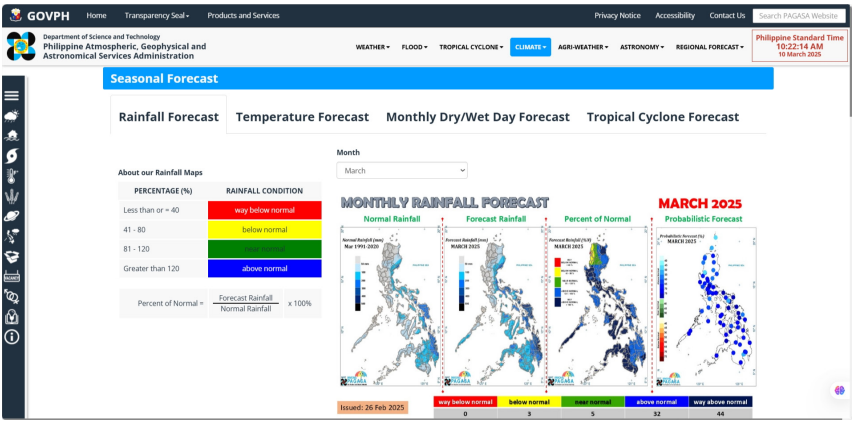
1. Regional & Provincial Seasonal Climate Outlook and Advisories [R/PSCOA]

It covers a 6-month period, projected weather systems which may affect the area and the rainfall.

Updated and localized once a month by the Regional and Provincial Government Units. These can be accessed through the ACAP Portal and PAGASA website.



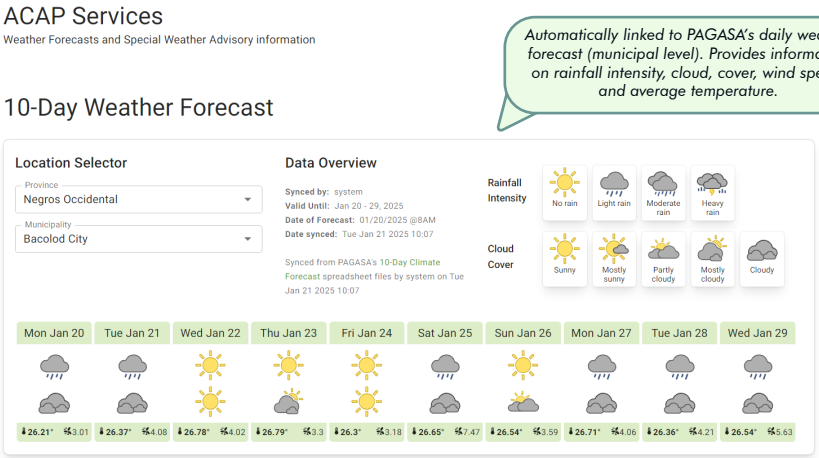
https://acap-westernvisayas.github.io/weather-services/#seasonal-forecast



https://bagong.pagasa.dost.gov.ph/climate/climate-prediction/seasonal-forecast

2. 10-Day Farm Weather Outlook

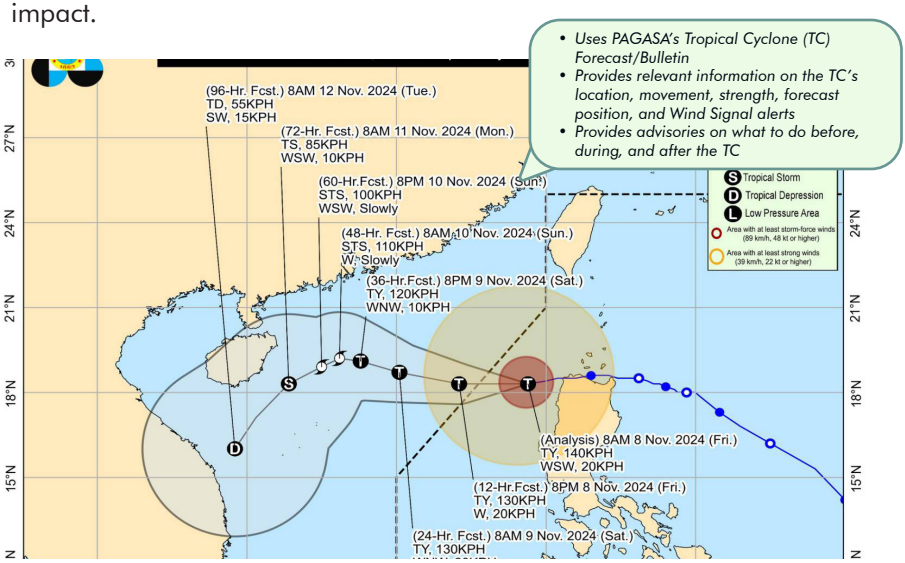
It covers a 10-day period. Updated and localized weekly by the partner Local Government Units (LGU).



https://acap-westernvisayas.github.io/weather-services/#ten-day-weather-forecast

3. Specialized Farm Weather Outlook

Provide early warning systems for extreme weather events, enabling communities to take proactive measures to mitigate risks and reduce the impact.



https://acap-westernvisayas.github.io/weather-services/#ten-day-weather-forecast

MODULE 1:
What are Climate Information Services?

Overall Impact of using Localized CIS

RELEVANCE TO LOCAL NEEDS

National climate data can be too broad or technical for community use. Localizing CIS ensures that weather forecasts, advisories, and risk information are tailored to the specific conditions of farming and fishing communities, making them actionable and practical.

PROACTIVE RISK REDUCTION

Localized CIS allows communities to anticipate and prepare for specific hazards like floods, droughts, or pest outbreaks, reducing the impacts of disasters on livelihoods and resources.

IMPROVED DECISION-MAKING

Localized CIS helps communities plan effectively for climate risks, such as adjusting planting schedules, preparing for typhoons, or timing fishing activities to minimize losses and optimize productivity.

SUSTAINABILITY

By addressing localized vulnerabilities and promoting adaptive measures, CIS localization helps communities better withstand and recover from climate-related shocks and stresses.

ENHANCED ACCESSIBILITY

Translating complex climate data into simple, local languages or culturally appropriate formats ensures that information reaches and is understood by all, including marginalized groups like small-scale farmers and fishers.

EMPOWERED COMMUNITIES

Equipping local stakeholders with the knowledge and tools to interpret and apply climate data fosters self-reliance and builds local expertise in resilience planning.

MODULE 2:
Climate, Weather, and Commodities

Imagine stepping out to your farm or fishing boat and noticing that the seasons no longer follow the patterns you once relied on. Rains come too early or too late, storms are stronger than before, and the heat seems more intense. This is the reality of climate change. For farmers and fisherfolk in the Philippines, climate change is not just a distant concern—it is something that affects your crops, your catch, and your daily life. It brings challenges like unpredictable weather, rising sea levels, and stronger typhoons. But by understanding climate change and using climate information wisely, we can find ways to adapt, protect our livelihoods, and build a more resilient future for our communities.

Discussion:

1. Importance of CIS in Agriculture and Fisheries
2. Climate, weather, and commodities
3. How do we use Climate Data in Decision-Making
4. Differentiating between Climate Change and Variability
5. How are crops affected by climate change?

1. Hazard Profiling per Commodity
2. Climate risk matching
3. Adapting to Climate Hazards

MODULE 2:
Climate, Weather, and Commodities

Importance of Climate Information Services (CIS) in Agriculture and Fisheries

How do we apply CIS in Agriculture and Fisheries?

Farming: Determining the best planting and harvesting periods, selecting climate-resilient crops, and mitigating risks from extreme weather events.

Fisheries: Identifying safe fishing conditions, understanding ocean temperature trends, and planning aquaculture activities based on climate patterns.

Examples of using CIS in agriculture and fisheries in the Philippines:

- The use of PAGASA's climate outlooks to inform rice farming schedules in Luzon though the Department of Agriculture's Adaptation and Mitigation Initiative in Agriculture Program.
- Traditional knowledge on weather patterns and seasonal indicators integrated with modern climate forecasts to guide planting and harvesting decisions in upland farming communities.
- Community-based early warning systems for fisherfolk in Visayas.

