Local Level Disaster Risk Reduction and Climate Change Adaptation in Agriculture:

Training for Planners and Implementers

Training Documentation Report

The report contains the highlights of the pilot trainings conducted by the AMICAF Project on “Local Level Disaster Risk Reduction and Climate Change Adaptation in Agriculture” for local planners in Caraga region on July 29 -31 and for field implementers in Bicol region on August 11 – 15, 2014.

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Overview of the Training Design

Background and Rationale

The unprecedented impacts of climate change will ultimately alter the lives of many vulnerable groups especially the rural folks who have no or limited access to resources and livelihood options in order to adapt. In the Philippines, the rural population greatly depends on agriculture and fisheries both as a means of livelihood and as a source of food. With the archipelagic location of the country, the increasing occurrence and intensity of extreme weather events like typhoons can severely damage crops and aggravates or cause hazards that can damage assets in production, marketing and agriculture based livelihoods. In terms of production, crops respond

even to the slightest change in temperature and water availability. Thus, with the gradual change in temperature and precipitation pattern, farmers have to deal with lower crop yield and in extreme cases, crop failure. All these threaten the stability of food availability, accessibility and utilization.

Climate change is not an individual problem. It is a global phenomenon that affects everybody but its impact varies across locations and sectors. Some sectors like agriculture are vulnerable to its impacts and so are people living in poverty. Thus, reducing risks from disasters while adapting to its impact require collective action from the national and local levels.

While disaster risk reduction (DRR) and climate change adaptation (CCA) and mitigation have become a major agenda of the government and structures are set-up/ strengthened for this purpose (e.g. NDRRMC and CCC), the local government units (LGUs), being the frontline of basic services to the communities, should serve as the platform of convergence to operationalize and implement location specific efforts. With development issues as aggravating factor in vulnerability, the understanding of LGUs of their local realities can well define their DRR and CCA efforts.

Another key to successful community-based DRR and CCA efforts is the scientific understanding of climate change and its causes. A scientific view would help them understand what is happening, why it is happening, and what/how should they do about it. The scientific knowledge also forms a solid base for planned adaptation.

This training is then designed for local policy makers, development planners and field implementers purposely to initiate or strengthen DRR and CCA initiatives in agriculture at the community level. The modules were developed and pilot tested as one of the outputs of a project titled, “Assessments of Climate Change Impacts and Mapping of Vulnerability to Food Insecurity under Climate Change to Strengthen Household Food Security with Livelihoods’ Adaptation Approaches” (AMICAF) of the Food and Agriculture Organization of the United Nations implemented in the Philippines through the Department of Agriculture, other government agencies, academic institutions, and the local government units of the two pilot regions, Bicol (Region V) of southern Luzon and Caraga (Region XIII) of northeastern Mindanao from October 2011- March 2015. The AMICAF is a comprehensive framework that combines building evidence-base for adaptation planning (Steps I and II), testing adaptation options on the farm (Step III) and providing enabling environment for all of the above (Step IV).

Objectives

In general the training is designed for local policy makers/development planners and field implementers to initiate or strengthen DRR and CCA initiatives in agriculture at the community level.

Specifically, it is hoped that after completing the modules in this training, the participants would be able to perform the following:

1) integrate DRR and CCA into their respective municipal local development plans; and
2) support the implementation of local DRR/CCA initiatives through appropriate policies and budget allocations.

Methodology

The training design was progressively developed as part of Step IV of the AMICAF Project by a training management team composed of the project staff and a hired consultant. This was done in collaboration with the project's regional partners in Bicol and Caraga who are familiar with the capacity needs at the field level during a workshop conducted for this purpose on April 29-30, 2014 in Quezon City. From this workshop, six major themes were identified which eventually became the modules containing key topics incorporating the experiences/learnings from the AMICAF and other DRR/CCA related projects. The key topics were also gleaned from the needs and situations manifested during the Regional Institutional Analysis Workshops conducted by the project for Bicol and Caraga in September 2013. From these workshops, it was found that at least for both regions, their efforts towards DRR and CCA in agriculture have reflected interdisciplinary/across the value chain approaches and several modalities were already employed to enlist community participation. Hence, the following modules that were pilot tested to these regions hoped to strengthen the capacities not only of their field implementers but also their policymakers to enable their ongoing efforts to be supported by local government funds.

The six modules are as follows:

MODULE I	DRR and CCA for Food and Nutrition Security	
	Session 1	Climate and Climate Change
	Session 2	Basic Meteorology, Weather/Climate Observation and Forecasting
	Session 3	Impacts of Climate Variability and Change on Food and Nutrition Security
	Session 4 (Synthesis)	Climate Change, Agriculture and Food Security: Concepts, Linkages and Considerations for Community-based DRR and CCA
MODULE II	Tools and Methods for DRR and CCA	
	Session 1	Hazard, Risk, Vulnerability, and Capacity Assessment
	Session 2	Spatial and Temporal Analysis of Climate Change Agricultural Impacts
	Session 3	Introduction to Maps and Geographic Information System
MODULE III	Planning and Implementing DRR and CCA in Agriculture Initiatives	
	Session 1	Overview of Existing Policies on DRR and CCA
	Session 2	Strategic Planning: Harmonizing DRR and CCA in Agriculture into Local Governance
	Session 3	Implementing DRR and CCA Initiatives through Community-based Approaches
	Session 4	Integrating Cross-cutting Concerns
	Session 5	Implementing Community-based Early Warning Systems for Agriculture
MODULE IV	Participatory Monitoring and Evaluation for DRR and CCA in Agriculture	
MODULE V	Climate-smart Agriculture and Good Practice Options	
MODULE VI	Communicating Climate Change Smartly	

Delivery

The training design was delivered in two different modes, one for local planners and the other for field implementers. The pilot training for local planners was conducted in Caraga on July 29-31, 2014 in Surigao City, Surigao del Norte. This three-day training covered Modules I, III and V which aimed to help local government planners integrate DRR and CCA into their local development plans. For field implementers, all of the six modules were covered and were pilot tested in Bicol for five days from August 11-15, 2014 in Nabua, Camarines Sur. Modules II, IV and VI were considered "specialized topics" in DRR and CCA field implementation and participants in Bicol can better relate to them because of their exposures to DRR/CCA projects.

Both trainings were carried out with the active participation of the DA regional field offices and other AMICAF regional partners. Invited speakers were technical experts from scientific and academic institutions within each region and were complemented by the AMICAF consultant.

A module delivery plan was prepared for each module outlining the learning objectives and key messages to be covered. This was given to the resource persons before the training proper. The said plan elaborated the module theme through the key topics covered by sessions. Ideally, each session starts with a workshop to draw out local experience and understanding of the topic. This is immediately followed by a lecture to synthesize and deepen the participants' understanding about the topic by providing the necessary and appropriate input.

Evaluation

A general evaluation form was prepared and was administered at the end of the training. The form included evaluation on the training management, content and delivery. Process documentation throughout the training duration was also done by the training management to immediately address concerns and gaps arising every session. Necessary adjustments in content and delivery modes were done through proper briefing and coaching to the resource persons by the AMICAF consultant based on noted observations during the workshop.

Training Schedules

The following tables show the planned run-down of the modules in the pilot trainings conducted:

Table 1. Training Schedule for Local Planners (Caraga region), Mt. Bagarabon Beach Hotel and Mountain Resort, P-6, Mabua, Surigao City, 29 – 31 July 2014

TIME	ACTIVITY	PERSON RESPONSIBLE

DAY 1			
7:30 – 8:30	**Registration**		RS Parejo, EM Velasquez
8:31 – 9:30	**Opening Program** ***1. Preliminaries*** ***2. Welcome/ Opening Remarks*** ***3. Expectation Setting*** ***4. Training Overview*** ***5. Host Team Formation***		
9:31 – 11:00	**MODULE I**	**Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) for Food and Nutrition Security**	
		Session 1: Climate and Climate Change	Daisy Ortega, PAGASA
		Session 2: Basic Meteorology, Weather/ Climate Observation and Forecasting	Daisy Ortega, PAGASA
		Strategic Learning Exercise	
		Session 3: Impacts of Climate Variability and Change on Food and Nutrition Security	Danilo A. Gaas, CSU
		Strategic Learning Exercise	
		Session 4: Climate Change, Agriculture and Food Security: Concepts, Linkages and Considerations for Community-based Disaster Risk Reduction and Climate Change Adaptation	Roberto C. Sandoval Jr., FAO
11:01 – 12:00		Open Forum	
12:01 – 13:00	**- - - L U N C H B R E A K - - -**		
	MODULE II	**Planning and Implementing DRR and CCA in Agriculture Initiatives**	
13:01 – 14:00		***Session 1: Key Policy Frameworks on DRR and CCA in Agriculture***	Roberto C. Sandoval Jr., FAO
		Open Forum	
14:01 – 15:00		***Session 3: Overview of Implementing DRR and CCA Initiatives through Community-based Approaches***	
14:00 – 15:00		***Session 4: Integrating Cross-cutting Concerns***	
		Open Forum	
15:00 – 17:00		***Session 5: Implementing Community-based Early Warning Systems (EWS) for Agriculture***	Lorenzo Alvina, DA – RFO V
17:01 – 17:30		Introduction to Farm Weather Bulletin Preparation and Hazard-Cropping Calendars	
17:3 – 17:45	Announcements		
DAY 2			
8:00 – 8:30	**Preliminaries**		Host Team
8:31 – 12:00	**Session 5 Workshop:** Introduction to Farm Weather Bulletin Preparation and Hazard-Cropping Calendars		Lorenzo Alvina, DA – RFO V
	Presentation of workshop outputs		
12:01 - 13:00	**- - - L U N C H B R E A K - - -**		
13:01 – 14:00	**MODULE III**	**Climate-Smart Agriculture**	

		Session 1: Overview of Climate-smart Agriculture and Synergies with DRR and CCA	Roberto C. Sandoval Jr., FAO
		Exercise – Identification of existing CSA practices/ possible CSA practices	
14:00 – 15:00		***Presentation/Discussion of Identified Local Practices***	Roberto C. Sandoval Jr., FAO
15:00 – 17:30	***Drafting of Local DRR and CCA plans***		Participants
		Workshop: plan preparation with ENSO as the major concern	
17:31 – 17:45	Announcements		
DAY 3			
8:00 – 8:30	**Preliminaries**		Host Team
8:31 – 10:00	***Presentation of Plans per Municipality***		Participants
10:01 – 12:00	**Closing Program**		
	Training Synthesis		
	Participants' Impressions (Evaluation and Training Needs)		
	Impressions on the plans presented		
	Awarding of Training Certificates		
	Closing Remarks		
13:00 onwards	**Departure**		

Table 2. Training Schedule for Field Implementers (Bicol region), Macagang Hotel and Resort, San Antonio Poblacion, Nabua, Camarines Sur, August 11 – 15, 2014

TIME	ACTIVITY	PERSON RESPONSIBLE
DAY 1		

10:00 – 12:00	**Registration and Billeting**	Secretariat
13:01- 13:30	**Opening Program** ***Preliminaries*** ***Welcome/ Opening Remarks*** ***Training Overview*** ***Host Team Formation***	
13:31 – 16:00	**MODULE I** — **Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) for Food and Nutrition Security**	
	Session 1: Climate and Climate Change	Arthur Estrella, CBSUA
	Session 2: Basic Meteorology, Weather/ Climate Observation and Forecasting	Henry Mabesa, CBSUA
	Strategic Learning Exercise	Training Team
	Session 3: Impacts of Climate Variability and Change on Food and Nutrition Security	Arthur Estrella, CBSUA
	Session 4: Climate Change, Agriculture and Food Security: Concepts, Linkages and Considerations for Community-based Disaster Risk Reduction and Climate Change Adaptation	Roberto C. Sandoval Jr., FAO
16:01 – 17:00	**MODULE II: Tools and Methods for DRR and CCA in Agricultural Systems**	
	Session 1a. Hazards and Impacts	Yolanda Agawa, CBSUA
	Session 1b: Hazard, Vulnerability and Capacity Assessment	
17:01 – 17:15	**Announcements**	Training Team
DAY 2		
8:00 – 8:30	**Preliminaries** by Host Team	
	Workshop 1: Resource and Hazard Mapping	Yolanda Agawa/ Rene Rabacal, CBSUA
11:01 – 12:00	***Workshop Output Presentation and Critiquing (Module II: Session 1)***	Participants
12:01 – 13:00	**- - - L U N C H B R E A K ---**	
13:01 – 14:00	***Session 2: Spatial and Temporal Analysis of Agricultural Impacts of Climate Change*** ***a. Rainfall Calendars*** ***b. Hazard Calendars*** ***c. Cropping and Seasonal Calendars***	Arthur Estrella, CBSUA
14:01 – 15:30	Workshop: Rainfall and Hazard Calendars, Cropping and Seasonal Calendars	Participants
15:31 – 16:15	***Workshop Output Presentation and Critiquing (Module II: Session 2)***	Participants
16:16 – 17:00	***Session 3: Brief Introduction to Maps and Geographic Information System***	Vladimir Foronda, CBSUA
17:01 – 17:15	**Announcements**	Training Team

DAY 3		
8:00 – 8:30	**Preliminaries** by Host Team	
	MODULE — **Planning and Implementing DRR and CCA in Agriculture Initiatives**	
8:31 – 9:15	***Session 1: Overview of Existing Policies on DRR and CCA***	Cely Binoya, CBSUA

9:16 – 10:00	MODULE III	***Session 2: Strategic Planning: Harmonizing DRR and CCA in Agriculture into Local Governance***	Cely Binoya, CBSUA
10:01 – 10:30		Strategic Learning Exercise	Training Team
10:31 – 12:00		***Session 3: Approaches to Assessment of Impacts and Vulnerability to Climate Change and Adaptation Options***	Roberto Sandoval Jr., FAO
12:01 – 13:00	**- - - L U N C H B R E A K - - -**		
13:00 – 13:45		***Session 4: Integrating Cross-cutting Concerns*** ***a. Gender*** **b. *Capacity Development***	Lora Panga, CBSUA
13:46 – 15:00		***Session 5: Implementing Community-based Early Warning Systems (EWS) for Agriculture***	Lorenzo Alvina, DA – RFO V
		Workshop: Analyzing Crop-level Agro-meteorological Risks	Participants
15:01 – 17:00	MODULE IV	**Participatory Monitoring and Evaluation for DRR and CCA in Agriculture**	
		Concepts and Considerations - ***Scope, purposes, frameworks*** - ***Measuring Baselines*** - ***Criteria and Indicators***	Vladimir Foronda/ Art Estrella, CBSUA
		Data Gathering Methods	Vladimir Foronda/ Arthur Estella, CBSUA
		Strategic Learning Exercise	Training Team
		Framing Contributions to Resilience	Roberto Sandoval Jr., FAO
		Externalities and Ancillary Impacts	
17:01 – 17:15	**Announcements**		Training Team
DAY 4			
8:00 – 8:30	**Preliminaries** by Host Team		
8:31 – 12:00	MODULE V	**Climate-Smart Agriculture (CSA) and Good Practice Options (GPO)**	Edgardo dela Torre
		Soil and Water Management	
		Sustainable and organic agriculture systems for CSA	Mely Cervantes, CBSUA
		Developing Sustainable and Inclusive Food Value Chains	Hanilyn Hidalgo, CBSUA
		Climate-smart Forestry	Aries O. Ativo, CBSUA
		Workshop on identifying other CSA and GPOs (in crop production, livestock, fisheries and aquaculture)	Participants
12:01 – 13:00	**- - - L U N C H B R E A K - - -**		

13:01 – 14:30	MODULE VI	**Communicating Climate Change Smartly**	
		Session 1: Risk Communication	Franie Belarmino and Lora Panga,
		Session 2: Techniques and Methods in Translation and Popularization	

		CBSUA
14:31 – 15:30	Workshop: Simulation through a 15-minute talk show titled, *"Usapang Climate Change"*	Participants
15:31 – 16:30	***Workshop Output Presentation and Critiquing (Module VI)***	Participants
16:31 – 18:30	**Closing Program**	
	Preliminaries: Opening Prayer, Lupang Hinirang	Training Team
	Training Synthesis	Training Team
	Participants' Impressions	Participants
	Message	DA – RFO V
	Awarding of Training Certificates	AMICAF
	Closing Remarks	Eulito U. Bautista, FAO – AMICAF
DAY 5		
8:00 onwards	**Departure**	Participants

The Participants

A total of 30 participants from the local government units and other government agencies in Surigao del Sur (2), Surigao del Norte (12), Agusan del Sur (4), and Agusan del Norte (12) successfully completed the training for local planners in Caraga region. The following are the distribution of represented agencies: DA RFO-XIII (1), PhilRice Agusan (3); NEDA-XIII (1); ATI-Caraga (1); PDRRMO (3); PPDO (1); OPAg (5), MDRRMO (3); MPDO (1); MAO (7); and AT (4)

Meanwhile, 23 participants attended the training for field implementers in Bicol region. The following are agencies were represented: technical and extension staff of the DA-RFO V V (3), local DRRM and Provincial/Municipal Agricultural Officers of PLGU Masbate (1), PLGU Camarines Norte (3), MLGU Camarines Sur (13), PLGU Sorsogon (1), and other field implementers from the Office of Civil Defence Region V (2).

Dir. Edgar R. Madrid (seated, fourth from left), the Regional Technical Director for Research and Regulations of DA – RFO V joined the participants, resource persons and AMICAF project personnel during the first day of the training, August 11, 2014.