Climate and Weather

Weather

Short-term
state of the atmosphere

Rain

Can change within
minutes or hours

VS

Climate

Long-term
pattern of weather

Tropical Climate

Average weather over
many years in one specific place

Differentiating Climate and

WEATHER

The short-term atmospheric conditions at a specific place and time (e.g., rain, temperature, wind).

CLIMATE

The long-term average of weather patterns over an extended period (e.g., tropical monsoon climate of the Philippines).

MODULE 2:
Climate, Weather, and Commodities

How Do We Use Climate Data in Decision-Making?

Examples of how the weather factors affect feld operations:

- **Temperature:** Affects crop growth and fish breeding cycles.
- **Rainfall:** Essential for irrigation but can lead to flooding.
- **Humidity and Wind:** Influence disease outbreaks and storm formation

Learning Sources of Climate

- **PAGASA and ACAP portal:** Weather and seasonal forecasts, typhoon alerts.
- **Local Government Units (LGUs):** Climate risk assessments, hazard mapping.
- **International Sources:** NOAA, IPCC reports, and global climate models

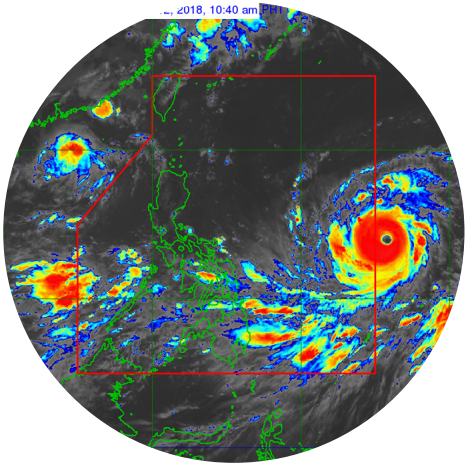
Interpreting Climate Data for Decision-Making

- **Using Seasonal Outlooks:** and the 10-day weather board Planning planting schedules based on expected rainfall and day to day operations based on the 10-day forecast.
- **Applying Hazard Mapping:** Identifying high-risk flood and drought-prone areas.
- **Developing Climate Action Plans:** Integrating climate data into community resilience strategies.

MODULE 2:
Climate, Weather, and Commodities

Understanding Climate Change and Variability

Climate change is like a shifting tide or an unpredictable growing season—it brings changes that farmers and fisherfolk in the Philippines are already experiencing. Rising temperatures, stronger storms, and unpredictable rainfall patterns are affecting crops, fisheries, and livelihoods. Farmlands face longer droughts or excessive rains, reducing harvests, while warmer ocean waters push fish farther from shore, making fishing more difficult. These changes are driven by increasing greenhouse gases in the atmosphere, which trap heat and disrupt natural weather patterns. But by understanding climate change and using climate-smart practices—like choosing resilient crops, adjusting fishing schedules, and preparing for extreme weather—communities can adapt and protect their way of life for future generations (Source: Intergovernmental Panel on Climate Change, 2023).



- **Climate Variability:** Natural fluctuations in climate over months or years (e.g., El Niño and La Niña events).
- **Climate Change:** Long-term shifts due to natural and human activities, leading to rising

How are crops and commodities affected by Climate Change

Reduced Agricultural Yields: Extreme weather events such as droughts, floods, and typhoons damage crops, disrupt planting schedules, and lower overall productivity.

Increased Pest and Disease Incidence: Changing weather patterns create favorable conditions for pests and crop diseases, leading to additional losses.

Soil Degradation and Water Scarcity: Heavy rainfall, erosion, and prolonged droughts degrade soil quality and reduce water availability for irrigation.

Damage to Fishing Infrastructure: Typhoons and storm surges destroy fishing equipment, boats, and aquaculture facilities, disrupting livelihoods.

Decline in Fish Stocks: Ocean warming, acidification, and disrupted ecosystems due to climate change reduce fish populations and alter migration patterns.

Economic Losses: Lower yields and damaged fisheries result in reduced incomes for farmers and fishers, increasing vulnerability to poverty.

Food Insecurity: Declining agricultural and fisheries outputs threaten local and national food supply, particularly in climate-vulnerable regions.

Health Risks: Poor nutrition from reduced food availability and post-disaster contamination of resources impact the well-being of communities.

MODULE 2:
Climate, Weather, and Commodities

Learning Activity 1: Hazard profiling per commodity

Commodity: **Oyster / Talaba**

Municipality: **Brgy. Kanlurang Malicboy, Pagbilao, Quezon**

Commodity Lifecycle Stages	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Pag-iipon ng balat ng talaba												
Paggawa ng plot o bamboo raft												
Pagsasabit / pagtatani ng spat collectors												
Monitoring at paglilinis												
Harvest												

Objective:

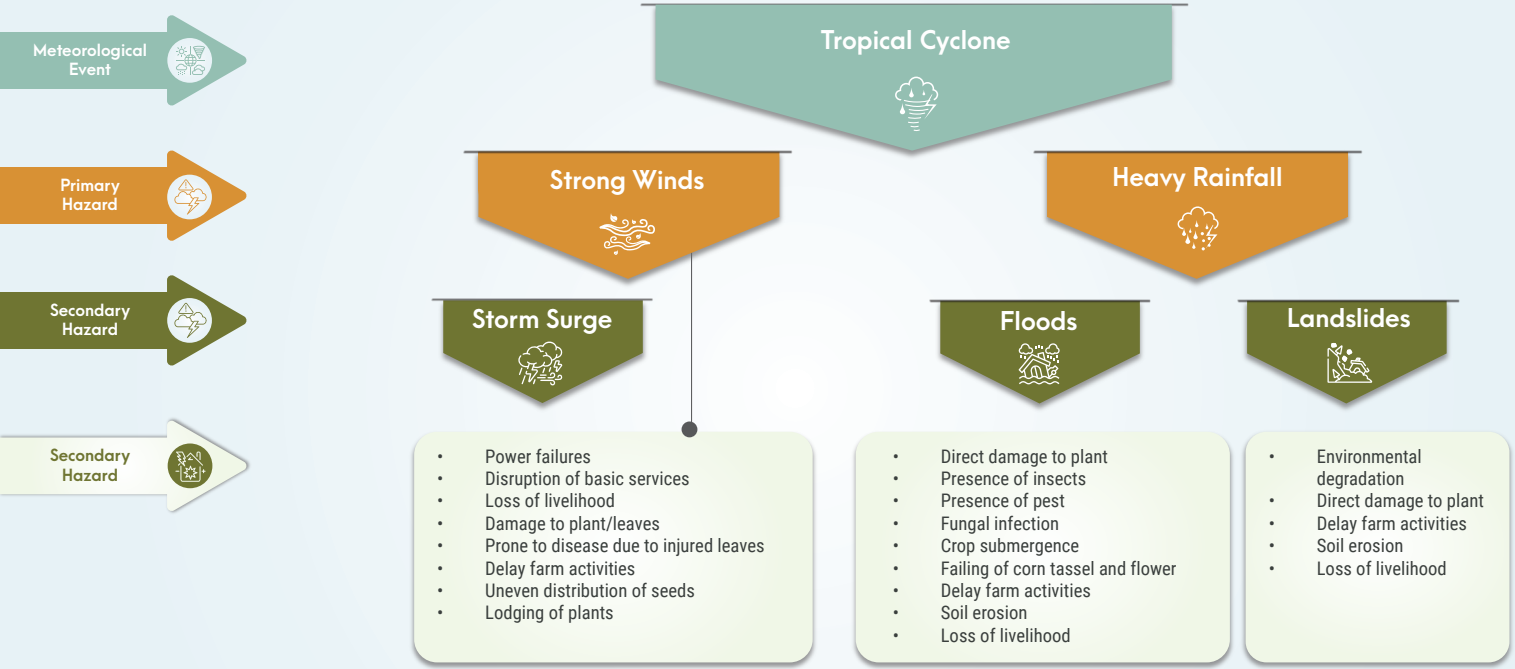
Identify localized impact of weather hazard/s on various commodities at different lifecycle / planting stages

Instructions:

- The participants are divided into 4 groups
- Each group should identify a specific commodity relevant to their area
- Use the meta cards to enumerate the lifecycle stages of your chosen commodity and identify which month/s each stage usually happens.
- Identify weather and climate hazard that have impacted your municipality.
- For each identified hazard, assess the specific impacts on your group's commodities. Consider aspects like crop yield, quality, and potential economic losses.

MODULE 2:
Climate, Weather, and Commodities

Learning Activity 2: Climate Risk Matching



Objective:

Identify localized impact of weather hazard/s on various commodities at different lifecycle / planting stages

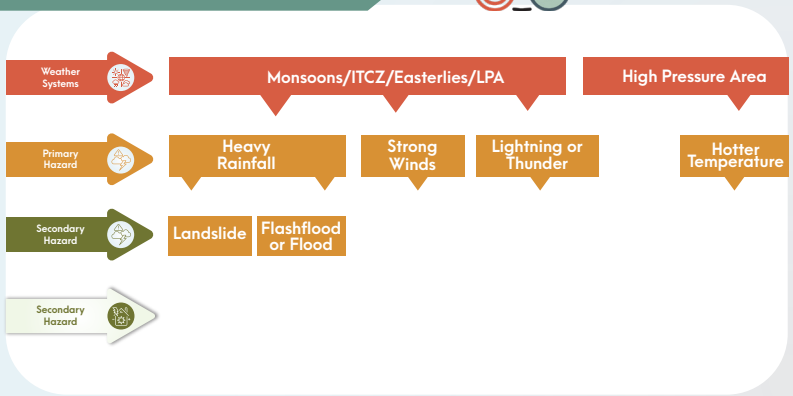
Instructions:

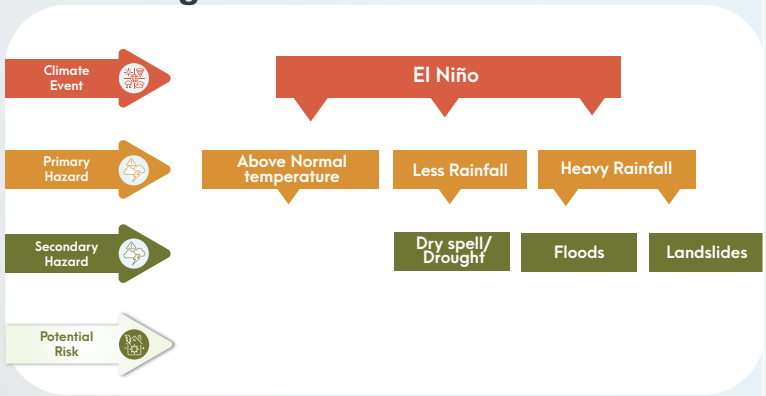
- The participants are divided into 4 groups
- Each group should identify a specific commodity relevant to their area and one meteorological event that is relevant for them
- List down the risks associated per hazard on the commodity chosen.

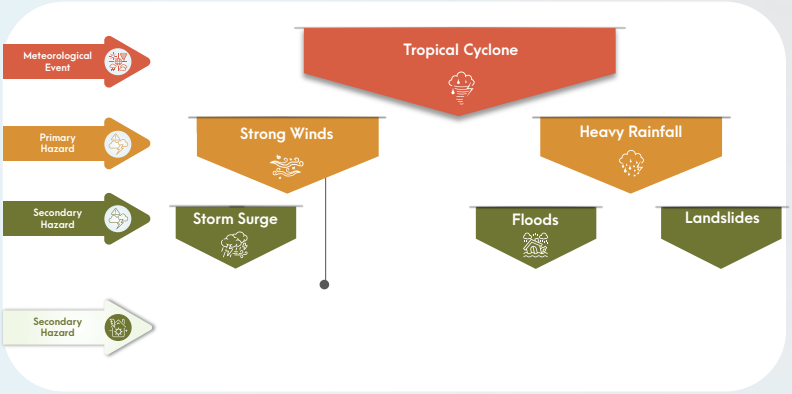
MODULE 2:
Climate, Weather, and Commodities

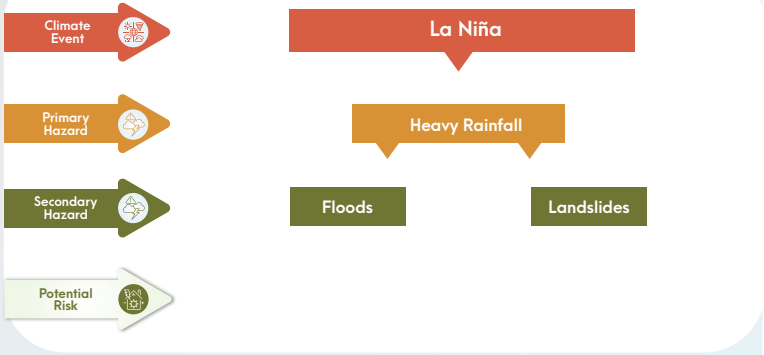
Learning Activity 2: Climate Risk Matching

Activity adapted from PAGASA CLIMPS









These are the associated risks and hazards of the meteorological events that the participants can choose from. Primary hazards refer to the effects of the event in the atmosphere (e.g. strong winds), and secondary hazards are the effects of the primary hazard as experienced on the ground (e.g. storm surges from strong winds.)

MODULE 2:
Climate, Weather, and Commodities

Learning Activity 3: Adapting to Climate Hazards

	VV						
Crop Stages	Too much rain extended rainy days	Flooding	Less Rains/ Droughts	Strong Winds	Increased Pests and Diseases	Cold Weather	Hot Weather
Crop							
Pre-production sowing							
Emergence							
Flowering							
Consumer Ripeness							

Objective:

Once the risks are identified per commodity, the participants can map out the preventive and reactive measures to reducing the impacts on their farming and fishing activities. This can be done by making a table listing down the measures per stage of production.

MODULE 3
10-day Weather Board

When planning agricultural and fishing activities, having reliable and up-to-date weather information is crucial for making informed decisions. This module introduces learners to the 10-day weather board—a simple yet effective tool designed to provide localized, accessible, and actionable weather updates based on the data provided by PAGASA and DA AMIA.

By learning how to create, maintain, and utilize this weather board, farmers and fishers can better anticipate weather conditions, minimize climate-related risks, and optimize their daily operations. Participants will also explore the best locations for displaying weather boards to ensure visibility and effective communication within their communities. Additionally, they will practice downloading, archiving, and regularly updating weather data, ensuring continuous access to vital weather information for local use.

Discussion:

- Understanding and Using the 10-day Weather Board
- Accessing data from PAGASA and DA-AMIA ACAP
- Localizing Weather Advisories and Field Recommendations
- Updating and Archiving Data

Learning Activities:

- Navigating the Agroclimatic Advisory Portal
- Preparing the 10-day weather board

MODULE 3:
10-Day Weather Board

Understanding and Using Weather Board

10-Day Weather Board

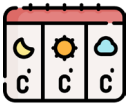
Serves as a vital tool for local government units (LGUs) and communities, ensuring that timely and relevant weather forecasts are easily accessible. With the increasing impacts of climate change, reliable weather information helps farmers and fishers make informed decisions about their daily activities, reducing risks associated with extreme weather conditions such as droughts, storms, and typhoons.

Purpose and Benefits of the Weather Board

- Provide real-time weather updates in an easy-to-understand format.
- Assist in planning agricultural activities such as planting, harvesting, and irrigation scheduling.
- Improve disaster preparedness, allowing communities to take precautionary measures against adverse weather conditions.
- Strengthen climate resilience by helping LGUs disseminate weather advisories effectively.