The Resource Persons

The training management through its regional partners made sure that the speakers invited were local experts within the area. Thus, for the training for local planners in Caraga region, the three modules were delivered by the following resource persons:

Engr. Daisy Ortega, PAGASA Mindanao
Dr. Danilo Gaas, Caraga State University
Mr. Lorenzo Alvina, DA – Region V
Dr. Roberto Sandoval, FAO Philippines

On the other hand, the six modules for the field implementer's training were delivered by the following resource persons:

Arthur Estrella, Central Bicol State University of Agriculture
Henry A. Mabesa Jr. , Central Bicol State University of Agriculture
Yolanda S. Agawa, Central Bicol State University of Agriculture
Cely S. Binoya, Central Bicol State University of Agriculture
Vladimir R. Foronda, Central Bicol State University of Agriculture
Lourdes-Rafaelita O. Panga, Central Bicol State University of Agriculture
Hanilyn A. Hidalgo, Central Bicol State University of Agriculture
Aries O. Ativo, Central Bicol State University of Agriculture
Frannie A. Belarmino, Central Bicol State University of Agriculture
Carmelita N. Cervantes, Central Bicol State University of Agriculture
Edgardo B. de la Torre, Freelance Consultant
Lorenzo L. Alvina, DA-RFO V
Dr. Roberto Sandoval, FAO Philippines

The resource persons for the training for local planners in Caraga region

 **Daisy F. Ortega** *Assistant Weather Services Chief* PAGASA – Mindanao Regional Division <u>Topics during the training:</u> • Climate and Climate Change • Basic Meteorology, Weather/Climate Observation and Forecasting	 **Danilo A. Gaas** *Director, Office for Resource Generation* Caraga State University <u>Topic during the training:</u> • Impacts of Climate Variability and Change on Food and Nutrition Security
 **Roberto Sandoval Jr.** *Climate Change Specialist* FAO Philippines <u>Topics during the training:</u> • Concepts, Linkages and Considerations for Community-based Disaster Risk Reduction and Climate Change Adaptation • Key Policy Frameworks on DRR and CCA in Agriculture • Overview of Implementing DRR and CCA Initiatives through Community-based Approaches • Integrating Cross-cutting Approaches • Climate-smart Agriculture	 **Lorenzo L. Alvina** *Agriculturist* DA-RFO V <u>Topics during the training:</u> • Implementing Community-based Early Warning Systems for Agriculture

Table 4. The resource persons for the training for field implementers in Bicol region

Arthur Estrella, Ph.D.
Director for Research
Central Bicol State University of Agriculture

Topics during the training:

- Climate and Climate Change
- Impacts of Climate Variability and Change on Food and Nutrition Security
- Spatial and Temporal Analysis of Agricultural Impacts of Climate Change

Henry A. Mabesa Jr., Ph.D.
Professor III
Central Bicol State University of Agriculture

Topic during the training:

- Basic Agrometeorology

Yolanda S. Agawa, Ph.D.
Director, RCDRRM and CCA
Central Bicol State University of Agriculture

Topics during the training:

- Hazards and Impacts
- HRVCA

Cely S. Binoya, Ph.D.
Dean, Graduate School
Central Bicol State University of Agriculture

Topics during the training:

- Overview of Existing Policies on DRR and CCA
- Strategic Planning: Harmonizing DRR and CCA in Agriculture into Local Governance

Lourdes-Rafaelita O. Panga, M.A.Ed.
GAD Focal Person and Guidance Counselor
Central Bicol State University of Agriculture

Topic during the training:

- Integrating Gender in Planning and Implementing DRR and CCA Initiatives in Agriculture

Vladimir R. Foronda, M.Sc.
Director, Information and Communication Tecnology
Central Bicol State University of Agriculture

Topics during the training:

- GIS Overview
- Participatory Monitoring and Evaluation for DRR and CCA in Agriculture

Edgardo B. de la Torre
Field Extension Worker
Freelance Consultant

Topic during the training:

- Overview of Climate-smart Agriculture and Good Practice Options

Lorenzo L. Alvina, M.P.A
Technical Staff, ORED
Department of Agriculture RFO V

Topic during the training:

- Implementing Community-based EWS for Agriculture

Aries O. Ativo, M.Sc.
Instructor
Central Bicol State University of Agriculture

Topic during the training:

- Climate-smart forestry

Hanilyn A. Hidalgo, M.B.A.
Director, OSAS
Central Bicol State University of Agriculture

Topic during the training:

- Developing Sustainable and Inclusive Food Value Chain

Frannie A. Belarmino, M.L.L
Instructor/Public Information Officer
Central Bicol State University of Agriculture

Topic during the training:

- Communicating Climate Change Smartly

Carmelita N. Cervantes, Ph.D.
Assistant Professor IV
Central Bicol State University of Agriculture

Topic during the training:

- Sustainable and Organic Agriculture Systems for Climate-smart Agriculture

Training Highlights

The following discussion highlights of the modules were a result of the harmonized documentation of the two pilot trainings. The topics were presented the way the resource persons delivered them during the actual training.

MODULE I
Disaster Risk Reduction and Climate Change Adaptation for Food and Nutrition Security

Climate change has now become the buzzword of many agencies and programs as its impacts are greatly aggravating many lives and climate-sensitive livelihoods like farming and fishing. However, understanding its causes remains elusive even to local development planners and implementers and this greatly affects the design and implementation of local DRR and CCA programs.

It is important to deepen one's knowledge and level of appreciation by introducing the science that explains the 'what' and the 'why' of climate change. Thus, the module's main objective is to ground the learners on the scientific explanations of climate change and predictions about future impacts especially in agriculture. More importantly, this introductory module should enable the learner to understand that "climate change is a global phenomenon" but "adapting to its impact is a local process". Also, it will situate them better to appreciate the relationship of climate change to food and nutrition security.

Objectives

At the end of the module, the learner should be able to:

1. Define climate and discuss climate system, climate variability and climate change
2. Discuss basic meteorology, weather and climate observation and forecasting
3. Discuss local examples of climate change impacts on food and nutrition security
4. Recognize and prioritize the importance of DRR and CCA in agriculture

Methodology

Lecture – discussion
Video presentation

Session 1: Climate and Climate Change

Weather is the specific condition or "actual state" of the atmosphere or "actual state" at a particular place and time. It is described by measuring the following:

a. wind direction

b. wind force
c. precipitation
d. temperature
e. sunshine
f. visibility
g. cloud

When these weather phenomena are measured systematically at a specific location over several years, a record of observations is accumulated from which averages, ranges, maximums and minimums for each variable can be computed, along with the frequency and duration of more extreme events (FAO, 2008).

The World Meteorological Association requires the calculation of averages for the consecutive periods of 30 years, with the latest being from 1961 to 1990. Such a period is long enough to eliminate year-to-year variations. The averages are used in the study of climate change, and as a base with which current conditions can be compared (UK Met Office Online as cited by FAO, 2008).

Climate, on the other hand, is the "average weather" or normal state of the atmosphere and its long term variability over a particular period (say, over a month, a season, a year or several years). For example, the climate of the Philippines may be characterized into hot and dry from March to May, rainy from June to October, and cool from November to February.

Discussion Option 1

Climate Variability and Extreme Events

By Daisy F. Ortega
Assistant Weather Services Chief
PAGASA – Mindanao Regional Division

Climate Variability

It refers to changes in patterns, such as precipitation patterns, in the weather and climate including droughts and floods. It also refers to variability on time scales of a few years to a few decades (shorter than climatic averaging period).

The Philippine Atmospheric, Geophysical and Astronomical Services Administration classified the Philippine climate as Tropical-maritime. *It is characterized by relatively high temperature, high humidity and abundant rainfall. Thus, temperature, humidity and rainfall are the most important elements of the country's weather and climate.*

The mean annual temperature is 26.6 °C. The coolest month is in January with mean temperature of 25.5 °C, while the warmest month is in May with mean temperature of 28.3 °C. The mean annual rainfall range is between 965 to 4,064 mm. The relative humidity range is between 71 – 85 % (Rice Watch and Action Network, 2012).

In terms of season, PAGASA used temperature and rainfall as bases. Thus, the climate of the country can be divided into two major seasons: the rainy season, from June to November and the dry season, from December to May. The dry season may be subdivided further into the cool dry season, from December to February and the hot dry season, from March to May.

In general, the Philippine climate is adequately described by one single climatic element – **rainfall**. The yearly distribution of rainfall is synchronized with the Southwest Monsoon (Habagat) and Northeast Monsoon (Amihan).

> ***First semester*** (April – September) is synchronized with the Southwest Monsoon (Northern Hemisphere Summer Monsoon) locally known as *Habagat*. This happens when the sun is directly shining in the northern hemisphere causing convective activities – rising and unstable air causing weather disturbance. In the Philippines, PAGASA (Rice Watch and Action Network, 2014) noted that *Habagat* is commonly experienced from June to September with August as the peak month. It affects the western sections of the country.
>
> ***Second semester*** (October – March of the following year) is synchronized with the Northeast Monsoon (Northern Hemisphere Winter Monsoon) locally known as *Amihan*. According to PAGASA (Rice Watch and Action Network, 2014), *Amihan* is commonly experienced from November to February. It affects the eastern sections of the country

Climate Type

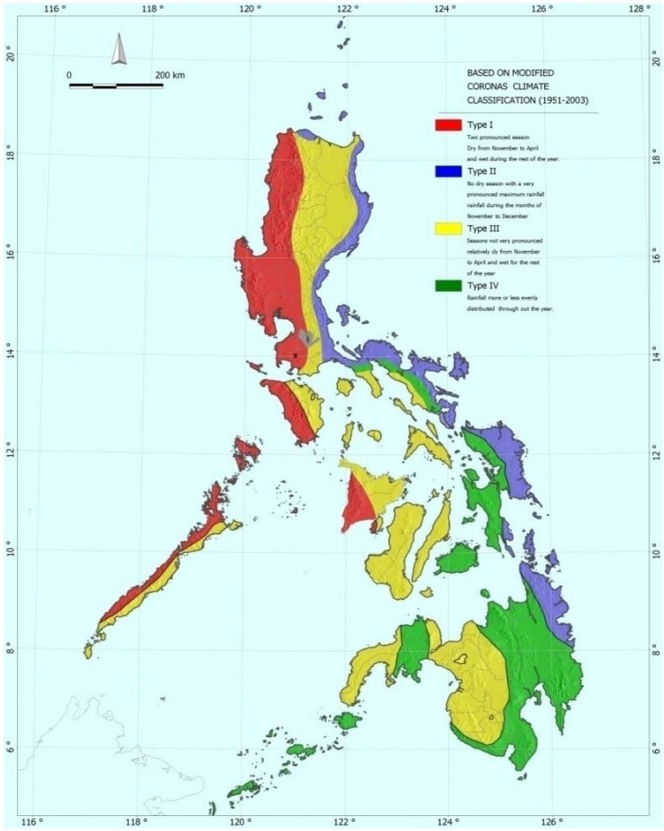
Based on the distribution of rainfall, there are four climate types recognized after the Coronas Classification in 1920. The PAGASA called it the Modified Coronas Classification, which are described as follows:

Type I - two pronounced seasons, dry from November to April and wet during the rest of the year.

Type II – no dry season with a very pronounced maximum rain period from December to February. There is not a single dry month. Minimum monthly rainfall occurs from March to May.

Type III – no very pronounced maximum rain period with a dry season lasting only from one to three months, either during the period from December to February of from March to May. This type resembles Type I since it has a short dry season.

Type IV – rainfall is more or less evenly distributed throughout the year. This type resembles Type II since it has no dry season.



Aside from monsoon, cold front and Intertropical Convergence Zone, the weather system which greatly influences the climate and weather conditions of the Philippines is the tropical cyclone. A great portion of the rainfall, humidity and cloudiness are attributed to it. In fact, 50% of the annual rainfall is attributed to tropical cyclone activity. According to PAGASA, tropical cyclones generally originate in the region of the Marianas and Caroline Islands of the Pacific Ocean which have the same latitudinal location as Mindanao. Their movements follow a northwesterly direction, sparing Mindanao from being directly hit by majority of the typhoons that cross the country.

Factors Affecting the Climate of the Philippines

The climate of the Philippines is influenced by the complex interactions of the various factors such as Philippine geography and topography, semi-permanent cyclones and anti-cyclones, principal air streams, ocean currents, linear systems, tropical cyclones, ENSO events, and human activity.

1. ***Geography and Topography***

   The Philippine archipelago is located near the equator, with the sun directed to it all year round. The light also has fewer atmospheres to travel through. , and surrounded by bodies of water separating the different islands. The land feature is generally mountainous.

2. ***Semi-permanent Cyclones and Anti-cyclones***

   Atmosphere (air) pressure is a measure of the weight of the atmosphere above any location. It is the force exerted on a person by the weight of tiny particles of air (air molecules).

Low and high pressure is created due to heat energy coming from the sun; it occurs due to the unequal heating of the surface of the earth, the earth being tilted. Warm air rises while cold air descends.

Coriolis effect moves winds to the right or left due to the rotation of the earth around its axis; rotates in a counter-clockwise manner. ***Global winds*** is the manner of the rotation of the wind

Vertical Flow versus Convergence and Divergence

- Low pressure rotates in a counter-clockwise manner while high pressure rotates in a clockwise manner. High pressure enters to low pressure
- Divergence aloft is when low pressure rises; convergence aloft is when high pressure descends

Anti-cyclone is a region of high atmospheric pressure; commonly known as "highs"

- Low pressure absorbs the high pressure; if low pressure is higher than high pressure a typhoon is created
- **Cyclone** is a region of low pressure area

Normal Position of Highs and Low Pressure Areas during January

- High pressure is found at the NH (northern hemisphere); low pressure is found at the SH (southern hemisphere)
- During July, the low pressure goes to NH
- July – peak of the southwest monsoon across the Philippines
- Trough is also considered as a zone of low pressure
- If there is climate change, the position of the low and high pressure changes.

3. Principal Airstreams

Southwest Monsoon (Habagat)

- comes from the southwest, affecting the western side of Luzon and Visayas; Mindanao is affected by the SW monsoon during the peak season only
- affects the country from July to September; very warm and humid because it passes through the Indian Ocean, collecting moisture
- occurs when warm moist air flows over the country from the southwest direction; characterized by heavy rainfall that may last for a week during July-September, bringing rainy season to the western part of the country

Northeast Monsoon (Amihan)

- ***Marginal flow of the wind*** – wind flows from north to south, causing extreme low temperature in Northern Luzon
- affects the eastern portions of the country from October up to late March
- starts over Siberia as a cold, dry air mass but gathers moisture as it travels across the Pacific Ocean before reaching the eastern sections of the Philippines
- occurs when the cold and intense Asiatic winter anti-cyclone sends northeasterly winds across the Philippines
- characterized by widespread cloudiness with rains and showers

4. Ocean Currents

High pressure produces cold currents on the western coast of the continent and warm currents on the eastern coast

- *Trade winds* carry warm air from the Pacific Ocean pushing it towards the eastern coast of the Philippines causing cloudiness and rainfall in the western coast

5. Linear Systems

Cold Front

- along the front, clouds develop bringing heavy rains
- not formed in the Philippines, but in the mid-latitude countries or cold areas
- usually brings low pressure area that forms into a tropical cyclone
- when cold air meets warm air, unstable air is formed and this unstable air rises forming cloudiness, scattered rain showers, and sometimes, thunderstorms

Intertropical Convergence Zone (ITCZ) – air from the NH and SH meet causing instability in the air and series of low pressure area

- ITCZ oscillates with the season
- January-February: ITCZ located in the northernmost part of the Philippines even reaching Australia – Philippines have good weather while Australia has bad weather
- July: ITCZ located across the Philippines; August: located in the northernmost part – many tropical cyclones entering the country because of this

Tropical Cyclone – intense weather disturbance with very low pressure and strong wind circulation blowing in a counter-clockwise direction toward the center or "eye" with minimum winds of 35 kilometers per hour

Classification of Tropical Cyclones in the Philippines

- *Tropical Depression* – maximum winds near the center: 35-64 KPH
- *Tropical Storm* – max. winds near the center: 64-118 KPH
- *Typhoon* – max. winds exceed 118 KPH
- *Super Typhoon* – conceived by JTWC; max. winds greater than 200 KPH near the center

Philippine Area of Responsibility (PAR)

- Around 20 tropical cyclones enter PAR every year
- Even though a tropical cyclone exits the PAR, it still affects the country – enhances the SW monsoon (Habagat) bringing heavy rains
- From 1948-2010, 1154 or 70% of tropical cyclones entered or formed in PAR
- Tropical cyclones enter or are formed in the Phils mostly in July, August and September in which the SW Monsoon is at its peak

Average Tropical Cyclone Tracks

- **February**: tropical cyclone rarely enter PAR because it diverts direction due to cold temperature
- **January 2013**: tropical cyclone "Crising" was formed
- **2011-present**: tropical cyclone track is changing
- Tropical cyclones form at the lowest latitude

Frequency of Tropical Cyclones in the Philippines

- Northern Luzon is most frequently hit by tropical cyclones, followed by Catanduanes and Northern Samar. Least hit is the Mindanao area.

Public Storm Warning

Signal No.	Description	Potential Impacts
1	Tropical cyclone may threaten or affect locality Winds: not more than 30-63kph may be expected within 36 hours Action: monitor the latest weather bulletin issued by PAGASA every 6 hours	• Twigs and branches of small trees may be broken • Some banana plants may tilt or land flat on the ground • Rice in flowering stage may suffer significant damage • some houses of very light materials may be partially uprooted • very light or no damage at all may be sustained by exposed community
2	Moderate cyclone will affect the locality Winds: 61 up to 100 kph may be expected within 24 hours Action: Prepare flashlights, batteries, matches, kerosene lamps or candles and charcoal in anticipation of power interruption	• some coconut trees may be tilted with few broken • few big trees may be uprooted • many banana plants may be drowned • rice and corn plants may be adversely affected • large number of nipa and cogon houses may be partially or totally uprooted • some old galvanized iron roofing's may be peeled off • light to moderate damage to the exposed communities
3	Strong tropical cyclone will affect the locality Winds: 101 up to 185kph may be expected in at least 18 hours Action: If the house is not strong enough to withstand the battering of strong winds go to the designated evacuation center or seek shelter in stronger houses. Stay in safe houses until after the disturbance has left the area.	• many coconut trees may be broken or destroyed • almost all banana plants may be drowned and a large number of trees may be uprooted • majority of nipa and cogon houses may be uprooted or destroyed and considerable damage to structures of light to medium construction • widespread disruption of electrical power and communication services • moderate to heavy damage may be experienced in the agricultural and industrial sectors
4	Very strong typhoon may threaten or affect the locality Very strong winds: more than 185kph may be expected in at least 12 hours Action: Stay in safe houses or evacuation centers	• coconut plantations may suffer extensive damage • many large trees may be uprooted • rice and corn plantation may suffer heavy losses • most residential and institutional buildings of mixed construction material may be severely damaged • electrical power distribution and communication services may be severely disrupted • damage to affected communities can be very heavy

Tropical Cyclone Warnings/Bulletins

- *The Weather Advisory*
  - General information on tropical cyclone or other severe weather systems such as the southwest monsoon
  - For southwest monsoon, low pressure area and other severe weather systems, it describes the expected weather condition in affected areas and its duration
  - For tropical cyclones, it provides additional details such as the maximum sustained winds, movement and forecast position. Issued once a day at 11:00 AM

- *Severe Weather Bulletin*
  - Tropical Cyclone Alert
    - A tropical cyclone either enters or develops in the PAR and has an impending threat to any part of the country

- No public storm warning signal is in effect in any part of the country
- Its content is similar to an advisory, however, the frequency of issuance of alert bulletin shall be twice a day, at 11AM and 11PM

- Tropical Cyclone Warning
  - Upgrading from tropical cyclone alert
  - Necessary to put in effect public storm warning signal no. 1 over certain areas of the country
  - Tropical cyclone has a real threat to some communities, provinces or regions in the country
  - Frequency of issuance very six hours: at 5 AM, 11 AM, 5 PM, and 11 PM

Beneficial Effects of Tropical Cyclone

- Rainfall increases groundwater and the water levels of dams that provide drinking water, irrigation water and power generation
- Rain means water for plants
- Rain decreases the level of pollutants and cleanses the atmosphere

6. EN/SO (El Niño/ Southern Oscillation) Events

EN/SO occurs when there is an anomalous warming of the waters during El Niño extended over a large portion of the equatorial Pacific; if the water warms up, the atmosphere reacts.

El Niño – refers to the warming of the ocean in the eastern equatorial and central Pacific. It is an oceanic phenomenon first recorded in the early 1500s along the coasts of northern Peru and Ecuador. It is originally used to describe the annual appearance of warm waters around Christmas time. In some years, warm waters appeared earlier and lasted longer; eventually, the term El Niño was used to describe these periods of anomalous warming

Southern Oscillation (SO) – the changes in atmospheric pressure associated with this warming, and SO index is the measure of these changes. It can be dated back as a large scale pressure fluctuations reported since the late 1800s. It is used as a forecasting tool.

Two Phases of EN/SO

El Niño (warm phase) – phenomenon where water across much of the tropical eastern and central Pacific is hotter than usual and affects the atmosphere and weather around the world

La Niña (cold phase) – phenomenon where water in the Pacific Ocean near the equator gets colder than usual and affects the atmosphere and weather around the world

How do ocean temperatures affect rainfall?

If the ocean is warm, there is plenty of evaporation; if there is plenty of evaporation, abundant moisture accumulates in the atmosphere causing rainfall.

If the ocean is cold, there is less evaporation; if there is less evaporation, less moisture accumulates in the atmosphere resulting to lesser rainfall or no rainfall at all.

Global winds: the rotation of the earth creates wind, and it changes in the presence of typhoons

What is normal condition?
There is no El Niño or La Niña.

When low pressure is at the western Pacific and high pressure is at the eastern Pacific; with trade winds, stronger wind pushes the warm water, hence more clouds and wind generated and warm water goes south in the western Pacific

Strong easterly wind pushes the warm air in the west Pacific producing rainfall and low pressure which pushes towards the Philippines

Upwelling – the circulation of warm and cold air under water, subsurface of ocean; fosters the growth of fish population

What if there is El Niño
Easterly wind weakens and westerly winds go against the direction of the easterly winds; tropical cyclones will not form in or near PAR because the warm air pushes the low pressure away from the Philippines

What if there is La Niña
Easterly winds are stronger pushing the warm air towards the Philippines; many tropical cyclones form and develop in and near the PAR

EN/SO Monitoring
Global observation: the climate condition in the eastern and central equatorial Pacific (CEEP) ocean as reflected by the sea surface temperature anomaly (SSTA), wind (trade winds), and the atmosphere above it (Southern Oscillation Index)

Key Indicators of El Niño and La Niña
Sea surface temperature anomaly (SSTA): if the threshold value is greater than or equal to 0.5 degrees Celcius, El Niño occurs; if threshold value is below or equal to -0.5 degrees Celcius, La Niña occurs.

Southern Oscillation Index (SOI): if the threshold value is below or equal to -8, El Niño occurs; if greater or equal to 8, La Niña occurs.

Trade wind (easterly wind): if trade wind is weaker than normal, El Niño occurs; when stronger, La Niña occurs.

NOAA Operational definitions of El Niño and La Niña
El Niño is characterized by a positive ONI greater than or equal to $+0.5^0$C while La Niña – characterized by a negative ONI less than or equal to -0.5^0C. By historical standards, to be classified as a full-fledged El Niño or La Niña episode, these thresholds must exceed for a period of at least 5 consecutive overlapping 3-month seasons. If the ONI is sustained for three consecutive months, it can be called El Niño; otherwise, it will just remain as a "condition," and not El Niño.

El Niño and La Niña events tend to develop during the period April-June. These tend to reach maximum strength during December-February; typically persist for 9-12 months, though occasionally persisting up to 2 years and typically recur every 2 to 7 years.

Overview of Climate Change and Global Warming

By Daisy F. Ortega
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Global Warming

- the increase in the earth's mean temperature due to the so-called enhanced greenhouse effect
- global average air temperature increased by 0.74^0C from 1906 to 2005; unprecedented strong temperature increase since 1975
- in 1975, technologies for human convenience were invented, that emit greenhouse gases in the atmosphere

The Greenhouse Effect

- a necessary phenomenon that keeps all Earth's heat from escaping to the outer atmosphere
- farmers in the temperate zone (cold places) establish greenhouses to maintain the temperature needed by their plants; without the natural greenhouse effect, life on Earth would be difficult to sustain
    - **Methane (CH4)**: animal husbandry, irrigated agriculture, and oil extraction release great amounts of this potent greenhouse gas
    - **Nitrous oxide (N2O)**: a by-product of burning fossil fuels and is also released when ploughing farm soil
    - **Ozone (O3)**: main element of the protective layer in the upper atmosphere, which shields the Earth from the sun's harmful ultraviolet radiation; both a natural and man-made gas; when produced in excess, results are smog and severe air pollution which are harmful to human health
    - **Chlorofluorocarbons (CFCs)**: chlorine containing gas used for refrigerators, air conditioners, aerosol sprays propellants and cleaning agents; these cause depletion of the atmospheric ozone layer

Selected Greenhouse Gases

- **Carbon dioxide (CO2)**: fossil fuel burning, deforestation are among its sources
    - anthropogenic increase: 30%
    - average atmospheric residence time: 500 years
- **Methane (CH4)**
    - source: rice cultivation, cattle & sheep ranching, decay from landfills, mining
    - anthropogenic increase: 145%
    - average atmospheric residence time: 7-10 years
- **Nitrous oxide (N_2O)**
    - source: industry and agriculture (fertilizers)
    - anthropogenic increase: 15%
    - average atmospheric residence time: 140-190 years

The Carbon "Bathtub" and its Components

- Carbon dioxide – the most abundant type of greenhouse gases present in the atmosphere
- If the amount of water flowing into a bathtub is greater than the amount of water leaving through the drain, the water level will rise; carbon dioxide emissions are like the flow of water into the world's carbon bathtub
- Global warming – result of CO_2 levels rising in the Earth's atmosphere
- "Thickening blanket"

- Carbon dioxide: +31%
- Methane: +151%
- Nitrous oxide: +17%

The Philippines is too far away from the top ranking greenhouse gases emitting countries so our advocacy is “adaptation” to the impacts of climate change. The Philippines has minimal contribution to greenhouse gases emissions since the population is low. The top emitters of greenhouse gases are the rich countries.

Humanity’s carbon dioxide sources as of 2010 comes from fossil fuels and cement (91%) which is equivalent to 33.4 billion metric tons and land use change (9%) equivalent to 3.3 billion metric tons.

Humanity’s carbon dioxide goes to the atmosphere (50%) amounting to 18.4 billion metric tons, land (26%) 9.5 billion metric tons and oceans (24%) 8.8 billion metric tons.

Natural sources of greenhouse gases – volcanic eruptions, forest fires, decay of plants, and soil.

- *Nitrous oxide* – produced by bacterial breakdown of nitrogen in soils and oceans

Man-made sources of carbon dioxide – burning of fossil fuels (oil, coal) by power plants, industries and vehicles; accounts for 20% of additional greenhouse effects

- *Methane* – decomposition of garbage and agricultural waste materials, leaks in coal mining and natural gas production

Causes of Climate Change

Natural causes – volcanic eruption, solar, and natural variability

Human causes – include greenhouse gases, aerosols, and land use

Ten Indicators of Warming World

The ten indicators are the changes in the following: humidity, air temperature near surface (troposphere), temperature over oceans, sea surface temperature, sea level, ocean heat content, temperature over land, glaciers, show cover, and sea ice. Seven of these indicators would be expected to increase in a warming world and observations show that they are, in fact, increasing; three would be expected to decrease and they are, in fact, decreasing

Observed Global Trends (IPCC Conclusions)

- Warming of the climate system
- Increasing global average air and ocean temperatures
- Rising global average sea level
- Reductions of snow and ice
- Sea ice has a bearing with the world’s climate. If sea ice lessens, more water will evaporate to the atmosphere subsequent to more moisture in the atmosphere. If there is a lot of moisture in the atmosphere, cloudiness develops resulting to rainfall in some parts of the world.

Change in Global Average Surface Temperature

- Eleven of the last twelve years rank among the twelve warmest years in the instrumental record of global surface temperature
- Usually, the sudden rise in temperature is connected to El Niño

Observed Changes in Climate

- Since 1993, global mean sea level has risen between 2.8 and 3.6 millimeters per year (0.11-0.14 inches/year).
- From 2005-2012, meltwater entering the ocean has dominated sea level rise, accounting for more than twice the contribution from warming-caused expansion.
- In the 20th century, sea level rise reached 0.17m.
- Sudden increase in local hazard intensity such as heat waves, heavy rainfall/ flood, tropical cyclones, coastal marine hazards, and strong winds indicate the need for disaster risk reduction management.

Impacts of Climate Change

Agriculture and Food Security – added heat stress, shifting monsoons, drier soils and water shortages as a result of higher temperatures will affect livestock and crop production patterns with expanded range of weeds, insects and diseases which may reduce global food supplies and contribute to higher food prices.

- A degree increase in temperature in the tropics results to as much as ***10% decline in agricultural yield***
- If temperature increases by 2-6 degrees, there will be a ***decline in the Philippine agricultural production by 29%-160%***
- ***Health and global warming*** – extreme temperatures can directly cause the loss of life (e.g. 35,000 people died during heat wave in Europe, August 2003); warmer weather provides an ideal breeding environment for mosquitoes
- Tropical diseases – global warming increases drought which lessens the supply of clean drinking water; less supply of clean water causes cholera. An increase in temperature provides an ideal breeding environment for mosquitoes bringing diseases such as dengue fever, malaria and yellow fever
- Coral reefs – highly sensitive to small changes in water temperature

Response to Climate Change

Mitigation – an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases (The Philippines already has windmills located at Northern Luzon)

Mitigation actions involve the following:

- First, improve and develop technologies to increase energy efficiency, to use renewable energy, and capture and store carbon
- Second, put in place regulations and standards that help move towards low fossil fuel use
- Third, use instruments, such as carbon finance, and markets, to help reduce emissions
- Fourth, change behavior and lifestyle; example: use more public transport and lower energy consumption at home

Adaptation – practical steps to protect countries and communities from the likely disruption and damage that will result from effects of climate change

Other Actions

- Manage resources, especially forests, in a sustainable way
- Use renewable energy sources such as solar, wind and geothermal power
- Recycle as much as you can; you'll be saving energy and preserving natural resources
- Reduce the number of journeys you make by car; use public transport, go by bike or walk
- Switch off lights; turn off home and office appliances when not in use
- Change your light bulbs to energy saving bulbs (CFLs) that use a fraction of electricity and last up to 13 times longer

PAGASA's Response

The PAGASA's response established through the years include enhancement of observing systems and monitoring facilities for early warning system through the upgrading of surveillance radars; establishment of Doppler radar, upgrading of satellite facilities (NOAA, MTSAT), acquisition of MODIS satellite, upgrading of upper air stations, buoys, wind profilers, automatic weather stations (AWS).

Discussion Option 2

Climate Change, Disasters and Food Security: The Challenge of Our Time

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Climate Change

- Caused by anthropogenic linkage
- Triggered during the industrial revolution, and great acceleration
- Caused by natural happenings such as volcanoes, tectonic plate movement, among others, however, with human activities it (climate change) agitates.

  Anthropocene regime refers to period where man shapes the world into his own desire by abusive activities. Industrial revolution is characterized by the environment being badly affected by man's activities. Great acceleration refers to the period where there is great increase in population, coastal zone destruction, and loss of biodiversity.

Climate Change Scenarios

- Coral triangle, the richest area of biodiversity is at stake, according to a study of World Bank
- El Niño characterized by rise of sea surface temperature, ocean acidification, rise of sea levels, tropical cyclones, rainfall, river flow and flooding
- Earthquakes, which is very difficult to predict. The Marikina fault is already wide and can fall anytime.
- Increase in global sea and air temperatures
- Widespread melting of ice and snow
- Typhoons
- Greenhouse effect caused by too much CO2, methane (CH4), nitrous oxide (N20), GNG or energy generation industrial power plants
- Climate Outlook and Knowledge of Community Hazards and Risks
- Cropping/ Enterprise Calendar
- Good Practices Options/Climate Smart Technologies
- Farm Plan/Enterprise Plan
- Post Disaster Needs Assessment
- Community DRRM Support Systems (BDRRM Plan, Policy/fiscal support, EWS, Capacity Development, Infrastructures, etc.)

Five Components of Weather

1. Temperature
2. Precipitation
3. Wind
4. Atmospheric pressure
5. Humidity

Weather is the present condition or change in the day, e.g. cold in the morning and hot in the afternoon.

Climate is longer change in temperature, precipitation, and others.

Climate variability is the way climate fluctuates yearly above or below a long term average value.

Climate Change

- It is long-term continuous change (increase of decrease) to average weather conditions or the range of weather.
- It is happening faster than ever before and will continue.
- It is variable, non-linear and no one knows when it will end.

Climate change affects agriculture. Plants in order to grow need water, sunshine or available light, and temperature. It also affects livelihood.

Projected seasonal temperature increase and rainfall in the Philippines (Project NOAH):

- In 2020, there will be temperature increase of 1.1 º C.
- In 2050, there will be temperature increase of 2.2 º C.
- In terms of rainfall, Bicol regions will have more rainy seasons and typhoons.
- Albay will have minimum temperature and maximum change in Camsur and Masbate with a rise 1.88 º C.

Temperature is the most observable effect of climate change.

Illustrations of temperature change:

- Blue-cold
- Red-hot and rainy season

Major conflict of climate change is level of CO2 in the atmosphere caused by our usage of energy resources especially hydro energy. PAGASA said that in 1897, the country surpassed the normal level of temperature.

Causes of Climate Change

Emissions from agriculture due to agriculture and land conversion contributing up to 1/3 to the human-induced greenhouse effect, e.g. manure emits CH4 and N20, and its contribution equals to 413 million tons of CO2.

Climate change is no longer irreversible; IPCC have the following conclusions:

- There is 95% certainty that human activities are responsible for global warming.
- CO is unprecedented level for the last 800, 000 years.
- Sea level is set to continue to rise at faster rate that over the past 40 years.
- Over the last decades, the Greenland and Antarctic ice sheaths have been melting and glaciers have receded in most parts of the world.

Impacts of Climate Change

Ability/capacity of man to produce food is at risk. Degree increase of temperature in the tropics will decrease agricultural yield by as much as 10%.

Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. (World Food Summit, 1996)

Components of food Security

1. Food utilization- nutritional value, social value, and food safety
2. Food access-affordability, allocation, and preference
3. Food availability-production, distribution, and exchange

Climate Change Possible Future Effects on Ecosystem

- Coral system cannot handle higher temperature well
- Wildfires will increase
- Up to 30% of species will be at increased risk for extinction due to the rapid changes in their ecosystems

Other Observed Changes and Effects

- 89% of current changes in ecosystems are consistent with changes expected due to global climate change.
- carbon dioxide, methane, and nitrous oxide levels in atmosphere have increased greatly due to human activities since 1750 and now far exceed previous levels.

Climate change is irreversible that is why there is climate adaptation.

Identified Portfolio of Upland Good Practices Options
(against strong wind, typhoon, continuous rain, flash flood and drought)

1. Strip cropping
2. Mixed cropping
3. Small farm reservoir (SFR)
4. Wide row spacing for rainfall multiplication
5. Tillage practices (zero and minimum tillage)
6. Coconut leaf pruning
7. Sloping Agricultural Land Technology (SALT-1)
8. Votive grass technology
9. Alley cropping

Identified Portfolio of Lowland Irrigated Good Practices Options
(against floods/flashflood, typhoon and saline intrusion)

1. Early-Maturing Rice Varieties
2. Submergence Rice variety (NSIC Rc-194)
3. Salt-tolerant rice variety (NSIC Rc-108)
4. Timing of planting/ratoon
5. Rice + Duck Farming Systems
6. Rice + fish farm system
7. Synchronized planting/controlled irrigation
8. Floating garden (San Buena, Buhi)

Identified Portfolio of Fisheries and Aquaculture Good Practices Options
(against typhoon, storm surge and fish kill)

1. Backyard raising of tilapia
2. Integrated rice-fish farming
3. Backyard pond polyculture of African catfish and tilapia
4. Polyculture of tilapia and carps in net cages
5. Small-scale seaweed (*Eucheumia and kappaphycus spp.)* farming
6. Mud crab (*Scylla serrata*) farming/fattening
7. Fish processing and value addition for housewives
8. Freshwater prawn *Macrobrachium rosenbergii* culture
9. Nursery of wild mangrove crab S. Serrata\
10. Squid pot fishing

In order to develop adaptation applications, it is important to identify the major and secondary hazards.