MODULE 3:
10-Day Weather Board

Understanding and Using Weather Board



Key Components of an Effective Weather Board

For the weather board to be effective, it must include the following key elements:

1. **Daily Weather Forecast** - A 10-day outlook with details on temperature, rainfall, and wind conditions.
2. **Advisories and Alerts** - Warnings about potential hazards such as typhoons, droughts, or excessive rainfall.
   Field Recommendations - Practical advice for farmers and fishers based on the forecast.
3. **Data Source and Date of Update** - Clear information on where the data comes from and when it was last updated.
4. **Contact Information** - A local government or PAGASA hotline for further inquiries.

Accessing Data from PAGASA and DA-AMIA

Overview of PAGASA's Weather Forecasting Services

PAGASA (Philippine Atmospheric, Geophysical and Astronomical Services Administration) provides a range of meteorological services essential for agriculture and fisheries. These include:

- **10-Day Weather Forecasts -** Covering temperature, precipitation, and wind patterns.
- **Seasonal Climate Outlooks** - Predictions for rainfall trends over the coming months.
- **Typhoon and Severe Weather Bulletins** - Real-time updates during storms and extreme weather events.
- **Agro-Meteorological Advisories** - Specific recommendations for agricultural activities based on weather forecasts.

Understanding the Agroclimatic Advisory Portal (ACAP) from DA-AMIA

ACAP is an online platform designed to provide agroclimatic information tailored for farming communities. It offers:

- Localized Climate Information - Data specific to different provinces and municipalities.
- Crop Suitability and Risk Maps - Identifies which crops are most viable given the forecasted conditions.
- Early Warning Systems - Alerts on potential agricultural hazards, such as La Nina and El Nino risks.

MODULE 3:
10-Day Weather Board

Localizing Weather Advisories and Field Recommendations

Translating Forecasts into Actionable Guidance

Weather advisories should be simplified so that local communities can easily understand and act upon them. LGUs and community leaders should:

- Use local dialects when posting weather updates.
  Provide clear instructions on what farmers and fishers should do based on the forecast.
- Highlight immediate concerns, such as flood risks or optimal planting windows.

Developing Community-Based Advisories

A practical approach to localizing advisories involves:

1. Collaborating with Farmers and Fishers - Understanding their specific needs and concerns.
2. Hosting Community Meetings - Disseminating information through barangay assemblies.
3. Utilizing Multiple Communication Channels - Posters, radio broadcasts, social media, and SMS alerts.

Learning Activity 1: Creating the 10-day Weather Board

Instructions:

- The participants are divided into 4 groups
- Each group should identify a specific commodity relevant to their area and one meteorological event that is relevant for them
- List down the risks associated per hazard on the commodity chosen.

MODULE 4

6 Month Climate Outlook and Localized Cropping Calendar

Planning agricultural and fisheries activities requires accurate and timely climate and weather information to ensure productivity and resilience. This module will guide participants in developing a six-month localized cropping calendar based on climate outlooks and agro-meteorological data from PAGASA and DA-AMIA. By aligning planting schedules with seasonal forecasts, farmers can optimize crop yields, reduce risks from extreme weather events, and improve overall farm management. Participants will also learn how to create tailored advisories to support decision-making in their communities, helping local agricultural and fisheries sectors adapt to changing climate conditions effectively.

Discussion:

- Understanding and Using the Localized Cropping Calendar
- Crop Planning and 6-month Climate Outlook
- Accessing data from PAGASA and DA-AMIA
- Updating and Archiving Data
- Putting the Cropping Calendar into Use

Learning Activities:

- Preparing the Localized Cropping Calendar based on the 6-month Climate Outlook

Understanding and Using the localized calendar

Purpose and Benefits of a Cropping Calendar

A cropping calendar is an essential tool for agricultural planning, helping farmers determine the best times for planting, harvesting, and other key farming activities. Based on weather and climate data, a cropping calendar provides guidance on:

- **Seasonal Weather Patterns** Predicting periods of rainfall, dry spells, and extreme weather events.
- **Crop Suitability** - Identifying the most viable crops for a specific season.
- **Risk Management** - Reducing losses from climate variability and extreme weather.
- **Efficient Use of Resources** - Optimizing irrigation, fertilization, and pest control schedules.

MODULE 4:
6 Month Climate Outlook and Localized Cropping Calendar

Crop Planning and 6-Month Climate Outlook

Farmers and fishers need to plan agricultural activities based on mid- to long-term climate forecasts. Understanding the 6-month climate outlook provided by PAGASA and DA-AMIA helps in:

- Identifying expected rainfall and temperature trends.
- Adjusting cropping schedules to avoid losses due to floods, droughts, or typhoons.
- Selecting climate-resilient crop varieties.
- Implementing adaptive strategies such as intercropping, staggered planting, and water-efficient irrigation.

Where do we get the data?

Overview of PAGASA's Climate Forecasting Services

PAGASA provides vital information through:

- **6-Month Climate Outlooks -** Seasonal predictions for rainfall and temperature.
- **El Niño and La Niña Advisories -** Updates on potential droughts or excessive rainfall periods.
- **Typhoon Forecasting -** Real-time tracking of storms affecting Philippine agriculture.

Using the DA-AMIA Agroclimatic Advisory Portal (ACAP)

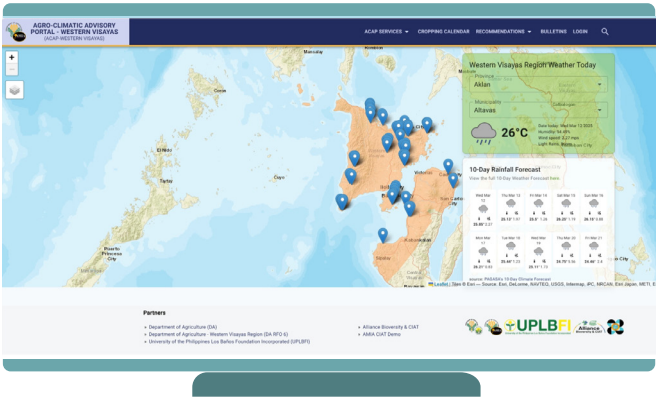
The DA-AMIA Agroclimatic Advisory Portal provides:

- **Localized Climate Information -** Data specific to provinces and municipalities.
- **Crop Suitability and Risk Assessments -** Identifying crops best suited for forecasted conditions.
- **Early Warning Systems -** Alerts for potential climate hazards.

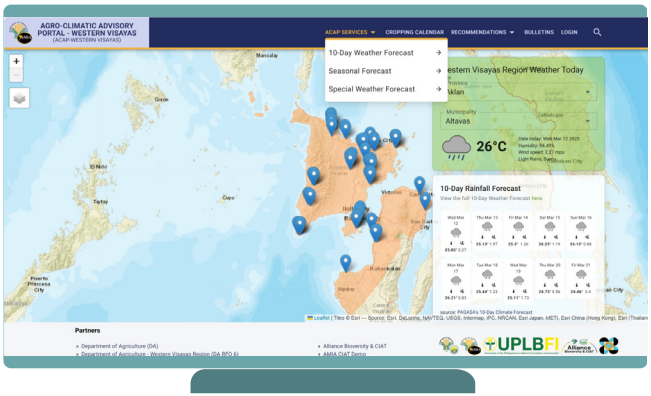
Agro-Climatic Advisory Portal

https://acap-westernvisayas.github.io/

The Agro-climatic Advisory Portal, provides real-time up-to-date and location specific weather and climate information tailored for agricultural needs. It can be accessed at the regional level where these portals are being developed led by DA-AMIA.



To access the 6 month climate outlook and the seasonal forecast, click the first tab ACAP SERVICES then go to SEASONAL FORECAST. This will give you information on the El Nino and La Nina, number of dry days throughout the 6 months, and rainfall analysis.