Secondary Hazards

- Floods-epidemics, snake bites
- Drought-pest infestation, epidemics, famine
- Pollution-disease

Tools for Hazard Assessment

- Historical profile
- Timeline
- Hazard map
- Hazard hunting
- Seasonal calendar
- Hazard assessment matrix

It is not the strongest species, nor the most intelligent, that survive,
but the ones most responsive to change.
---Charles Darwin

Session 2: Basic Meteorology, Weather/Climate Observation and Forecasting

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Basic Meteorological Concepts

Meteorology is a branch of science which deals with weather elements and it includes forecasting.

Sun is the most important source of energy. Sunlight reaching the earth is determined by the rotation of the earth on its axis and its revolution in its orbit around the sun.

The earth, on the other hand, is the third planet from the sun. It is the only planet that has living things. It is divided into four quadrants. Its northern and southern hemisphere is divided into two: Prime Meridian and Greenwich England.

Weather variability is caused by the circulation of the atmosphere and unequal distribution of the earth's surface. Countries nearer the equator receive more solar radiation compared to those located on the pole. This is the reason why there are varying levels/characteristics of weather elements especially with respect to the position of our place to the sun. Equator is an imaginary line that divides the northern and southern hemisphere.

Aspects of Meteorology

1. Observation
2. Understanding
3. Prediction of weather

Branches of Meteorology

1. ***Climatology*** – study of climate of a place or regions on the basis of weather-related data gathered over a period of time
2. ***Synoptic Meteorology*** – study of the movement of low pressure area, air masses, fronts, and other weather systems, depression and tropical cyclones. Data are collected on a weather map which helps the experts get a synoptic view of world weather. Synoptic meteorology-day-to-day analysis and forecasting
3. ***Dynamic Meteorology*** – study of atmospheric process through mathematical equations, are called numerical model when taken together
4. ***Physical Meteorology*** – study of the physical process of the atmosphere, such as solar radiations, its absorption and scattering in the earth.
5. ***Micrometeorology*** – study if atmospheric conditions over an area of smaller than 1 km.
6. ***Hydrometeorology*** – study if occurrence of water in various from in relation to weather elements.
    - Water cycle explains the components of water in various forms which is very important in monitoring water resources, water balance and others.
7. ***Agricultural Meteorology*** – study that deals with weather and its relationship to crops and vegetation.

Agrometeorology is the relationship of weather and climate to agricultural production (crops, vegetation & livestock)

Branches of Meteorology in Agriculture

1. Hydrometeorology-occurrence of water in various forms
2. Agricultural meteorology-establishes relationship of weather elements to agricultural production

Importance of Agricultural Meteorology

1. Long-range planning of agricultural systems (RDE)
    - Irrigation & drainage systems (gravity and pressurized)
    - Land-use and farming patters
    - Crop protection/fertilizer application
    - Prediction of el niño and rainfall variability
    - Selection of crops, animals and breeds and farm machineries
2. Observation/ monitoring and real-time dissemination of meteorological information & timely

Atmosphere

The ***atmosphere*** is the layer from our ground land surface up to several thousand kilometers moving towards the sun. It is referred to as "protective bubble." It has several layers characterized based on some physical dimensions like the density of gas, movement, thermal characteristics, chemical composition and movement. These layers are:

1. ***Troposphere*** – it begins at the earth's surface and extends up to 4-12 miles high. As the density of the gases in this layer decrease with height, the air becomes thinner. Tropopause is the transitions boundary between the troposphere and the layer above.

    - tropopause and troposphere – lower atmosphere

2. ***Stratosphere*** – it extends from the tropopause up to 31 miles above the earth's surface. It holds 19% of the atmosphere's gases but very little water vapor. Temperature increases with height as radiations is increasingly absorbed by oxygen molecules leading to the formation of Ozone.

    - stratopause and mesopause – middle atmosphere

3. ***Mesosphere*** – it extends from the stratopause to about 53 miles (85 km) above the earth. Temperature decreases with height.

4. ***Thermosphere*** – it extends from the mesopause to 690 km above the earth. It is known as upper atmosphere. Thermopause is the transition boundary which separates the exosphere from the thermosphere below.

5. ***Exosphere***- It is the outermost layer of the atmosphere. It extends from the thermopause to 10, 000 km above the earth.

Hydrologic Cycle Concepts

- Water cycles through various pools in the environment
- Cycling occurs when the water changes state (liquid to vapor)
- It is driven by solar energy.

Weather Observation and Forecasting

Weather systems that affect the Philippines are thunderstorms, cold front, Southwest and Northeast monsoons, Intertropical Convergence Zone, easterly wave, orographic lifting, and tropical cyclone.

Weather observation and forecasting involves the following:

1. Observation of different weather elements
2. Collection and transmission of weather data
3. Plotting of weather date
4. Weather map analysis
5. Formulations of forecasts

Farm Weather Forecasting (PAGASA)

Weather forecast – the weather advisory for the guidance of all people.

Farm advisories – weather advisory for the guidance of farmers in their farming activities for the period

Fishing advisories – weather advisory for fishermen on their fishing activities for the period

Session 3: Impacts of Climate Variability and Change on Food and Nutrition Security

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Projected change in annual mean temperature for the Philippines (2020, 2050, 2100)

2020- 09 to 1.1 ºC
2050- 0.9 to 2.2 ºC
2100-0.9 to 3.4 ºC

PAGASA reported that there was an increase of 0.648 ºC in the Philippine mean temperature from 1955-2010.

Frequency of Extreme Temperature: Hot temperatures (indicated by the number of days with maximum temperature exceeding 35 ºC will continue to become more frequent.

Frequency of Extreme Rainfall- Heavy daily rainfall (exceeding 300 mm) events will continue increase in number in Luzon, Visayas and Eastern sections of the country.

Significant Climatic Variability Findings

Warming of the Climate system

- Increasing in global air and ocean temperatures
- Rising global average sea level
- Reductions of snow and ice

Observed Changes in Climate

- Global average sea level rose at a level of 1.8 mm per year over 1961-2003.The rate was faster over 1993-2003, about 3.1 mm per year
- Total 20th century sea level rise is .17 mm

Signs of Global warming

Rising Sea Water Temperature-Warmer water in ocean takes up more space than the cold water contributing one way or the other to the rise of sea level due to “Thermal Expansion of Water” leading to:

- Coral reefs damage (30% of world’s coral reefs have already been damaged and by 2010 it is estimated to rise up to 60% if we do not do something the soonest possible time.)
- Weather shifting or climate change-more ENSO/La Niña episodes are likely to occur.
- More and stronger Tropical Cyclones
- Flora and fauna will be forced to “Adapt or Die”

The climate change that is besetting us today is a result of anthropogenic activities. Thus, while climate change affects agriculture, it also contributes to climate change. The relationship is directly proportional.

The vulnerability of the Philippines cannot be denied. Due to its geographic location in the Pacific ring of fire, the archipelago is vulnerable to rising sea level and extreme weather events. Its vulnerability is aggravated by the country’s weak and unstable economy. For the agriculture sector, while it must do its part to mitigate, foremost is to learn to adapt.

Samples of Weather and Climate Effect to Agriculture

1. Livestock

- Required temperature for breeding/right season for breeding
- Relative humidity, rainfall and temperature for the occurrence of pests and diseases
- Water and feed requirement during dry season or wet season
- Others

2. Crops

- Photoperiodic sensitivity of crops
- Adaptation of crops/vegetation based on pressure, altitude, and pressure

Impacts of Climate Change in the Agriculture Sector

On Crop Behavior

1. Higher CO2 levels can increase yields, yet high temperature, lack of water and low nutrients reverse this effect. In controlled – environment agriculture, e.g. nursery and greenhouses, CO2 fertilization is done to increase yield. However, during photosynthesis, elevated CO2 also needs more water. Hence, in drought areas and in depleted soils,higher CO2 levelreverses crop development. The carbon cycle can best illustrate how this happens.

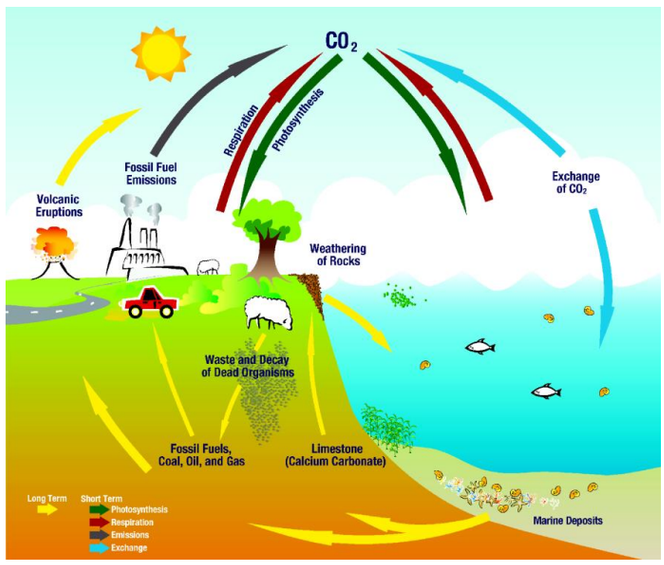

Figure 1. The carbon cycle

Carbon dioxide is the most important raw material in photosynthesis so that crops can produce organic matters. The natural exchange of CO2 occurs during respiration, photosynthesis, volcanic eruptions, and fermentation process. During decomposition, carbon dioxide maybe trapped and be converted into energy through a process called CO2 harvesting/capturing. In California, for example, one of their alternative sources of energy is from anaerobic digestion. Manures from 500 cows are collected in a lagoon which is covered with canvass to prevent oxygen in the fermentation process. After sometime, the canvass would rise indicating the accumulation of methane gas inside. This methane gas can generate 40 megawatts electricity, enough to run a generator. While there are ways to harvest CO2, terrestrial plants remain the biggest natural sinks of CO2 from the atmosphere. And with the increase of CO2 emission especially from the burning of fossil fuels, there is no way plants could be able to absorb it. This gas stays in the atmosphere contributing to the overall warming.

2. Extreme events, especially floods and droughts can harm crops and reduce yields. This is true in rice because it is dependent on the availability of water. The abundance and lack of water can significantly reduce yield.

3. Drought is difficult to deal with because of the increased temperature and less precipitation. In agriculture, crop productivity is relative to temperature. Because drought is accompanied by temperature increase, there are crops that die when temperature reaches 24 ^{o}C no matter how much moisture and fertilizers are provided. Even if some plants can, crops cannot recover with the prolonged absence of water.

4. Many weeds, pests and fungi thrive under warmer temperatures, wetter climates, and increased CO2 levels. Organisms that cause disturbance to agriculture are more adaptive to warmer temperatures. This is because most commercial crops are cultivars as compared to weeds that are indigenous hence, more resistant to pests and diseases. Most of these problems, however, are ecological repercussions of pesticide use.

On Livestock

1. Heat waves (heat stress) increases vulnerability to disease, reduces fertility, and reduces milk production. Heat stress affects the hormonal production in the pituitary and reproductive organs.

2. Drought may threaten pasture and feed supplies

3. Prevalence of parasites and diseases that affect livestock

4. Increases in atmospheric CO2 : upsets forage quality

On Fisheries

1. Changes on range of species of fish and shellfish. Temperature threshold reduce reproducibility and survival.

2. Species movement bring greater competition in food and other resources

3. Aquatic diseases are more prevalence in warm waters.

4. Timing of reproduction and migration leads to decline in population.

5. World's oceans acidification threatens sensitive ecosystem.

On Global Food and Nutrition Security

Global food shortages can cause humanitarian crisis in some countries. Adaptation problems would magnify in developing countries and poorer countries may find it difficult to adapt.

Aside from drought and extreme events that bring outright damage to production areas, creeping impacts like increase in temperature can also increase pests and diseases including the adaptability of weeds. All of these are aggravated by the conflict of resource use because of increasing population. Human health is also affected while damage and decline in production will also cause the loss of livelihood to agriculture workers.

According to the Food and Agriculture Organization, food security exists when all people at all times has physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lives.

The following are the primary risk factors of food security: drought and flood shipping/distribution disruptions, fuel shortages, economic instability, and wars.

As discussed earlier, water is a basic component for plant photosynthesis. Excess water during flood also destroys the plants.

Food shortage may not be caused by low production but in the equitable shipping and distribution of produced goods. Prices of these commodities are also influenced by fuel shortages. The buying capacity of the people is reflective of a country's economic stability.

The four components or pillars of food security are availability (production, distribution and exchange), access (affordability, allocation and preferences), utilization (safe, nutritious and healthy), and stability (over-time).

Availability is related to production. There is produce which could be exchanged. Accessibility is the availability of a produce and its affordability. Utilization means, is it safe and does it provide the right and adequate nutrition. Stability is the ability of food to be present over a period of time.

In summary, the present farming practices have contributed to the greenhouse gases that altered the atmospheric processes which lead to what is now called anthropogenic climate change. As a result, the changes in temperature and the frequent occurrence of extreme events affect agriculture.

For extreme events, the following are the possible adaptive mechanisms: use of traditional instead of commercial crops, the practice of traditional soil conservation as first line of defense, organic composting and amelioration, bio-indigenous pesticides use, promoting local markets, seed banking, etc.

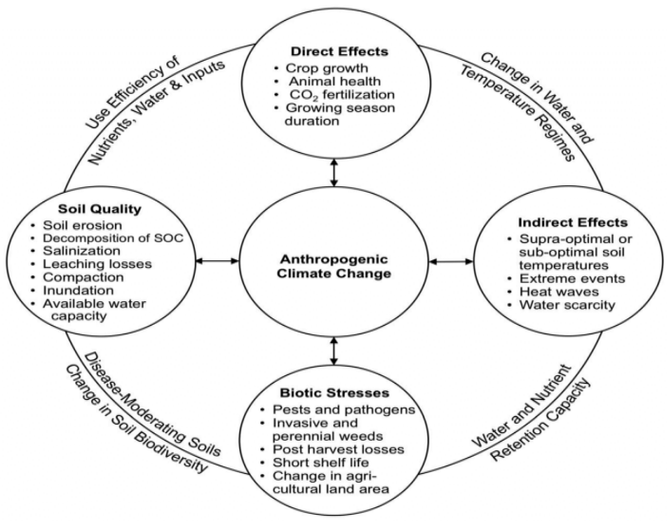

Figure 2. The complex relationship of agriculture and anthropogenic climate change

Agriculture's Contribution to Greenhouse Gases

Meanwhile, can agriculture hasten climate change? According to the Climate Change Commission, agriculture is responsible to 14% direct greenhouse gas emission. An additional 18% is from deforestation. Living carbon becomes emitted from farmlands due to inappropriate farming and overgrazing practices.

To summarize, carbon dioxide becomes lost from the biosphere as a result of deforestation, biodiversity loss, accelerated soil erosion, loss of soil organic matter, coastal water pollution and acidification of the oceans. All of these are anthropogenic in nature.

Changes in land use also contribute to atmospheric carbon. To meet the needs of an increasing population, farmers resorted to machine intensive farming which unfortunately reduced land cover and encouraged chemical farming which led to soil loss associated with low organic matter.

Module I Synthesis

Session 4: Climate Change, Agriculture and Food Security: Concepts, Linkages and Considerations for Community-based Disaster Risk Reduction and Climate Change Adaptation

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Main Topics

1. Concepts and linkages of disaster risk reduction and climate change adaptation in the context of agriculture and food security
2. Overview of institutional policies
3. Approaches on climate change impact assessment and adaptation assessment
4. Monitoring and evaluation considerations for climate change adaptation and disaster risk reduction in agriculture

The linkages among agriculture, climate change and food security are dynamic. These concepts are like a series of gears; any change in the climate impacts agriculture and whatever movement in agriculture impacts the four components of food security.

Climate Change Key Variables

The key variables of climate change are temperature rise, change in precipitation, extreme weather events, and sea level rise. The nature of impact depends on the sector, location and type of ecosystem.

Examples of Impacts

Ocean Ecosystem

In the ocean ecosystem, acidification occurs because of the increase of greenhouse gas concentration in the atmosphere. In the atmosphere, part of that carbon dioxide is absorbed by the ocean water. When sea water absorbs CO2, it forms carbonic acid increasing water acidity. This occurrence affects the reproduction of mallows and shellfish. Studies have found out that increase in salt water acidity affects the reproduction of some species.

Aside from this, acidification and warming of the sea stress the corals. Corals are polyps, colorless. What give them color are microscopic algae called zooxanthellae which live in the small holes of the corals. Zooxanthellae and corals share a symbiotic relationship. This algae need to live in the corals for protection from predators at the same time to access light to manufacture food. On the other hand, zooxanthellae help generate energy for the coral. When the ocean water warms, the corals release zooxanthellae causing the corals to be colorless. Slowly, the corals will die because they can no longer metabolize energy. When corals die, many fish species will also suffer because they will no longer have shelter and source of food.

Examples of Impacts

- In the forest ecosystem, a deforested mountain is prone to landslide during extreme weather events like typhoon. It does not only damage properties and livelihood, but it also deposits the sediments during surface run-off to the oceans. These sediments can damage the coral reefs because these can block sunlight. Whatever happens in one ecosystem can result to ecological imbalance.
- With thermal expansion which will cause surface intrusion in the coastal areas. This occurs when saltwater seeps into the rice fields eventually affecting the rice plant. Seepage also occurs in freshwater sources just like cases observed in the Ilocos region. Careful planning then is needed in order that one solution may worsen another existing condition
- More intense drought is connected to temperature rise which is also associated to higher evaporation rate causing drier soils. Rainfall variability leads to changing rainfall patterns.

  When talking about intense drought, the Food and Agriculture Organization classified it into the following: 1) metrological drought this is when it is above the threshold levele declared by PAGASA; 2) hydrological drought is when water resources start to get affected, this can be manifested in decrease in the supply ng irrigation or domestic water; 3) agricultural drought happens when it affects agricultural production (this is when the moisture content ng soil is very low); and 4) economic drought happens when it affects the prices of commodities.

Important DRR and CCA Concepts

Classification of Hazards

When talking about climate variability and climate change in the context of agriculture and food security, it is important to classify hazards for effective planning.

Quick-onset hazards – storms, floods
Slow-onset hazards – drought, dry and wet spells, ENSO associated droughts
Creeping changes – changing rainfall patterns, salinity intrusion, increasing temperatures

Quick-onset hazardscan be experienced anytime like storms and floods. On the other hand, slow-onset climate extremes happen short term but it may take few months for ipacts to be experienced such as dry and wet spells and ENSO associated droughts. Creeping changes happen over decades or over several years like changing rainfall patterns and saline intrusion.

These classifications can better guide DRR at climate CCA planners design the appropriate plan. For instance, hazards being experienced now can be prioritized and those that can happen in 20 to 30 years can have a better CCA and DRR options. Good plans are those that can address two or more hazards.

Coping

Coping is what people usually do when experiencing a hazard. It is characterized as follows: immediate and short term, geared towards survival, reactive not continuous, and often degrades the resource base.

For example, a strong typhoon hit a coastal community ravaging rice farms. As a form of coping, an affected farmer may resort to the cutting of mangrove trees for income in order to support his family. The farmer's action is an example of coping. The action is immediate, geared towards survival of the farmer and his family. It is reactive, not planned but rather based on impulse. The most defining characteristics of coping, it often degrades the resource base.

Coping Range

This is the range in which the effects of climate conditions are beneficial or negative but tolerable. Beyond the coping range, the damage or loss is no longer tolerable and a sociatey or a system is said to be vulnerable.

Adaptation

Adaptation involves changes in practices, both short and long term, which takes into account the impacts of climate change. Unlike coping which does not involve planning, adaptation involves changes in practices, both current and long term, while anticipating the possible impacts of climate change.

> ***Levels of Adaptation***
>
> *Anticipatory adaptation* – takes place before impacs of climate change are observed. It is also referred to as proactive adaptation.
>
> *Autonomous adaptation* – does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market of welfare changes in human systems. It is also called spontaneous adaptation.
>
> Planned adaptation - result of a deliberative policy decision based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state. This is when interventions are formalized in a plan that is accepted to the barangay level, municipal, provincial level, and national level.

Resilience

Resilience is the ability of the system, community or society exposed to hazards to resist, absorb accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of the essential basic structures and functions.

Ideally, a community is resilient if it can resist, otherwise then it should have the capacity to obsorb, accommodate or recover. For instance, if there's a crop failure for rice in a community but its farmers have vegetable farms, fishponds, other source of income, and crop insurance then that particular community is can recover and is therefore resilient. However, the recovery should be timely and not after some years.

Disaster Risk Management (DRM)

Disaster risk management is the systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disasters.

It comprises the whole range of interventions before, during and after a shock in the continuum of development.

Risk – probability of an event to occur and cause negative consequence

Vulnerability –probability of being negatively affected of a particular hazard.

Risk Management Framework

1. Risk assessment –the identification of areas and where high risk Are located
2. Risk evaluation
3. Risk management

Three Basic/Major Risk Management Action

1. *Risk avoidance*
2. *Risk mitigation*
3. *Addressing residual risk*

The problem with risk is that it is a probability, it has uncertainties. This means there are risks which may not be prevented. This is called ***risidual risks***. This is where risk sharing mechanisms are used.

Importance of DRR and CCA in Agriculture

Climate vriability today and long term climate change are two ends of a continuum of time scales at which the climate varies and impacts agriculture. Climate change brings two scales of problems, short term and longterm (20 – 30 years in the future).

Disaster risk reduction focuses on current climate-related extreme events while climate change adaptation focus is somehow longer term. It is also important to address first the current risks or reduce the risks being experienced through DRR to be able to adapty to future changes. This is the reason wht DRR comes first before CCA to ensure that a community, for example, is stable before slowly increasing its capacity towards longterm adaptation to climate change.

Disaster Risk Reduction and Management for Food and Nutrition Security

The elements in the DRR continuum are the following:

1. Prevention
2. Mitigation
3. Preparedness
4. Response
5. Rehabilitation
6. Transition

It is important to have DRR initiatives in place, to reduce the possibility of losses and to help in the immediate recovery of a community's growth pattern. Adapatation to climate change is difficult if there is no recovery from current risks.

Disaster risk management is the first line defence to increase resilience against climate change impacts. In the Philippines, agriculture is the center of DRR and CCA. There is an increasing convergence of CCA and DRR agenda.

Linkages: Climate Change and Disaster Risk

- Climate change increases the frequency and intensity of disasters
- Disaster risk reduction is a natural entry point for climate change adaptation
- Disaster risk reduction structures exist in most countries to build on

The common concern between CCA and DRR is the ***climate-related risks and hazards***. This are the short term problems that DRR tries to respond at the same time the long term problem that may worsen that CCA will still have to address. These are the main considerations in planning to be able to come up with plans and interventions that would promote drr and climate change adaptation.

MODULE II
Tools and Methods for Disaster Risk Reduction and Climate Change Adapatation

Planning and implementing community-based DRR and CCA greatly depends on latest climate scenarios and the assessment of current vulnerability, risks and local livelihoods. Assessments are done using various tools which are mostly designed to be inclusive and conscious of the concerned community's participation. This aspect of participation is in itself an education process that allows the community people to better understand their vulnerabilities and capacities thereby encouraging them to participate and appreciate local adaptation. This module aims to capacitate learners to be able to determine the appropriate tools to be used and to acquire the basic skills of how these are conducted.

Objectives

At the end of the module, the learner should be able to:

1. Describe and demonstrate the basic skills needed to conduct hazard, vulnerability and capacity assessment method and tools
2. Demonstrate skills in drafting the following calendars of agricultural impacts:
   a. Rainfall calendars
   b. Hazard calendars
   c. Cropping and seasonal calendars
3. Perform cost-effective environmental monitoring techniques

Methodology

Lecture – discussion
Workshops

Session 1a: Understanding Hazard and its Impacts

Yolanda S. Agawa, PhD
Director, CBSUA RCDRRM and CCA
Central Bicol State University of Agriculture

Definition of Hazard

Hazard is a potentially damaging physical event, phenomenon and/or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation (UNISDR, 2004). A hazard can only be a hazard if it is a threat to like and just like what typhoon Yolanda did.

Classification of Hazards

1) ***Natural hazards*** – arise from purely natural processes like earthquakes and floods
2) ***Quasi-natural hazards*** – arise through the interaction of natural processes and human activities like smog and desertification
3) ***Technological/Anthropogenic (man-made) hazards*** - arise directly as a result of human activities like toxicity of pesticides to fauna, accidental release of chemicals, radiation from a nuclear plant.

Hazards can be single, sequential or combined in their origin and effects.

Secondary hazards – hazards that follow as a result of other hazard events (earthquake can lead to: fires, tsunami, water pollution, dam failure

Chronic hazards – group of hazards that do not stem from one event but arise from continuous conditions which accumulate over time (famine, resource degradation)

Thunderstorm – localized storm cloud producing lightning and thunder and often brings heavy rainfall or hail as well as strong, gusty winds. Associated hazards are: lightning, heavy rainfall, tornado/ water spout (hazards of tornado is on the land while water sprout is on the water surface), hail

Signs of an Impending Thunderstorm

- Towering cumulonimbus clouds
- Darkening skies
- Flashes of lightning and gusty winds
- Sound of thunder
- Static AM radio signal

Typhoon/Tropical cyclone – general term given to describe a major weather disturbance in the tropics. It is a closed wind circulation accompanied by strong winds and voluminous rains characterized by a low pressure center called the “eye” of the storm with no rain and calm. The winds blows around the low pressure center spiraling inward in a counterclockwise direction. Its diameter ranges from 300 to 1000 kilometers.

Structure of a Typhoon

- Eye – relatively calm & generally clear area of sinking air and light winds
- Eyewall – ring of tall clouds and thunderstorms that produce heavy rains and usually the strongest winds
- Rainbands – curved bands of clouds and thunderstorms that trail away spirally from the eye wall, capable of producing heavy bursts of rain, wind, tornadoes, etc.

Storm surge – a sudden rise in sea level above the normal level on the coast due to a very low atmospheric pressure and the force of the winds as a tropical cyclone approaches the coast. Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). It is new to us when typhoon Yolanda fell in the country.

Flood – occurs when the level of a body of water rises until it overflows its natural or artificial confines and submerges land in the surrounding area. Water will always find its way and will find its depth.

The Philippines is to flooding because of the following weather systems affecting the country: tropical cyclones; Inter Tropical Convergent Zone; Southwest monsoon; Northeast monsoon; thunderstorms; Easterly waves; and tail end of cold front. All of these bring rains.

Types of Flood

- Flash flood
- Standing flood
- Coastal flood
- Riverine flood

Impacts of Flood

- Destruction of houses, bridges, roads,
- buildings and other infrastructure
- Erosion of river banks and farm lands
- Siltation of agricultural fields
- Crop loss
- Deaths due to drowning, electrocution
- Interruption of services
- Health problems
- Permanent changes in the river channel
- Loss of wildlife habitat

Earthquake – the shaking felt when sudden, strong movement takes place along a break in the earth's crust.

Types of Hazards from Earthquakes

- ground shaking
- fault rupture
- tsunamis
- ground failures (landslides, differential ground, settlement, ground upheaval/lurching, soil liquefaction, lateral spreading, fracturing,
- slumping)

Types of Earthquake

1. Tectonic – earthquakes produced by sudden movement along faults and plate boundaries
2. Volcanic – earthquakes produced by movement of magma beneath volcanoes

Earthquake Hazards

- Tsunami
- Fire
- Ground shaking
- Ground rupture
- Liquefaction
- Landslides
    - Fall – falls down from its original position
    - Slide – from its original position, it will slide down and will create slumped mass
    - Topple – creates domino effect
    - Flow – tipping type of earthquake

Impacts of Earthquake

- Death
- Destruction of houses, bridges, roads,
- Buildings and other infrastructure
- Displacement of community
- Interruption of services
- Secondary hazards such as tsunami, flooding,
- Fire, erosion

Volcanic Hazards

- Hazards brought about by the eruption of volcanoes

Types of Volcanic Hazards

- lava flows
- pyroclastic flows
- lahar
- ashfall and ballistic projectiles

Session 1b: Hazard, Risk, Vulnerability, and Capacity Assessment

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The hazard, risk, vulnerability, and capacity assessment (HRVCA) is a data needed to come up with the MDRRM plot. The DILG gave a template in 2012 and HRVCA was included but now, there is again a new DILG circular for the preparation of the contingency plan. With this plan, it is understood that all sectors participates in the planning; agriculture must not be left out. For instance, in the preparation of an evacuation center, a space for your agricultural crops, plants and animals must be included.

Hazard

Hazard is a potentially damaging physical event, phenomenon and/or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. (UNISDR, 2004)

Hazard Assessment

This is the process of estimating, for defined areas, the probabilities of the occurrence of potentially damaging phenomenon of a given magnitude within a specific period of time.

NATURAL HAZARD	EVENT PARAMETER	SITE PARAMETER
Cyclone	***Wind Speed (kph)*** How fast is this cyclone?	***Area Affected*** How wide is the area affected?
Earthquake	***Magnitude (Richter scale)*** How strong is the magnitude?	***Intensity (Modified Mercalli Scale)*** Based on the reception of the community.
Flood	***Volume of Water (cu.m.)*** ***Velocity*** →can be slow or **trap concept**	***Area Flooded (sq. km.)*** ***Depth of Flood Water (m.)***
Landslide	***Volume of Dislodged Material*** ***Area Affected***	***Ground Displacement (m.)***
Tsunami	***Height of Wave Crest***	***Depth of Flood Water***
Volcano	***Eruption Size and Duration***	***Ash Fall (m.)*** ***Lava Flow (area in sq. km.)***

Hazard Assessment Tools

This is alsways done at the barangay level

1. Historical profile
   How many times do you experience hazard?
   What is the strongest hazard you experienced?
2. Timeline
   In a year, how many times typhoon visit your place?
   In what season does typhoon visits your place?
3. Hazard map
4. Hazard hunting
   What other hazards does your place experience?
   What activities/natural processes can trigger new hazards?
5. Seasonal calendar
6. Hazard assessment matrix

Hazard Type	***Origin***	***Force***	***Warning Signs***	***Fore-warning***	***Speed of Onset***	***Frequency***	***Period of Occurrence (When)***	***Duration***
Flood	cyclone	Volume of water	Rising of water	12 hrs	slow	Once or 2 times/year	Northeast monsoon (Amihan) season	3 days
Hazard Type	Origin	Force	Warning Signs	Forewarning	Speed of Onset	Frequency	Period of Occurrence (When)	Duration

Risk

Risk is the probability that a community's structure or geographic area can be damaged or disrupted by the impact of a particular hazard, on account of their nature, construction, and proximity to a hazardous area. It is the exposure or the chance of loss due to a particular hazard for a given area and reference period. It may be expressed mathematically as the probability that a hazard impact will occur multiplied by the consequences of that impact.

(R = H x E x V) Risk=Hazard x Exposure x Vulnerability

Elements at Risk

1. Persons – this should be categorized according to the vulnerable sectors. These are 1) children, 2) senior citizen, 3) persons with disabilities, 4) women, 5) men
2. Infrastructure
3. Crops
4. Sources of livelihood
5. Other societal components exposed to known hazard, which are likely to be adversely affected by the impact of the hazard. In MDRRM, these are referred to as the life **bloods** such as transportation, communication, electrical supply, and water supply.

Vulnerability

Vulnerability is a condition or set of conditions that reduces people's ability to prepare for, withstand or respond to a hazard. It is a complex situation created by multiple levels of causes. Unsafe conditions are often only symptoms

Aspects of Vulnerability – it is about susceptibility and resilience

- Susceptibility – the fact of being exposed to an event
- Resilience – the ability to adjust and recover

What makes communities vulnerable to disasters?

- Rapid growth and inadequate planning
- Population density
- Ecological imbalance
- Dependency on infrastructure and services
- Concentrated political, economic and other resources
- Inappropriate construction site and design (e.g. makeshift housing on unstable slopes)

What makes communities vulnerable to disasters?

- Deforestation
- Inadequate emergency planning and warning
- Unmarked evacuation routes
- Lack of urban planning, no safety measures
- Inappropriately built and poorly maintained essential facilities and services

What makes communities vulnerable to disasters?

- Housing too close to each other.
- Bad management of industrial wastes.
- Technological disaster risks
- Inappropriately constructed buildings in high risk areas

Vulnerability Assessment

A participatory process to identify what elements are at risk per hazard type, and to analyze the causes why these elements can be damaged

Vulnerability assessment answers the following questions:

1. Who are at risk or can incur damage or loss?
2. What are other elements at risk?
3. What damage or loss can these people or elements at risk suffer or incur? (physical damage, deaths, injuries, disruption to economy, social disruption, environmental impact, need for emergency response)
4. Why will these people and elements suffer damage and loss?

Vulnerability Assessment (Urban setting, hazard specific)

Elements At Risk (EAR)	***Effects on Different EARs***	***Characteristics of EARs That Contribute to Vulnerability***
People	injured, died, starvation, trauma	Age, gender, physical health, social, economic & demographic
Buildings (houses, others)	Partial damage/fully damage	Construction materials, design, location, height
Infrastructure (roads, bridges, telecommunications, electricity)	Partial damage/full damage	Size, height/depth, design, materials, level of exposure
Industry	Damage to building, products, raw materials, machinery, (labor, management)	Size, type of products, type of raw material,

Vulnerability Assessment (Rural setting, hazard specific)

Elements At Risk (EAR)	***Effects on Different EARs***	***Characteristics of EARs That Contribute to Vulnerability***
Crops	Destroyed	Height, water dependent , cropping calendar
Environment	Damage to vegetation, harm to flora and fauna, damage to water ways, mountains, etc	Terrain type, nature of flora and fauna
Land	Erosion, salinity, deposits, desertification,	Location, elements of soil, terrain
Irrigation system	Deposit of silt, breaking of channels, damage to machinery (tube-wells)	Location, design, construction materials
Animals	Injured, died, disease,	Location, characteristics of species, health

Capacity

It is the positive conditions or abilities which increase a community's ability to deal with hazards. The goal is to have access to resources and capacities which determine the ability to recover from the impacts of a hazard event.

Capacity Assessment

This is an analysis done to determine what people do in times of crisis to reduce the damaging effects of the hazard, and to protect themselves and secure livelihood and community services. It involves the following:

- understanding people's previous experiences with hazards that enabled them to develop coping and survival strategies
- identifying resources which are available and can be used in disaster risk reduction and management

What is Hazard, Risk, Vulnerability, and Capacity Assessment (HRVCA)?