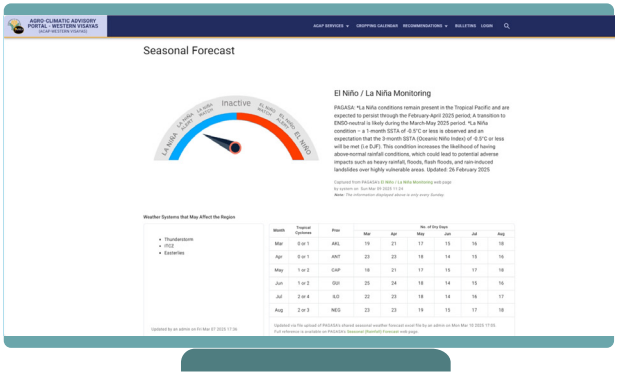


MODULE 4:
6 Month Climate Outlook and Localized Cropping Calendar

Agro-Climatic Advisory Portal

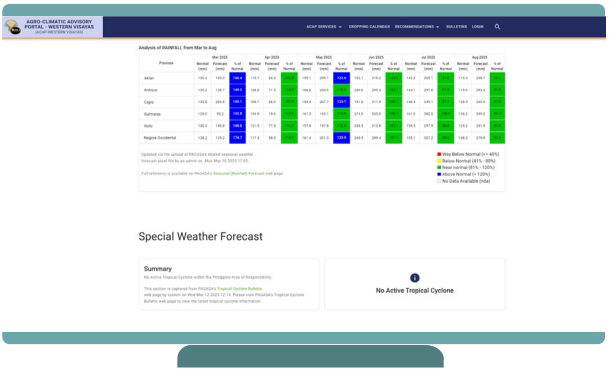
https://acap-westernvisayas.github.io/

In the **Seasonal Forecast** tab, it provides updates on the El Niño and La Niña monitoring, based on PAGASA's data.

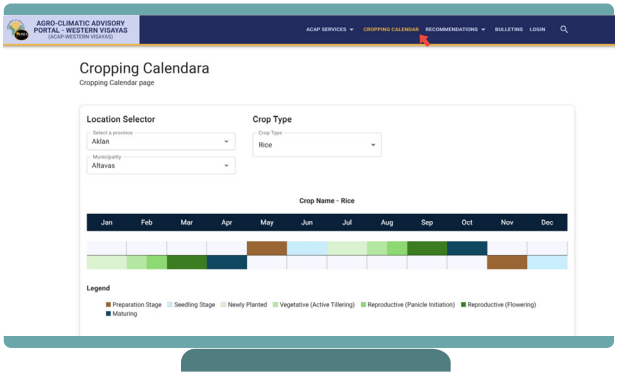


This tab also provides information on possible tropical cyclones, and number of dry days for 6 months at a time.

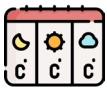
You will also see the likelihood of increased or decreased rainfall, based on climate normals. All of this information can helpful for crop planning and suitability.



To view crop calendar recommendations, you may go to the **Crop Calendar** tab, and this will bring you to generated calendars per location and commodity based on the 6 month climate outlook data provided by PAGASA.



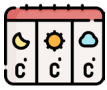
Updating and Archiving Data



Maintaining an effective cropping calendar requires regular updates based on:

- **New climate forecasts.**
- **Actual observed weather patterns.**
- **Changes in agricultural policies and advisories.**

Archiving past cropping calendars helps farmers and LGUs analyze climate trends and refine future farming strategies.



For the cropping calendar to be effective, it must be:

- **Easily Accessible - Posted in barangay halls, farmers' cooperatives, and online platforms.**
- **Regularly Updated - Adjusted based on new climate forecasts and observed conditions.**
- **Communicated Clearly - Explained through farmer training, community meetings, and local radio programs.**

Learning Activity 1: Creating a Localized Cropping Calendar

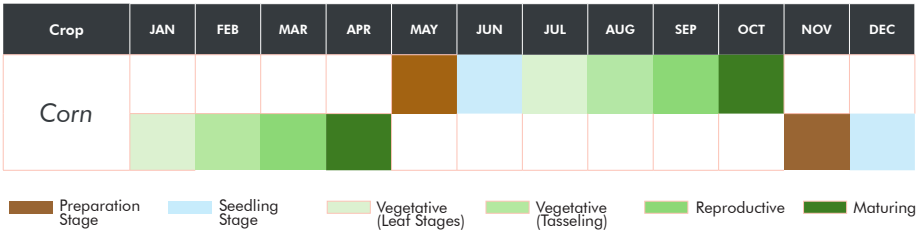
Preparing the Localized Cropping Calendar Based on the 6-Month Climate Outlook

- **Step 1: Gathering Data**
  Access the latest climate outlook from PAGASA and DA-AMIA.
  Identify local cropping patterns and challenges.

- **Step 2: Developing the Calendar**
  Match crops with expected climate conditions.
  Determine key dates for planting, maintenance, and harvesting.

- **Step 3: Creating Tailored Advisories**
  Draft advisories for farmers on climate-smart farming practices.
  Use local languages and simple visuals for better understanding.

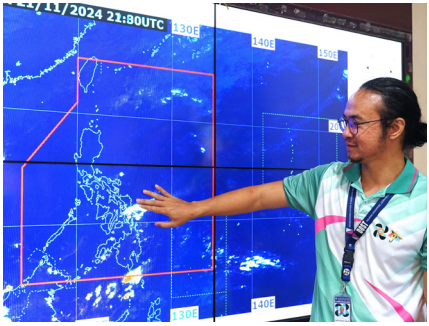
- **Step 4: Implementation and Monitoring**
  Assign responsible persons for updates.
  Encourage community feedback to improve calendar accuracy.



MODULE 5

Communicating Climate Information Services

Effective communication of Climate Information Services (CIS) is essential for ensuring that farmers, fishers, and local communities can make informed decisions to protect their livelihoods. Simply having access to climate data is not enough, it must be translated into clear, actionable, and locally relevant information. This module focuses on strategies for delivering CIS in ways that are understandable, accessible, and useful, empowering communities to respond proactively to climate risks and opportunities. By strengthening communication channels and tailoring messages to local needs, we can bridge the gap between climate science and everyday decision-making, fostering resilience and sustainability in agriculture and fisheries.



Communicating climate information effectively requires collaboration among government agencies, local leaders, scientists, and community members. It involves using appropriate language, choosing the right platforms, such as community bulletin boards, local radio, or mobile messaging, and ensuring that advisories are timely and actionable. More importantly, it emphasizes two-way communication, where communities can provide feedback and share local observations to refine and improve climate services. By enhancing the way climate information is shared and understood, we empower individuals to take meaningful action, reducing risks and maximizing opportunities for sustainable livelihoods.

MODULE 5:
Communicating Climate Information Services

What are the ways to communicate CIS?

Community Meetings with DA-Technician

CIS will also be relayed by the Agri-technicians during field visits

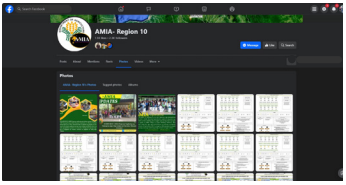
Physical Copies

Printed CIS are distributed to those who request them from the DA Office.

Radio Advisories

Some LGUS broadcast their Weather Outlook and Advisory on their radio station.

SMS/Text Message



Officers and members of the associations will be provided a 10-day outlook via SMS by DA personnel. This will be relayed to farmer leaders and members.

Social Media

Regular CIS updates will be posted to the official pages of AMIA Central Visayas and partner LGUs for public advisory

Weather Bulletin Board

Weather boards are situated at strategic locations are updated by trained local champions and are updated regularly for the community.

Roles and Responsibilities for Localization of CIS

Local Government Units (LGUs)

- Allocate budgets for CIS infrastructure, such as weather boards and AWS installations.
- Facilitate the cascading of CIS through barangay-level officers and community leaders.

Agricultural and Fisheries Extension Officers:

- Act as focal points for CIS training, data dissemination, and feedback collection.
- Assist farmers and fishers in interpreting advisories and implementing mitigation practices.

National Agencies (e.g., PAGASA, DA)

- Provide technical expertise, data, and training materials for CIS localization.
- Maintain coordination with LGUs to ensure continuous updates and support.

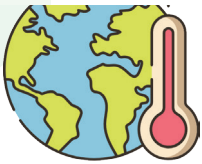
Community Champions:

- Act as grassroots advocates, ensuring advisories reach vulnerable groups.
- Facilitate knowledge transfer to community members and provide feedback to LGUs.