This is the process of identifying and validating the vulnerability and capacity of the community to potential disaster – causing hazards. Its results will lead to the identification of disaster potential areas that maybe difficult to recognize because of the unusual combinations of the state physical/material, social/organizational, and attitudinal/motivational factors

Types of Vulnerability and Capacity

- ***Physical and material***
  - Economic – includes the means of livelihood, productive skills, land, water, livestock, other means of production (access and control)
  - Infrastructure and services - roads, health facilities, schools, electricity, communication, transport, housing, access routes, buildings
  - Human capital – mortality, diseases, nutritional status, population, literacy, numeracy, poverty levels
  - Environmental factors – forestation, soil quality

- ***Social and organizational***
  - Special categories of vulnerable groups of people (young children, elderly, differently able, women)→we look into how many children, elderly, etc are there in the community? So if we conduct a plan, the vulnerable groups were counted. The census must be updated census which we can get from barangay.
  - Livelihood at risk
  - Population density issue
  - Local institutions or organizations and social structures –community organizations (formal/informal, traditional)
  - Family structure
  - Leadership qualities and governance structures
  - Decision- making structures
  - Participation levels
  - Division and conflicts – ethnicity, class, caste, religion, ideology, political group, language group, structures for conflict
  - Degree of justice/injustice - equality, access to governance
  - Coordination and relationship of governance structures

- ***Attitudinal and motivational***
  - Beliefs
  - Cultural traditions (indigenous and local knowledge)
  - Practices
  - Standards of values and morals
  - Attitudes towards change
  - Initiative
  - Faith determination
  - Dependency and access
  - Cohesiveness, unity, cooperation
  - Orientations

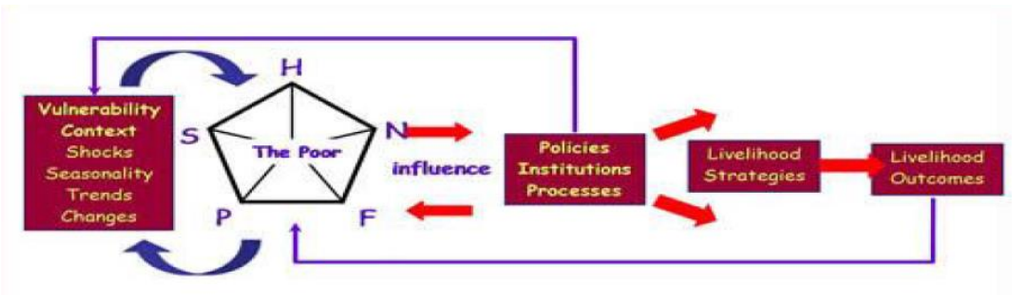
Sustainable Livelihood Approach (SLA)

The Sustainable Livelihood Approach (SLA) is alway to improve understanding of the livelihoods of poor people. It draws on the main factors that affect poor people's livelihoods and the typical relationships between these factors. It can be used in planning new development activities and in assessing the contribution that existing activities have made to sustaining livelihoods.

Seven guiding principles of SLA

- Be people – centered
- Be holistic – involve all stakeholders
- Be dynamic
- Build on strengths
- Promote micro-macro links – create partnership, private-public partnership
- Encourage broad partnerships
- Aim for sustainability

SLA framework



The poor have assets like human asset (knowledge, skill, attitude), natural resources (soil fertility, water, etc), financial assets (investments, credits), fiscal (agricultural implements, agricultural structures), social (applications, organization, partnerships).

Resource and Hazard Mapping

Resource and hazard map allows the community to identify graphically the vulnerable members of the community especially the young, the elderly and the disabled who are put at special risk by hazards.

Transect Walk

Transect walk is walking in the geographical area belonging to a community to get a picture of the vulnerability of the community and the resources that are available or may be available for disaster risk reduction and management.

Vulnerability Mapping to ENSO Events of Selected Crops

- ENSO has been linked to droughts and flooding
- Vulnerability of vegetation/ crops
- Good practice options in agriculture – drought resistant crops, flood resistant crops

Session 2: Spatial and Temporal Analysis of Agricultural Impacts of Climate Change (Farm-level Techniques)

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Spatial Analysis

- It describes how objects fit together in space, either among the planets or down here on earth.
- Spatial statistics extend traditional statistics to support the analysis of geographic data.
- It provides techniques to describe the distribution of data in the geographic space (descriptive spatial statistics).
- It analyzes the special patterns of the data (special pattern analysis), identifies and measures special relationships (spatial regression).
- It creates a surface from sampled data (spatial interpretation, usually categorized as geostatistics)
- It includes areas of the atmosphere.
- It is over space. Allocation of land resources is spatial.
- It is concerned more in geographic and topographic.
- Its best manifestation of a spatial diagram is a map over space in 2D or 3D. It makes use of ICT / Information Technology like GIS.

Spatial Analysis Tool

It locates resources or hazards over space by doing Resource map and Hazard map.

Resource Map includes the allocation of physical and biological resources. It describes the location of resources over space. A true resource map should be polygon not a square. It should also be a map of a barangay that shows the accurate location of the resources over space.

Temporal Analysis

- It describes relations to time as distinguished from space, or relations to the sequence of the time.
- It is by time element. Allocation of land resources is over time.
- Examples are time of year where there are floods, time when precipitation is low, among others.

Spatio-Temporal Analysis is the combination of space and time – e.g. Transect map which refers to the cross-section of an area by time and space element. It is basically divided into two zones. In forestry, in order to make a spatio-temporal analysis, one needs to get the land cover maps several years ago and latest land cover maps.

Temporal Analysis Tool

It describes seasonal changes which connote time showing the overlapping changes in seasons, climate, or weather.

It includes the following:

Hazard Calendar

It includes the process of making hazard maps over space indicating the time of the year when there are hazards. It is a very simple diagram.

Cropping Calendar

In Agriculture, there is a need to consider the cropping calendar aside from hazard calendar.

Rainfall Calendar

It basically/graphically includes a plot of average rainfall over time.

Session 3: Introduction to Maps and Geographic Information System

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Map

A map is a symbolic depiction highlighting relationships between elements of some space, such as objects, regions, and themes. Its function is to aid in planning and decision-making, not for legal purposes.

Geographic Information System (GIS)

Geographic Information System (GIS) is software being used by technical personnel in generating maps.

Participatory Mapping

It is allowing the community people to participate in making their maps in relation to Disaster Risk Reduction and Management (DRRM) to give them the sense of ownership to the map and to allow them to express their ideas into the map.

Its advantage is that the people already know the placement or location and condition of things (in a given time) in the map as compared to visiting technical people who will still need to do a transect map.

3-D Mapping

It is time-consuming, expensive to construct, requiring large space to install, and difficult to maintain.

It provides options and an attempt to improve the visibility/features of mapping.

Challenges

- Harmonizing community sketch maps with the official maps to maximize its use to upgrade its data
- Using of technology (computer and mapping softwares such as Google Earth and Bing Map) to improve maps and its utilization

Aerial Photography

It is highly technical, requiring experts, and expensive. A practitioner in mapping can use aerial photographs when looking at the past.

Geographic Information System (GIS) is a system used to describe and characterize the earth and other geographies for the purpose of visualizing and analyzing spatially referenced information. This work is primarily performed using maps.

It links locational (spatial) and database (tabular) information and enables a person to visualize patterns, relationships, and trends. The process gives an entirely new perspective to data analysis that cannot be seen in a table or list format.

Five GIS Components

1. Software
2. Hardware
3. People
4. Methods
5. Data

The GIS does mapping and spatial analysis easily and comprehensively – e.g. Using a real world data, it could separate maps into other different maps called layers. In the local perspective, layers are called maps. In real world scenario, one can produce several layers, but seems/appears to be one when evaluated. Each layer can also be analyzed using GIS.

Characteristics of GIS

1. ***GIS can integrate maps into 3D***

   It could transform a flat surfaced map into a 3-Dimensional (3D) map. Each element like typography, mountain slope and crevice becomes detailed. For instance, a slope map can be raised coming from a flat surface using GIS by just a single press. Other elements can also be integrated.

2. ***Established coordinates help to integrate layers of maps into one***

   Another element to be considered is the coordinates. In making projects, it should always have coordinates for easier overlaying of layers when making maps.

   Coordinates appear like pins and each represents a data. These are retrieved using GPS. GIS can merge all layers using one coordinate. Each layer represents a specific feature like land cover, structures, etc. One coordinate is composed of several maps.

3. ***GIS Mapping (digital maps)***
   We can transform a paper-blessed map into a digital map by scanning, and digitization. The GIS has a legend like the paper maps.

   A digital map generated using GIS are segregated into layers (containing specific "features" of the map) that can be easily overlapped.

   Features
   - Use points, lines, and polygon/area with coordinates to determine its location using GPS, and online mapping tools
   - Have shapes and sizes and can be displayed accordingly
   - Linked to information in their attribute table
   - New layer of features can be created and added from areas of overlap
   - Using gathered coordinates, layers can be integrated into one community map

GIS maps are used for communication and understanding

- Maps are used to communicate and convey overwhelmingly large amounts of information in an organized way.
- Humans, as spatial thinkers, are able to view a map, associate map locations with real-world phenomena , and interpret and grasp critical information from the sea of detailed content that is contained within each map display.

GIS maps help you see patterns

- Maps are used to discover and investigate patterns.
- In GIS, interactive, online maps are used to compare information reports for multiple features and how phenomena change through time.

GIS maps provide interactive reports of the information behind the map

- It provides interactive reports of the information behind the map, not solely lists of attributes but also charts, reports, photos, and virtually any relevant content. E.g. a link to a website
- Defining how features are being reported and what you access through a map feature is one of the key specifications that you design and capture when you create a GIS map.

GIS maps are used to derive new information using analysis

- They combine powerful visualization with a strong analytic and modeling framework into rich analytic results.

GIS maps are used to openly share geographic information

- They are effective and efficient in visualizing geographic knowledge. Great maps help

GIS users communicate and share geographic information

Sample Application GIS Maps on Climate Change

- Land-cover pattern in a municipality (forest cover)
- Changes in flooded level or areas covered across time (years) and the potential affected population
- Hazard maps (baseline and monitoring maps) and the possible communities affected
- Pest incidences trend
- Lake shore enlargement (per month)

A GIS map on climate change helps to show the trend and the changes. Instead of a tabulated data, it is more exciting to present these through illustrations or visuals which could be easily understood. Poverty Incidence Trend shows the comparison of the poverty incidence between years.

MODULE III
Planning and Implementing Disaster Risk Reduction and Climate Change Adaptation in Agriculture Initiatives

Adaptation is a local process which entails community participation and institutional and policy support. After assessment, it is important that local institutions who will be implementing DRR and CCA initiatives align their efforts to existing international and national policies. Local policies should allow for the creation/strengthening of structures/platforms and mechanisms to support initiatives. These serve as enabling environments upon which DRR and CCA programs will take off and be sustained. In addition, implementation mechanisms should always ensure that part of the attainment of DRR and CCA objectives is to ensure that all sectors in the community especially women participates and are capacitated.

Objectives

At the end of the module, the learner should be able to:

1. Discuss existing international and national policies on DRR and CCA
2. Harmonize DRR and CCA in agriculture into local governance
3. Describe community-based DRR and CCA in agriculture program implementation appreciate community-based early warning systems for agriculture

Methodology

Lecture – discussion
Workshops

Session 1: Overview of Existing Policies on Disaster Risk Reduction and Climate Change Adaptation

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The Republic Act (RA) 10121 is an act strengthening the Philippine Disaster Risk Reduction and Management System, providing for the National Disaster Risk Reduction and Management Framework and Institutionalizing the National Disaster Risk Reduction and Management plan appropriating funds therefore and for other purposes.

Disaster Risk Reduction (DRR) refers to the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

The Philippine Disaster Risk Reduction and Management Act was enacted on May 27, 2010 replacing PD 1566.

Under the old law (P.D. 1566), disaster management centered only on the hazards and the impacts of a disaster. It assumed that disasters cannot be avoided. Most of the plans were on the provision of relief goods and infrastructures like dikes and flood control systems. The government's response to disaster was focused on disaster response.

Overview

- It prioritizes on community level DRRM focusing on the most vulnerable sectors (i.e., the poor, the sick, people with disabilities, the elderly, women and children). Agriculture and fisheries sectors are the most vulnerable sectors. For instance, animals cannot evacuate themselves during times of disasters so they need trainings.

  In terms of gender, men are more vulnerable than women after a disaster, since they are the ones who are responsible in raising their families. Men become down and out-focused when source of living is gone. In the end, women, who are in-charge of feeding the family, are more resilient since they are determined to find ways just to feed their families after a disaster.

- It recognizes the important role and strengthens capacities of local communities. Community-based DRRM is being taught because after a disaster, it is the people in the community who organize and help one another.

- It ensures broad-based and greater participation from Civil Society. It should involve the participation of everyone in the community.

- It addresses root causes of disaster risks. Knowledge of the basis or source of disasters which is the hazard is important in order to be able to mitigate, prevent, and prepare for disasters.

Paradigm Shift in DRRM

- It is the new concept of DRRM.
- It is a centralized management. It starts in the LGU level (Municipal DRRMC) with the participation of all sectors.
- It focuses in knowing how to deal with hazards and managing effective tools to be able to make a very effective DRRM plan.
- It aims to identify the most vulnerable areas during times of disasters and integrates this in the development of the DRRM plan.

Salient Features of the DRRM Act

- Coherence with the international framework
- Adherence to universal norms, principles, and standards of humanitarian
- Good governance through transparency and accountability
- Strengthened institutional mechanism for DRRM – there is a need to make sure that in every LGU, there should be a DRRM office and it must have people, budget, structure and mechanism.
- Integrated, coordinated, multi-sectoral, inter-agency, and community-based approach to disaster risk reduction.
- Empowerment of local government units (LGUs) and civil society organizations, (CSOs such as the academe) as key partners in disaster risk reduction
- Integration of the DRRM into the educational system – the practices and concepts of DRRM should be integrated in the formal education. In CBSUA, DRRM was integrated in the curriculum so MS in DRRM was offered. DRRM contents are also incorporated in the project, Save the Children.
- Establishment of the DRRM Fund (DRRMF) at the national and local levels – RA 10121 states that a minimum of 5% funds should be allocated for DRRM fund in the LGU to national level. In the DRRM fund, 70% of it should be allocated to mitigation, prevention and preparedness, even in making studies to assess risks; it can be used for trainings, provision for the declaration of state of calamity and come up with remedial measures. If these are not done, the government can be punished.
- Providing for provisions on the declaration of a state of calamity, remedial measures, prohibited acts and penalties

Who are Involved in DRMM as Mandated in the DRRM Act?

- National Government (NDRRMC)
- Local Government (LDRRMC)
- CSOs, Private Sector, and Volunteers
- Community

New DRRM Structure (PD 1566 vs RA 101221)

The national level is equivalent to OCD, and then followed by Regional, Municipal and Barangay level DRRMC.

The DRRM Act clarified the distinction between oversights versus implementation of DRRM in order to strengthen the capacities of local governments. It broadened the membership of the DRRM Councils at all levels. It also recognizes the importance of local communities by institutionalizing the participation of civil society organizations and the private sector.

Structure of the NDRRMC

The National Disaster Risk Reduction and Management Council (NDRRMC) is a multi-sectoral body composed of the heads of the different executive departments of government, government institutions, local government associations, civil society organizations, and the private sector. It shall oversee the DRRM system in the Philippines. (Secs. 5 and 6)

For NDRRMC, the major stakeholders include the Department of National Defense as the Chair; DOST for Mitigation and prevention Division; DILG for Disaster Preparedness; DSWD for Disaster Response; and, NEDA for Rehabilitation & Recovery. For instance, TNA result showing those who are in need of rehabilitation, is being presented to NEDA since it is important for Rehabilitation and Recovery.

Regional DRRM Councils (RDRRMC)

- Responsible for coordinating, integrating, supervising and evaluating DRRM activities of the Local DRRM Councils.

  Regional Development Plans should be sensitive in DRRM concerns. It is important to harmonize DRRM into local government plans.

- Responsible for ensuring disaster sensitive regional development plans, and convening the different regional line agencies and concerned institutions and authorities in case of emergencies (Sec. 10).

  Since there are many agencies, there is a need for coordination and unity in the implementation and assessment of the activities of the DRRM.

Local DRRM Councils (LDRRMC)

They are found at the provincial, city, and municipal levels. Provincial level is to be led by the Governor; Municipal is by the Mayor, and Barangay is by the Punong Barangay. The Barangay Development Council (BDC) shall assume the powers and functions of the council at the barangay level.

These are composed of multi-sectoral and multi-agency members. For instance, the concern also includes the Agriculture Officer for rehabilitation of their sector; the Planning Officer because it is important to integrate DRRM in the municipal plans; and, the Veterinary officer since the livestock is one of the most vulnerable to disaster.

Role of LDRRMC

It oversees the implementation of the Local DRRM Plans (LDRRMPs) formulated by Local DRRM Offices (LDRRMOs) (Sec. 11).

Local DRRM Offices (LDRRMO)

In a local DRRMC, there should be a DRRM officer and three (3) other staff that will be responsible in administrative and training, research and planning and operational warning, independently.

Role of LDRRMO

Local DRRM Offices set the direction, development, implementation and coordination of DRRM programs and activities within their territorial jurisdictions. The LDRRMOs are

established in every province, city and municipality (PDRRMO, CDRRMO and MDRRMO) (Sec. 12 .a).

The LDRRMO is under the Office of the Governor, City or Municipal Mayor, and Barangay Captain. Each office will be headed by a DRRM Officer to be assisted by three staff (Sec. 12.b).

Qualifications of the DRRM Officer

- Must be civil service eligible
- Must have a civil defense/ DRM experience
- Graduate of MS in Public Safety or MS in DRM

Barangay DRRM Committees (BDRRMC)

At the barangay level, Barangay DRRM Committees (BDRRMC) shall be established (Sec. 12.a) with at least two (2) members representing the civil society organizations (CSOs). The BDRRMC shall be a regular committee of the BDC (Sec. 12.d).

The Barangay Captain is the acting Chair of the Barangay DRRM Committee.

National DRRM Framework (NDRRMF)

It serves as the principal guide to disaster risk reduction and management efforts in the country. This shall be developed by the NDRRMC. It shall be the basis for the formulation of the National DRRM Plan (NDRRMP).