Private Sector and NGOs:

- Partner with LGUs to fund CIS projects and expand dissemination channels.
- Offer digital tools and technology to enhance CIS accessibility.

Policies that can support Localization and use of Climate Informed Services



Sustainability Mechanisms like budget allocation and ordinances to mainstream LCIS

Accountability and Monitoring
Institutionalized performance monitoringLGUs to submit periodic CIS utilization reports

Inclusive Participation
gender-balanced and culturally sensitive approaches

Data Sharing Agreements:
protocols for real-time data from stakeholders

Incentives for Adoption
financial or technical support to LGUs that demonstrate exemplary use of CIS

Integration of CIS into Local Development Plans

Produce

External Data Providers

Ministerial Departments Agriculture, DRR, Water, Health, Energy

Translate

Sector-Experts, Co-producers

Ministerial Departments Agriculture, DRR, Water, Health, Energy

Tra

Bo Orga

Media, ICT Telecom Agricultur Agents, N

In-country Data Providers

National Hydro-Meteorological Services

ansfer

undary anizations

Ts, Rural Radio, Companies, ral Extension, NGOs, CBOs

Use

Community-level users

Farmers, pastoralists, vulnerable communities

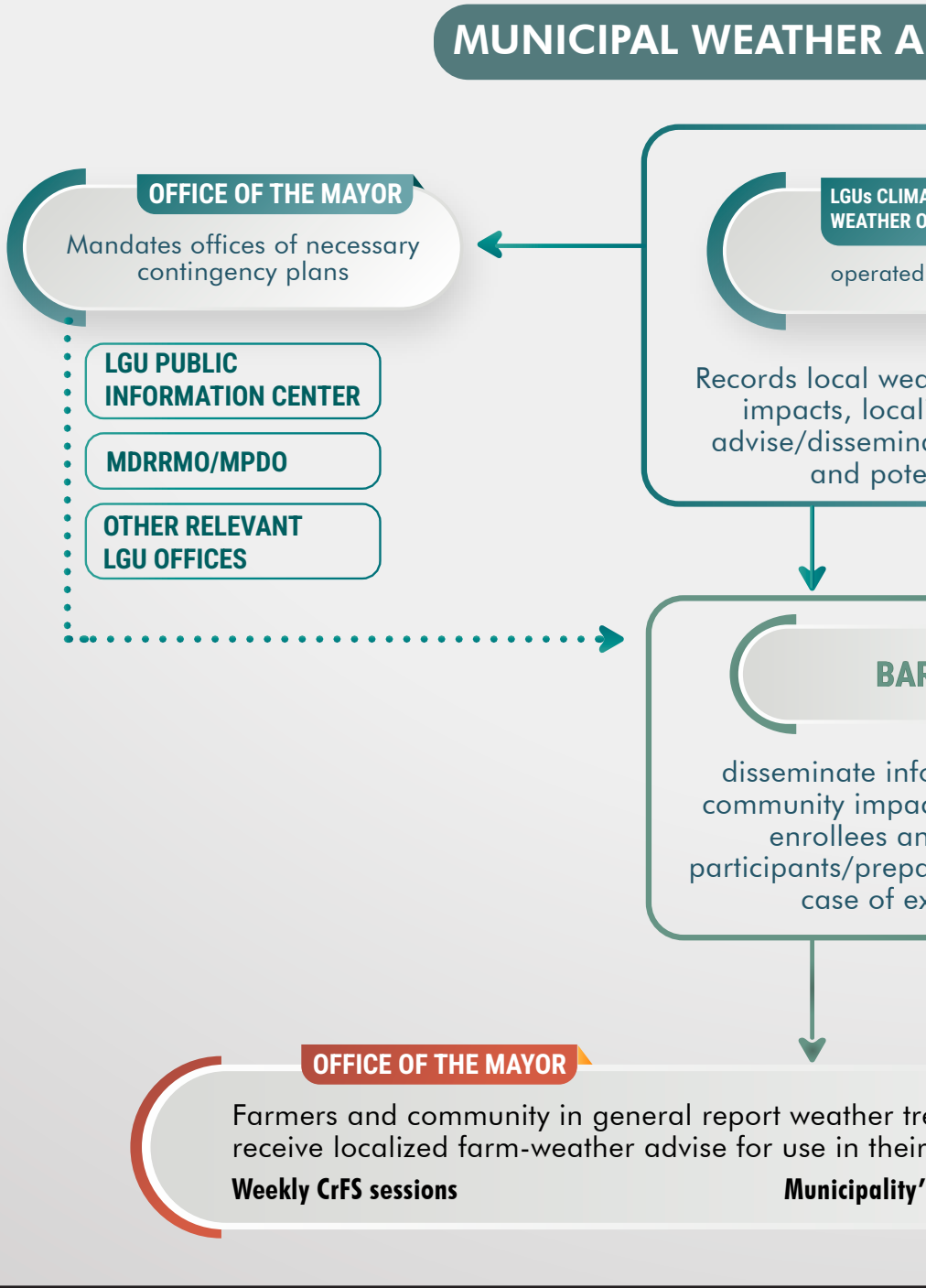
National level users

Rural development planners, disaster managers, public health, dam builders, private sectors

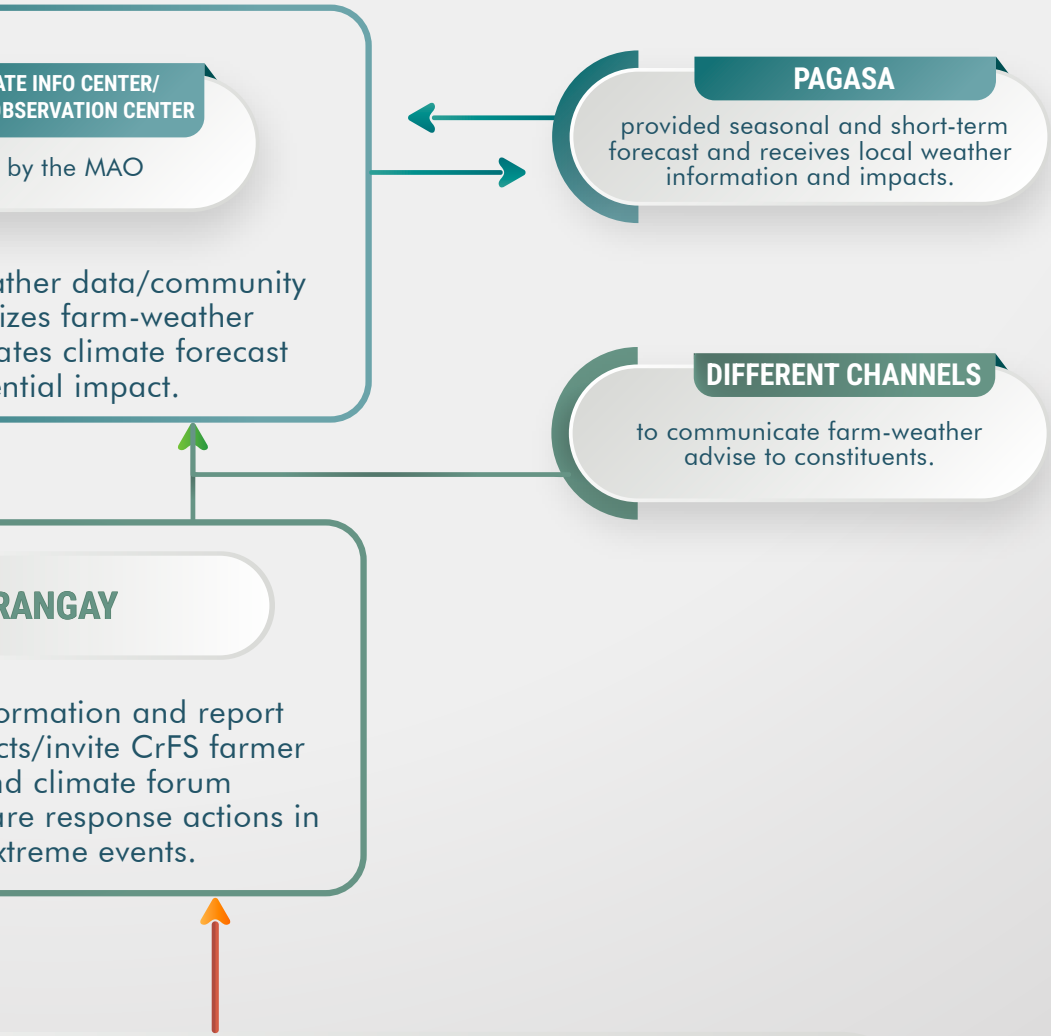
Feedback

Other Support Services

Localization of Climate Information Services



ND CLIMATE INFO CENTER



ends and climate-related impacts. In return, they may
decision-making and farm contingency planning.