It shall provide for a comprehensive, all-hazards, multi-sectoral, inter- agency and community-based approach to DRRM (Sec. 3.y and Sec. 6.a).

DRRM Plan Framework Paradigm

It is important to make resource map, hazard map, hazard calendar and cropping calendar, because we will know when hazards are expected, and we could match it with our cropping calendar to save our crops from hazards.

For Risk Assessment, there is a need to identify Prevention and Mitigation measures, build capacities and awareness about the plan, set- up preparedness plans and early warning to ensure that everyone is not affected during a calamity. Once we are affected, it is better to have Emergency Response plans.

It is observed that there are more actions to be taken before a disaster. This is the reason why 70% of the DRRM fund is appropriated from Risk Assessment to early warning; and 30% for emergency response, rehabilitation and reconstruction.

In the old paradigm, development is found outside the paradigm. But it is placed inside the paradigm in the new DRR paradigm. The new framework states that development focus will not be affected if all concerns are put within the DRRM plan.

National DRRM Plan (NDRRMP)

The NDRRMP shall be formulated and implemented by the Office of Civil Defense (OCD) (Sec.3.z and Sec. 9.b). The NDRRMP sets out goals and specific objectives for reducing disaster risks. This includes the identification of hazards, vulnerabilities and risks to be managed at the national level; DRRM approaches and strategies to be applied in managing

said hazards and risks; agency roles, responsibilities and line of authority at all government levels; and vertical and horizontal coordination of DRRM in the pre-disaster and post-disaster phases.

In preparing DRRM plan, it should:

1. Acknowledge risks and vulnerabilities that need to be addressed
2. Identify strategies
3. Set the roles of people
4. Make sure there is a structure; and coordination mechanism should be well said

Local DRRM Plans (LDRRMP)

The Local DRRM Plan will guide DRRM implementation at the local level. The LDRRMP will be formulated by the LDRRMOs/BDRRMC in close coordination with the local development councils. (Sec. 12.c.6)

In local plans, it is creating or making local plans. The government mandates institutions that they could not use their DRRM fund without an approved DRRM plan.

Vulnerability Reduction

The damaging effects of disasters can decrease by reducing vulnerabilities and enhancing capacities of local communities.

- It is not necessary to wait for a disaster to happen before planning and taking action against hazards.
- Before, the local calamity fund can only be used after a declaration of a state of calamity; the fund has been renamed as the DRRM Fund and is encouraged to be used to fund activities such as training personnel and procurement of equipment to reduce vulnerabilities.

Uses of DRRM Fund

- capital expenditures
- conduct of participatory risk assessments
- establishment of early warning systems
- conduct of emergency drills
- public awareness campaigns
- purchase of communication equipment
- construction of safe evacuation centers, etc.

Difference Between the DRRM Fund and the Previous Calamity Fund

- A declaration of a state of calamity is no longer necessary to access and utilize the DRRM Fund.
- The Local DRRM Fund shall be sourced from not less than 5% of the estimated revenue from regular sources (Sec. 21 par. 1). The 5% is just the initial appropriation but we can go higher than 5% when all orders and projects have gone concerns to make us implement such. Meanwhile, each sector (agriculture, infrastructure and health) has each respective DRRM. Thus, to sum up all the DRRM fund of all sectors, it can go as higher than 5%.

- The DRRM Fund can be used for DRRM. It can be used to implement the DRRM Plan. Thirty percent (30%) of the fund shall be set aside as a Quick Response Fund (QRF) for relief and recovery programs. (Sec. 21 par 1; Sec. 22.a & c). The 70% is used for the first activities for DRRM from assessment to early warning system and the 30% for response.
- Unexpended LDRRMF goes to a trust fund which will be used solely for DRRM activities of the LDRRMC within the next five (5) years. Funds which are still not fully utilized after five (5) years shall go back to the general fund and will be available for other social services to be identified by the local sanggunian. (Sec. 21 par. 3).
- Unutilized quick response fund should be put into a special trust fund which can stay there for five years. It can be used for social activities. For instance, in some barangays, when meetings are being conducted, sometimes bar soaps are given just to encourage their constituents to attend their trainings, and meetings. It is indicated as a training material in an activity or training for disaster preparedness so DRRM fund can be used.
- The Special Trust Fund is not planned because it is a quick response fund.

Vulnerability Reduction

At the local level, the LDRRMO through the LDRRMC and the LDC shall submit the proposed programming of the LDRRMF to the local sanggunian (Sec. 12.c.7).

It shall likewise submit the report on the utilization of the LDRRMF and other dedicated DRRM resources to the local Commission on Audit (COA) (Sec. 12.c.24). The LGU must submit DRRM plan as basis for spending and must be agreed upon plan by the local DRRMC, and give copy to COA.

Disaster Preparedness

The LDRRMO shall conduct public awareness programs and activities to provide stakeholders with knowledge and skills in preparing for disasters (Sec. 12.c; Sec. 10 and Sec.17).

Also, public sector employees are required to undergo training in emergency response and preparedness (Sec. 14).

The LDRRM Fund can be utilized for pre-disaster preparedness programs such as training, purchasing life-saving rescue equipment, stockpiling of food and medicine (Sec. 21 par. 1).

Disaster Response

A State of Calamity can be declared so that disaster response can be coordinated, remedial measures can be taken, and the Quick Response Fund can be used to provide assistance to those affected.

Remedial measures are the mandatory courses of action which shall immediately be undertaken during the declaration of a state of calamity (Sec. 17). These are as follows:

1. Imposition of a price ceiling on basic necessities and prime commodities
2. Prevention of overpricing/profiteering
3. Prevention of overpricing/profiteering and hoarding of prime commodities, medicines and petroleum products
4. Programming/reprogramming of funds for the repair and upgrading of public infrastructure

5. Granting of no-interest loans by government financing institutions to the most affected population

Declaration of State of Calamity

The President can declare a state of calamity upon the recommendation of the NDRRMC. The local sanggunian may now also declare and lift the state of calamity within their locality. This is upon the recommendation of the LDRRMC based on the results of the damage assessment and needs analysis (Sec. 16).

How Will DRRMCs Coordinate During a Disaster?

The LDRRMCs take the lead in preparing for, responding to, and recovering from the effects of any disaster based on the following criteria (Sec. 15):

- The Barangay Development Council - One (1) barangay is affected
- The City/Municipal DRRMCs -Two (2) or more barangays are affected
- The Provincial DRRMC - Two (2) or more cities/municipalities are affected
- The Regional DRRMC -Two (2) or more provinces are affected

Taking the onslaught of typhoon Yolanda, the LDRRMC was blamed for the disaster but in that context, the NDRRMC should have taken the response since the LDRRMC is also devastated.

The LDRRMCs shall coordinate with the private sector and CSO groups through the LDRRMO. The LDRRMO conduct continuous disaster monitoring and mobilize volunteers to utilize their facilities and resources (Sec. 12.c.8). The LDRRMO shall respond to and manage the adverse effects of emergencies and carry out recovery activities in the affected area (Sec. 12.c.16). It shall build links with the LGUs, private sector and CSOs and volunteers who could be tapped or mobilized for DRRM.

Prohibited Acts

- Dereliction of duties which leads to destruction, loss of lives, critical damage of facilities and misuse of funds
- Preventing the entry and distribution of relief goods in disaster-stricken areas, including appropriate technology, tools, equipment, accessories, disaster teams/experts
- Buying, for consumption or resale, from the disaster affected recipient any relief goods, equipment or other aid commodities received by them
- Selling of relief goods, equipment or other aid commodities which are intended for distribution to disaster victim
- Forcibly seizing relief goods, equipment or other aid commodities intended for or consigned to a specific group of victims or relief agency
- Diverting or misdelivery of relief goods, equipment or other aid commodities to persons other than the rightful recipient or consignee
- Misrepresenting the source of relief goods, equipment or other aid commodities by:
- Covering, replacing or defacing the labels of the containers to make it appear that the goods, equipment or other aid commodities came from another agency or persons
- Repacking the goods, equipment or other aid commodities into containers with different markings to make it appear that the goods came from another agency or persons or was released upon the instance of a particular agency or persons

- Making false verbal claim that the goods, equipment or other aid commodity in its untampered original containers actually came from another agency or persons or was released upon the instance or a particular agency or persons
- Substituting or replacing relief goods, equipment or other aid commodities with the same items or inferior/cheaper quality
- Illegal solicitations by persons or organizations representing others as defined in the standards and guidelines set by the NDRRMC
- Deliberate use of false or inflated data in support of the request for funding, relief goods, equipment or other aid commodities for emergency assistance or livelihood projects
- Tampering with or stealing hazard monitoring and disaster prepared

Penal Clause

Section 20 of the DRRM Act imposes the penalty of:

1. Fine between P50, 000 to P500, 000
2. Imprisonment between six months to one year
3. Both fine and imprisonment
4. Confiscation or forfeiture of the objects and instrumentalities used

Policies on Climate Change

The RA 9729 is an act mainstreaming climate change into government policy formulations, establishing the framework strategy and program on climate change, creating for this purpose the climate change commission, and for other purposes.

“Climate Change” refers to a change in climate that can be identified by changes in the mean and/or variability of its properties and that persists for an extended period typically decades or longer, whether due to natural variability or as a result of human activity.

Climate Change: A Reality

Climate change is a reality as evident in the occurrence of disasters like drought, flood, cyclone, typhoons, salinity, and erosion. These bring worse impact on Agriculture.

Phenomena like increased natural hazard threats, sea level rise causing salinization of soils and drinking water, and on changing cropping seasons do not leave any doubts indeed that impacts of Climate change are already visible.

The poorest are the first to be hit, and due to their basically high vulnerability they are also likely to be hit hardest by climate change.

Hydrometrelogical disasters increase as a result of climatic change and affecting livelihood worst. In case of Bangladesh, (where > 80% population dependent on agriculture and allied sectors) livelihood sector is mainly represented by these sectors. Thus, there is a need to give this issue a special attention. Taking this strategic issue into consideration LACC projects are initiated, in drought prone and coastal areas as pilot projects.

Effects of Climate Change

Greenhouse gases (GHG)" refers to constituents of the atmosphere that contribute to the greenhouse effect including, but not limited to, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

"Greenhouse effect" refers to the process by which the absorption of infrared radiation by the atmosphere warms the Earth.

1. ***Climate change directly affects food security***

   A one degree increase in temperature in the tropics causes 10% decline in agricultural yield. This would impact on food security.

2. ***Climate change impact on rural livelihood***

Climate Change	***Results***	***Impacts on Rural Livelihood***	***Effect to National Development***
Change in Rainfall	Frequent and Severe flood Higher river erosion Increased sedimentation	Agriculture land inundation and erosion Damage to crop, fishery, livestock Agricultural Input loss (fertiliser, seeds, etc.)	Food insecurity Nutrition deficiency Increased poverty Poor health Scarcity Livelihood Migration
Glacier Melting	Increased River Flow (warm season) Lower flow (once glacier melted) Increased saline intrusion	Agriculture land inundation Scarcity of water for irrigation Soil degradation (more salinity)	
More Cyclone	More storm surge Higher wind speed Saline water intrusion	Direct loss to crop, fishery, and livestock Soil becomes infertile Scarcity of fresh water (irrigation)	
Humid/Warm Climate	Rise in Temperature More wet climate	Rise in insect infestation Crop and cattle disease Less evapo-transpiration	
Sea Level Rise	Land inundation Saltwater intrusion Increased soil salinity	Agriculture land loss Scarcity of irrigation water Soil degradation (more salinity)	
Lower Rainfall	Droughts condition Soil degradation Fall in water table	Irrigation water scarcity Soil nutrient deficiency More disease (cattle/crop)	

3. ***Climate change causes land and water constraints***

   It causes water and soil scarcity.

4. ***Climate change causes erratic rainfall patterns***

   There is heavy rainfall during wet seasons; dry seasons become drier.

Anticipated Impacts on Agriculture
(*Source: IPCC 2007*)

- 1°C rise in air temp agricultural irrigation demand increases by 6-10% or more in East Asia; rice yield declines by 10% in Korea; wheat yield declines by 4-5 million tons (India)
- 2°C rise in air temperature reduction of rainfed rice yields by 5-12% in China
- 3°C rise in air temp disappearance of Tibetan Plateau glaciers of <4km length (China)
- 2-4°C rise in air temperature increase of tropical cyclone intensity by 10-20% in East Asia
- 30cm sea level rise increase of area under coastal flooding by 5-6 times in Chanjiang and Zhujiang deltas of China
- 40cm sea level rise by 2100,13-94 million people to be at flood risk in Asia
- 1m sea level rise Inundation of 2643 km2 of Korean peninsula

Climate Change Impact on Crop Yields by 2050

There will be a gradual decline of yields in crops like rice by 14-26%; wheat by 32 – 44%; maize by 2-5%; and, soybean by 9 – 18%. It will result in the increase of price in rice by 29-37%; maize by 58-97%; wheat by 81-102%; and, soybean by 14-49%.

Other yields of major crops such as drybean, peanut and grain sorghum will also decrease.

Causes

“Anthropogenic causes” refer to causes resulting from human activities or produced by human beings.

Policy on Adaptation

Adaptation refers to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Adaptation occurs at a range of inter-linking scales, and can either occur in anticipation of change (anticipatory adaptation), or be a response to those changes (reactive adaptation).

It is a social and institutional process that involves reflecting on and responding to current trends and projected changes in climate.

Policy on Mitigation

a. “Mitigation” in the context of climate change involves reduction in the concentration of greenhouse gases, either by reducing their source or by increasing their sinks.

   It involves reduction in the concentration of greenhouse gases, either by reducing their source or by increasing their sinks. Example of source reduction is using bicycles instead of using vehicle to save use of fuel.

   It entails acting to tolerate the effects of global warming

   It is a human intervention to reduce the sources or enhance the sinks of greenhouse gases (UN)

b. “Mainstreaming” refers to the integration of policies and measures that address climate change into development planning and sectoral decision-making.

c. Gender mainstreaming” refers to the strategy for making women’s as well as men’s concerns and experiences an integral dimension of the design, implementation, monitoring, and evaluation of policies and programs in all political, economic, and societal spheres so that women and men benefit equally and inequality is not perpetuated.

   It is the process of assessing the implications for women and men of any planned action, including legislation, policies, or programs in all areas at all levels.

d. “Vulnerability” refers to the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes.

   It is important that if we look at climate change adaptation, there is a need to consider those who are vulnerable and susceptible groups and those who are unable to cope with climate change.

   Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Principles to Consider in Designing Adaptation Policies and Mechanisms (Scheraga and Grambsch)

- ***The effects of climate change vary by region***

  E.g. Temperature rise affects some ethnic groups. In the tropics, the Waray tribe is affected because of gradual temperature rise.

- ***The effects of climate change may vary across demographic groups so there is a need to identify the most vulnerable groups***

  Accordingly, farmers and fisherfolks are the most vulnerable groups because their livelihood is dependent on weather or change in climate.

- ***Climate change poses both risks and opportunities***

  Climate change does not always bring negative effects. The planning of DRRM is one good effect of climate change.

- ***The effects of climate change must be considered in the context of multiple stressors and factors, which may be as important to the design of adaptive responses as the sensitivity of the change***

- ***Adaptation comes at a cost***

  There is investment in adaptation.

- ***Adaptive responses vary in effectiveness, as demonstrated by current efforts to cope with climate variability***

- ***The systemic nature of climate impacts complicates the development of adaptation policy***

- ***Mal-adaptation can result in negative effects that are as serious as the climate-induced effects that are being avoided***

  Dam can be a maladaptation strategy. For instance, Bataan and Bulacan was once submerged into flood because the dam released a massive amount of water which could happen during a strong typhoon signal. But it could also be good reservoir for irrigation.

  Many opportunities for adaptation make sense whether or not the effects of climate change are realized.

Climate Change Adaptation: The Appropriate Strategy

- Bridge the gap between global climate information and local adaptation needs of rural population.

- Develop mechanisms to address climate change adaptation at the local level by using different prediction models and climate scenarios data, translating them into local impact outlooks and finally into location specific livelihood adaptation practices.

  It should be situation specific. For example, one should not copy the DRRM Plan that worked on Palawan or Laguna. It involves knowing our local disaster situation in order to familiarize ourselves with our hazard and cropping calendar counts.

  The principle in DRRM is that there is no one preach-all- formula. It may work in one area but may not work efficiently in our situation.

- Ideal Practices or options therefore need to fit the location specific agro-ecological setting; increase climate resilience and reduce the risk of hazard impacts to the production system; must maintain the income level of rural population and do not increase greenhouse gas emissions.

The Approach

It starts from vulnerability, risks and local livelihoods until it ends in Up-scaling and mainstreaming.

- Assess current vulnerability, risks and local livelihoods
- Assess future climate risks
- Promote institutional and technical capacities for adaptation

After identifying current and future vulnerabilities, we put up institutional mechanisms and train people from the local government units.

- Identify, validate and test suitable adaptation options
- Design location-specific adaptation strategies
- Upscaling and mainstreaming

Mitigation Practices

- Using fossil fuel more efficiently for industrial processes or electricity generation,
- Improving the insulation of buildings, and
- Expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere. There is a need to reforest our forests because it is already denuded. If without forest, there would be no carbon sinks.
- Reducing energy waste and switching to cleaner energy sources switching to renewable energy (solar energy or wind power, biofuels)

Adaptation Option's Prioritization Mechanism

- Feasibility Evaluation (of adaptation options)
- Agro- ecological suitability
- Economic & social feasibility
- Increase resilience against impact of climate hazard exposure
- Does not make contribution to GH Gases

Examples of Field Levels

Agro-ecological suitability	***Economic and social feasibility***	***Increase resilience against impact of climate hazard exposure***	***Does not make contribution to GHG***
• Farmer's perception • Expert's perception • Climatic, edaphic and topographic conditions and agro-ecological zones	• Cost of input • Net benefits • Quantity of yield • Capacity building requirements • +/-employment opportunities for the landless	• Hazard resilience of innovation • +/- water use • Cost for irrigation • Reduced risk by changed farming schedule or varieties	• =/- chemical fertilizer use • + /- use of organic manure Not using chemical fertilizer is favourable. Although in organic fertilizer, it depends on the duration it will take to decompose. For instance, farmers are advised to put their rice straws in their rice paddies until these will be decomposed. During the process, the decomposing rice straw has high methane gas emission. This is the reason why in decomposing, it should be covered in plastic to prevent methane gas emission from the compost.