s constituents **Public Climate Forum**

MODULE 6

Climate Resilient Agriculture and Fisheries

Agriculture and fisheries are the lifeblood of many communities in the Philippines, providing food, livelihoods, and economic stability. However, climate change is disrupting traditional farming and fishing practices, bringing unpredictable weather patterns, prolonged droughts, stronger typhoons, and rising sea levels. These changes threaten food security, income stability, and the overall well-being of millions of Filipinos who rely on natural resources for survival.

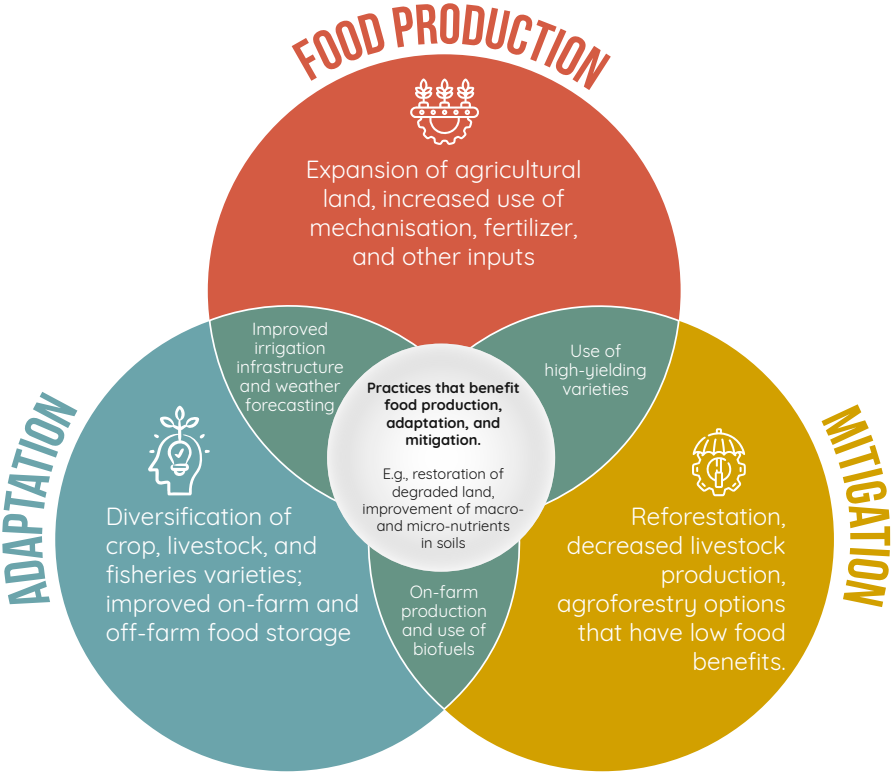
Climate-resilient agriculture and fisheries offer a way forward. By integrating climate information, innovative practices, and sustainable resource management, farmers and fishers can adapt to changing conditions while maintaining productivity and protecting ecosystems. This chapter explores strategies to build resilience, from climate-smart farming techniques to sustainable fishing methods, all grounded in data-driven decision-making using Climate Information Services (CIS).

MODULE 6:
Climate Resilient Agriculture and Fisheries

What is Resilience?

Resiliency is the ability to manage challenges, quickly recovering from them, and even growing and improving as a result of these challenges.

A resilient food system must be financially equitable (economic resilience), supportive of the entire community (social resilience) and it must minimize harmful impacts on the natural environment (ecological resilience).



MODULE 6:
Climate Resilient Agriculture and Fisheries

How do we adapt in Agriculture and Fisheries?

- Agroecological principles
- Enhance the recycling of biomass, with a view to optimizing organic matter decomposition and nutrient cycling over time
- Strenghthen the "immune system" of agricultural systems through enhancement of functional biodiversity –natural enemies, antagonists, etc. by creating appropriate habitats
- Provide the most favourable soil conditions for plant growth, particularly by managing organic matter and by enhancing soil biological activity
- Minimize losses of energy, water, nutrients and genetic resources by enhancing conservation and regeneration of soil and water resources and agrobiodiversity
- Diversify species and genetic resources in the agroecosystem over time and space at the field and landscape level
- Enhance biological interactions and synergies among the components of agrobiodiversity, thereby promoting key ecological processes and services.

CLIMATE RESILIENT AGRICULTURE REFERENCE

Climate Change Challenge	Interventions
01 DROUGHT	CIS, water-saving technologies, efficient irrigation systems, drought-tolerant varieties
02 FLOODS	Water-harvesting technologies, floating/hanging gardens, flood-tolerant varieties, CIS
03 STRONG TYPHOONS	Decision tools, Typhoon-resistant farm structures, windbreaks, CIS
04 SALTWATER INTRUSION	Water/tillage/crop management technologies, salt-tolerant varieties, CRVA
05 TEMPERATURE RISE	Efficient irrigation methods, heat-tolerant varieties, CRVA
06 CHANGING RAINFALL PATTERNS	Decision tools, Customized planting calendars, CIS

Ecosystem-based Adaptation

- **Integrated Water Management:** Use of water-efficient techniques like alternate wetting and drying (AWD) and floodwater management to save water and reduce methane emissions. Example: In some parts of the Philippines, rice farmers use AWD to control water levels in paddies and reduce flooding, saving water and increasing soil fertility.

- **Cover Cropping and Crop Rotation:** Planting cover crops such as legumes in between rice crops to improve soil fertility and reduce weed growth.

  Example: Farmers use mungbean as a cover crop to fix nitrogen in the soil and reduce the need for chemical fertilizers.

MODULE 6:
Climate Resillient
Agriculture and Fisheries

Ecosystem-based Adaptation

- **Integrated Rice-livestock Farming:**

  Example: Farmers in Negros raise ducks with their integrated rice and takway (gabi) farms.

- **Agroforestry and Buffer Zones:** Establish tree belts or agroforestry systems to act as windbreaks, reduce soil erosion, and improve soil health.

  Example: Farmers in Central Luzon plant native trees like Kamagong along the edges of their rice fields to reduce wind and water erosion.

Ecosystem-based Adaptation

- **Agroecological Approaches:** Diversifying crop species and integrating small livestock to improve resilience and reduce vulnerability to pests and diseases.

  Example: In Bukidnon, farmers practice intercropping corn with legumes and vegetables, which enhances soil fertility and pest control.

- **Use of Drought-Resilient Varieties:** Planting drought-resistant corn varieties that can withstand dry spells and fluctuating rainfall patterns.

  Example: Farmers in Mindanao use drought-resistant corn varieties that require less irrigation and perform better during dry seasons.

Ecosystem-based Adaptation

- **Agroforestry-Based Poultry Systems:** Integrate native trees and shrubs into poultry areas to provide natural shade, reduce heat stress, and improve forage availability.

  Example: In Leyte, chicken farmers plant ipil-ipil and malunggay around poultry areas to create a cooler microclimate and supply supplemental feed.

- **Free-Range Systems in Biodiverse Landscapes:** Allow chickens to forage in diverse environments, incorporating insects, seeds, and plants as part of their natural diet.

  Example: Farmers in Bukidnon practice rotational grazing with chickens in permaculture setups, enhancing soil fertility and reducing feed costs.

Ecosystem-based Adaptation

- **Coconut Agroforestry:** Integrating coconut palms with other tree species to diversify income, enhance biodiversity, and provide windbreaks.

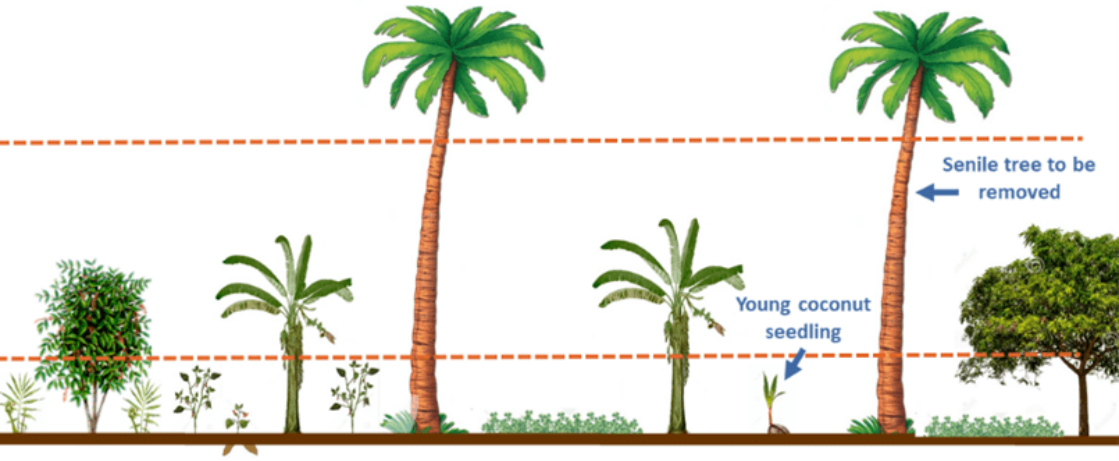
  Example: Coconut farmers in Bicol integrate banana and cacao trees into their farms to increase income diversity and protect coconut trees from wind damage.

- **Coastal Buffer Zones with Mangroves:** Planting mangroves around coastal coconTut farms to protect them from storm surges, reduce saltwater intrusion, and promote biodiversity.

  Example: In coastal areas of Samar, coconut farmers have collaborated with environmental groups to restore mangrove ecosystems along shorelines.

MODULE 6:
Climate Resillient
Agriculture and Fisheries

Ecosystem-based Adaptation



Ecosystem-based Adaptation

© DA-Philippine Rural Development Project

- **Permaculture Principles:** Designing farm systems that mimic natural ecosystems, reducing inputs, and promoting biodiversity

  Example: Farmers in Bohol adopt permaculture principles by planting diverse crops like ginger, turmeric, and tomatoes in harmony with the local ecosystem.

- **Use of Greenhouses:** Building greenhouses to protect high-value crops from extreme weather conditions and pests.

  Example: In highland areas, greenhouse farming is used to grow strawberries and other delicate crops, reducing exposure to heavy rains and temperature extremes.

Ecosystem-based Adaptation

- **Designing Integrated Crop-Livestock Systems:** Combining crops like vegetables or fruits with livestock to enhance nutrient cycling and increase farm income.

  Example: In Negros Occidental, farmers integrate poultry farming with vegetable gardens to use animal manure as fertilizer and enhance productivity

- **Soil Erosion and Water Management:** Installing terracing and effective irrigation systems to prevent soil erosion and manage water efficiently.

  Example: Vegetable farmers in Cordillera use rainwater harvesting and small-scale terracing to prevent soil erosion and ensure sustainable water use.

- **Climate-Resilient Varieties:** Using crop varieties that are resistant to temperature extremes, drought, and heavy rainfall.

  Example: Farmers in Ilocos use drought-resistant varieties of tomatoes and peppers to ensure harvests during the dry season.

Ecosystem-based Adaptation

- **Composting with Chicken Manure:** Use chicken manure as a nutrient-rich organic fertilizer for crops, preventing methane emissions from improper waste disposal.

  Example: In Nueva Ecija, smallholder farms compost chicken manure to enrich rice fields and vegetable gardens, boosting productivity and soil health.

- **Native Breed Conservation:** Raise native chicken breeds that are more adapted to local conditions, requiring less intervention for disease management and climate adaptation.

  Example: In Negros Occidental, farmers focus on native breeds like Banaba and Darag chickens, which are more resilient to local climate fluctuations.

Ecosystem-based Adaptation

- **Agroforestry-Based Poultry Systems:** Integrate native trees and shrubs into poultry areas to provide natural shade, reduce heat stress, and improve forage availability.

  Example: In Leyte, chicken farmers plant ipil-ipil and malunggay around poultry areas to create a cooler microclimate and supply supplemental feed.

- **Free-Range Systems in Biodiverse Landscapes:** Allow chickens to forage in diverse environments, incorporating insects, seeds, and plants as part of their natural diet.

  Example: Farmers in Bukidnon practice rotational grazing with chickens in permaculture setups, enhancing soil fertility and reducing feed costs.

Ecosystem-based Adaptation

- **Integrate Mangrove Restoration for Coastal Protection:** Restoring mangrove ecosystems around Bangus farms to reduce the impact of storm surges, prevent coastal erosion, and enhance water quality.

  Example: In Pangasinan, Bangus farmers collaborate with environmental groups to plant mangroves and sea grass beds along their coastal farms.

- **Polyculture Systems:** Introducing complementary species (e.g., shrimp, crabs) into milkfish ponds to enhance ecosystem services and diversify income streams.

  Example: Milkfish farmers in Zamboanga adopt polyculture systems, integrating prawns to improve pond productivity and reduce the risk of monoculture failure.

Ecosystem-based Adaptation

- **Water Quality Management:** Regular monitoring and management of water quality to ensure optimal growth conditions and reduce the spread of diseases.
  Example: In Bulacan, Bangus farmers use natural filtration systems like biofilters and aerators to maintain water quality in fish ponds.

- **Sustainable Feed Practices:** Using locally available, natural feed to reduce reliance on commercial feeds and promote sustainable farming practices.
  Example: Bangus farmers in Northern Samar use seaweed and algae as natural feed sources to improve the sustainability of their operations.

- **Restoration of Coral and Seagrass Beds:** Enhancing coastal ecosystems through coral reef and seagrass restoration to improve the overall health of marine environments, benefiting milkfish populations.
  Example: Fishermen in the Visayas help restore coral reefs to improve marine biodiversity and provide better feeding grounds for Bangus.

Ecosystem-based Adaptation

- **Integrated Coastal Management (ICM):** Promoting coastal management practices that balance ecological health with economic use of seaweed resources.

  Example: In the Visayas, local governments and seaweed farmers work together to implement ICM, protecting critical coastal ecosystems while allowing sustainable seaweed farming.

- Diversification of Seaweed Species: Cultivating a variety of seaweed species to improve resilience against disease outbreaks and market fluctuations.

  Example: In Bohol, seaweed farmers cultivate multiple species like Eucheuma and Kappaphycus to ensure income stability and enhance biodiversity.
  populations.

Ecosystem-based Adaptation

Regular Seaweed Restoration for Ecosystem Health: Promoting the restoration of natural seaweed beds to improve water quality, enhance biodiversity, and protect coastal areas.

Example: Fishermen in Tawi-Tawi work on seaweed bed restoration to improve coastal protection and increase wild seaweed stocks

Climate Resilient Farming Practices: Adopting farming methods that are resilient to sea level rise and changing ocean temperatures, such as floating seaweed systems.

Example: Seaweed farmers in Southern Leyte have developed floating seaweed farming systems to adapt to rising sea levels and extreme weather events.

REFERENCES

Machingura, F., Nyamwanza, A., Hulme, D. et al. Climate information services, integrated knowledge systems and the 2030 Agenda for Sustainable Development. Sustain Earth 1, 1 (2018). https://doi.org/10.1186/s42055-018-0003-4