Good Adaptation Practices in Agriculture

- Changing sowing times and cropping patterns
- Adopting new water saving technique – use of plastic mulch
- Use of drought tolerant varieties
- Rainwater harvesting
- Cloud seeding

Adapting to Climate Change: Technological Options

Private

- Alter crop species and varieties
- Alter livestock species and breeds
- Alter timing of planting and harvest
- Multiple cropping season
- Rehabilitation of on-farm structures
- Change land use

Public

- Plant and animal breeding
- Public awareness and extension
- Insurance schemes and conditional cash transfers
- Modernization of irrigation systems

Examples of Adaptation

Sea-level rise

- Better flood defenses, by establishing greenbelt along shorelines
- Changing patterns of land use like avoiding more vulnerable areas for housing

Good adaptation practices

- Use of saline tolerant varieties
- Water harvesting pond with azolla
- Use of lemon grass as a biological control

Lemon grass can be used as an insect repellant

- Use of plastic mulch to conserve water – mulching can prevent sea level rise since it does not allow water to evaporate from the soil.
- Use of plastic mulch and rice hull for water conservation and weed control – in mulching, it is advised not to water the plants.
- Construction canals and dikes to prevent further shoreline erosion

Examples of Mitigation Practices

- Use of Renewable Energy Sources
- Energy efficiency and conservation
- Use of bicycles for zero carbon footprints
- Greening the Building Designs; ex: BedZEDzero-energy housing in the UK
- Reforestation, avoidance of deforestation

- Bio/Carbon sequestration of greenhouse gasses – use of vaccine in Australia to lower methane release from ruminants due to flatulence and eructation
- Efficient practices in organic agriculture

Focal Areas of Adaptation Policies

- Information- effective – it should focus more on information campaign.
- Capacity – strengthening capacities in technical and planning disciplines to understand potential Climate change impacts and devising response strategies
- Financial Resources should focus on poorer countries – e.g. carbon trading between rich and poor countries. Rich countries pay for every seed planted by poor countries.
- Institutions – focal points are needed at the national and international levels to garner expertise, develop and coordinate comprehensive strategies and advocate for broad-based planning and action
- Technology – suitable to the needs

Stages Developed by the Conference of Parties (COP)

Stage 1 – identifying most vulnerable countries and regions and adaptation options

Stage 2 – to involve measures, including capacity building to prepare for adaptation

Stage 3 – implementing measures to facilitate adaptation

The Philippines has already gone through these stages 1 to 3. Many countries like Canada and Japan cannot anymore abide with the initial agreement on climate change so small countries need to full force to pressure these bigger countries to commit in the initial agreement that they would buy carbon elements or would also implement carbon minimizing options. It resulted in bilateral programs amounting to US$110 M to more than 50 adaptation projects in 29 countries. Also, it provided funding to member countries to prepare the NAPAS-National Adaptation Programs of Actions.

Priorities in Moving Forward

- Adaptation under the UN Framework Convention on Climate Change (UNFCCC) – strengthening support for proactive adaptation by facilitating comprehensive national policies and committing reliable funding for high priority projects
- Integration with Development – this means factoring adaptation into development Assistance thru measures such as mandatory climate risk assessment for projects finance by bilateral cooperation. For instance, geo-hazard map is required in infrastructure projects. This is for geologic assessment.
- Climate Insurance – for instance, cropping insurance should not only be limited to rice but also to animals.

Near term policy options for adapting to climate change and securing food supply (Source: V. Anbumozhi, ADBL, 2002)

Policy options should become part of the Climate Change Response Measure.

Climate Change Response Measure	Policy Option
Near Term Actions (5-10 years)	
Crop insurance for risk coverage	Improved access to information, risk management , revised pricing incentives
Crop/livestock diversification to increase productivity and protect against diseases	Availability of extension services, financial support etc
Adjust timing of farm operations to reduce risks of crop damage	Extension services, pricing policies etc
Changes in cropping pattern, tillage practices	Extension services to support activities, policy adjustments
Modernization of irrigation structures	Promote water saving technologies
Efficient water use	Water pricing reforms, clearly defined property rights
Risk diversification to withstand climate shocks	Employment opportunities in non-form sectors
Food buffers for temporary relief	Food policy reforms
Redefining land use and tenure rights for investments	Legal reforms and enforcements

Session 2: Strategic Planning: Harmonizing Disaster Risk Reduction and Climate Change Adapation in Agriculture and Local Governance

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Issues at Hand: Global Warming and Disaster Risks

Factors Influencing the Agricultural Landscape (Paul Teng, 2014)

- Demographic landscape
- Declining performance of Agriculture
- Stress factors on the rural resource base
    - Soil degradation; Water – pollution of industrial and agriculture effluent, Air pollution by natural and anthropogenic sources
    - Global climate change – temperature (global warming, light (global dimming)
    - temperature change
    - Oil prices vs. Food Prices – biofuel expansion
- Rapid transformation of supply chain
    - emergence of supermarkets and large wholesalers/processors in the last two decades
    - Impact: lower food prices for urban consumers but lower market participation among poorer small farmers. It affects technology, and society.
- Association of Southeast Asian Nations (ASEAN) Integration – zero tariffs, free flow of people, single market and production base, ASEAN Investment area. Accordingly, Philippines would hardly cope up during the full swing of ASEAN integration especially on Rice Production.
- Declining enrolment in agriculture – the agriculture sector is met by declining population. Accordingly, 70% are indigent farmers.

Issues and Opportunities for Action

1. Food security
2. The sustainability challenge
3. Biotechnology /Biodiversity Management/ Genetic Engineering – Molecular Biology

   This is receiving negative acceptance among farmers while scientists think that these can be an answer to food security. Undeniably, biotechnology actually has a big contribution to food security and productivity so there is the need to educate our farmers. One issue is about Genetic Engineering.
4. Urban/Peri-urban agriculture - part of the problem of part of the solution
5. Bio – entrepreneurship: keeping farmers on the farm thru profit motivation, value addition> science + technology+ investment

Why is Strategic Planning Important?

- Secures the future of the institution
- Provides a roadmap
- Sets priorities
- Allocates resources
- Establishes measure of success
- Gets inputs and ideas from all parts of the institution
- Coordinates actions of different parts of the institution
- Responds to changes in the environment

What is Strategic Planning?

- Strategic planning is an organizational management activity that is used to
    - set priorities,
    - focus energy and resources to strengthen operations,
    - ensure that employees and other stakeholders are working toward common goals,
    - establish agreement around intended outcomes/results (Scorecard), and
    - assess and adjust the organization's direction in response to a changing environment.
- Effective strategic planning articulates not only where an organization is going and the actions needed to make progress, but also how it will know if it is successful.
- Involves formulating and implementing decisions about an institution's future direction.
- A Strategic Plan is a document used to communicate with the organization the ff:
    1. Organization goals
    2. The actions needed to achieve those goals
    3. All of the other critical elements developed during the planning exercise.

Strategic Management

- It involves processes that organizations use to systematically coordinate and align resources and actions with the mission, vision and strategy throughout the organization.
- Activities transform the static plan into a system that provides strategic performance feedback to decision making and enables the plan to evolve and grow as requirements and other circumstances change.

Rationale, Sequential and Analytical Strategizing

Integrating TQM in Strategic Planning Framework

1. ***Begin with the end in mind*** – for instance, it involves envisioning how the small farmers can compete to the ASEAN 2015.
    a. Draw a picture of your institution's future
    b. Describe that picture
    c. Vision Statement

2. ***Analyze past trends like asking the question***: Where is your Institution now?

External Analysis (Projection of the Future)

After analyzing the past trends, one should do an External Analysis and project the future.

- Institutional Mandate
  E.g. What is the mandate of the Department of Agriculture (DA) in terms of the context in Climate Change on DRR?
- Government Policies, Regulations and Incentives
- Sector Status, Dynamics and Structure – in 2015, budget for the activities of DRRM should be highlighted
- Sector Demand and Supply, Potentials and Prospects
- Micro-market Assessment - it is projected that small farmers cannot compete during the ASEAN 2015

Internal Analysis (Projection of the Future)

From external analysis, do a Strengths, Weaknesses, Opportunities, and threats (SWOT) Analysis. In doing SWOT Analysis, the process includes starting from the External Environment before going internally. After knowing your external environment, you can review your internal conditions.

- Assess Performance vis a vis targets and benchmarks
- Assess Organizational Capabilities
- Assess Resources and their allocation
- Assess Functions in regulations (Policy Making -Technical, Monitoring, Evaluation, Administrative, Etc.)
- Assess Management Processes
- Assess Teams and Individuals
- Assess Top Management and Strategic

Internal analysis is like undergoing ISSO accreditation. After undergoing it (internal analysis), opportunities and trends can already be identified from External Analysis, while strengths and weaknesses can be identified from Internal Analysis. Then, Cross Impact Analysis can now be done.

Vision – it is an idealized picture of your institution in the future / picture of the target clients or beneficiaries.

Strategies – these are means that will get you to the vision.

Mission – it is the basic purpose of being of the organization.

Objectives – these are measurable end results that are derived from the vision and mission/ mandate.

Key result areas – these are qualitative manifestations that the objectives are being achieved.

E.g. For Higher Education, key results areas include the number graduates, number of students who graduated on time, number of unrelated programs, and percentage passing in licensure exams.

Performance Indicators or Outcomes – these are quantitative measurements of key result areas.

The Six R's of Performance

When looking at the performance indicators, the six R's of performance must be considered.

1. Reach – physical presence
2. Revenues – agency income
3. Returns – bottom line profit and equity
4. Recognition – image and reputation
5. Ratings – product rating by clients
6. Responsiveness – impact on the market

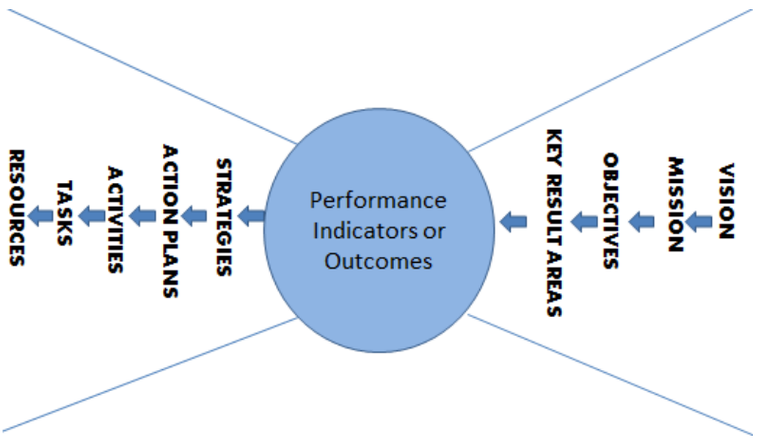
Strategies
From performance indicators, identify strategies or the major moves or directions that will allow the institution to move.

Action Plans
There will operationalize the Strategies, Regulation, Monitoring, Special Projects, Administration, Human Resource and Finance.

Activities
These are set of tasks to be done.

Resources
These are the inputs that are needed for the accomplishment of strategies, programs, activities and tasks.

Full- Spectrum of Right to Left Planning



From the Full Spectrum of Planning, it starts with Right to Left Planning which is the (Vision, Mission, Objectives, Key Result Areas, and Performance Indicators) VMOKraPI's progress.

It is the management that sets the strategic planning. For example, Department of Agriculture sets up its own DRRM Plan for Agriculture. It is the agency that sets its dream.

Top – Down Approach

It starts from vision, mission, objectives, key result areas, and performance indicators. It will be met by Bottom-Up Planning.

Bottom-Up Planning

Here, one needs to consider External and Internal Environment Analysis that are inputted to the selection of strategies, operating plans and action programs, activities and tasks, and resources required.

There should be a Top-Down and Bottom-Up Planning that are meeting at the middle.
Needs identification may start from the bottom for as long it will meet the needs of the top.

VMOKraPI-SPATRes

- Vision is the 5 to 10 – year picture of the future.
- Mission is the reason for being /purpose.
- Objectives are the direction/measurable end results.
- Key Result Areas are specific manifestations that objectives are met
  E.g. CHED has 9-Point Roadmap. From the 9-Point Agenda, a SOT Analysis is being done. It involves determining areas to be funded. While thinking of that 9-point agenda of CHED, we also try to address local situations.
- Performance Indicators are Numerical Translation of KRAs.
- Strategies are best Ways of Doing Things.
- Programs are done by multi-functional groups.
  E.g. Climate Risk Assessment and Disaster Preparedness is a joint project of DRRMC and DA then there are many agencies that are working towards the attainment of the program. The role of each sector should be specific.
- Activities are done by groups in a department.
- Tasks are done by individuals.
- Resources include human and financial.

Planning Framework

Where we are now?

- Internal Analysis
- External Analysis

How do we get there?

- Strategies
- Programs
- Tasks
- Resource Allocation
- Contingency Planning
- Integrate Functional Plans

How do we know we are getting there?

- Strategic Control
- Monitoring
- Evaluation

Where do we want to be?

- Vision
- Mission
- Objectives
- Key result areas
- Performance Indicators

The New Balanced Scoreboard and Measurement-Based Management

The major elements of Score Card include customer, financial, internal business processors and learning and growth. We can devise our own Score Card based on your major final outputs.

The Strategic Planning Process

The three foundations of Strategic Planning Process include External Analysis, Internal and VMOKraPI. For instance, levels of external analysis in the academe include curriculum, library facilities, Research and Extension, etc.

The Three Foundations

1. Environmental Analysis should cover what can or can't be done.
2. Internal Analysis should cover what we are able or unable to do.
3. VMOKraPI should cover what we want or not want to do.

Selective Process

It involves choosing from many strategies.

- Screen the strategic options against the VMOKraPI.
- Those that pass the screen will be developed into SPATRes.

What influences what?

VMOKRAPI is driven mostly by External Analysis and answers 'What? On the other hand, SPATRES is driven mostly by Internal Analysis and answers 'How?'.

Three Rules

- Never use IA to determine Vision.
  It is to avoid being short-sighted so as not to take advantage of the opportunities around and misaddress the threats.
- Use IA to determine the near future Performance indicators but use EA to determine the 3rd to 5th year Performances
  There is a need to determine the opportunities and the threats.
- Use IA to determine the Human Resource and Financial Strategies

Operations Strategies

- How to keep Quality consistent with what market wants
- How to improve quality
- How to ensure that delivery is on time
- How to improve productivity

Human Resource Strategy

- How to make people competent to perform tasks
- How to make people become the best they can be
- How to reward/punish people who live or violate culture set by the values

Financial Strategies

- How much money is needed to deliver the tasks
- Cash flow management better than Income statement management
- Asset Management

Marketing Strategies

- How to retain clients/customers
- How to get more from current clients/customers
- How to gain new clients/customers

Other Major Considerations

These are the new considerations in planning especially during the current adminsitration.

- Results Based Performance Management System
- Organizational Performance Indicators Framework
- Strategic Performance Management System (SPMS)
- Program to Institutionalize Meritocracy and Excellence in Human Resource Management (PRIME-HRM)

Vision Setting

- A clear, measurable and challenging description of a desired future goal around which an organization can direct its program of work
- An image of how we see our purpose upholding
- A picture of the preferred future we seek to create
- An answer to the question “What do we really want”

Qualities of a Vision

- It motivates and inspire.
- It is a stretch, move towards greatness.
- It is clear and concrete.
- It is achievable, not a fantasy.
- It fits with highest values.
- It is easy to communicate.

Vision and Mission

- Picture of the future
- Of our institution and of our stakeholders and clientele
  Element
- Elements
  Who are we?
  Who we serve?

What type of product and services we offer?
How do we make them available?
Return of Investment
Services and commitment

Definition of Mission

It is the organization's driving purpose for existence usually specified in terms of mandates and principal products and services, people it serves and key element of the organization's philosophy

Why is it important?

- Defines what our organization means to us.
- Distinguishes the organization from other organizations.
- Serves as a framework for evaluating current and prospective activities.

Components

- A description of the mandates of our organization
- The organization's key strengths
- Broad strategies to be pursued in order to achieve the mission
- The values the organization adheres to in pursuit of its mission

Definition of Values

- Enduring standards of what is worthwhile, which serve to guide behavior in meeting objectives, in dealing with the people the organization serves, colleagues and others.
- Reflect the way the organization will achieve its mission
- Can be a source of strength if consistent with strategies
- Enduring beliefs that a specific mode of conduct of existence is personally or socially preferable to an opposite.

If we want our farmers to become resilient and competitive during the ASEAN Integration, we should identify the values that they need to have in the market. It may include discipline.

Session 3: Approaches to Assessment of Impacts and Vulnerability to Climate Change and Adaptation Options

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Review of Terms

Risk is the probability of an event to occur and cause relative consequences.

Hazard is any event that has a potential to cause harm (to any sector).

Vulnerability was first defined by taking the formula used by engineers and scientists in landslide modeling: Hazard (location/geography) x Risk Exposure – e.g. in terms of exposure, lowland community is more prone to storm surge than upland; or in the same manner, the upland is more prone to landslides as compared to coastal areas.

However, since impacts of climate change do not only affect the ecosystem but also communities, a modern definition of vulnerability came out. It is now defined as exposure (location or geography), and susceptibility. E.g. In the upland, an area with less vegetation is more prone to landslides) and adaptive capacity (socio-economic side of the communities like educational attainment, livelihood of people in a community, access to insurance, etc.).

Vulnerability is the susceptibility to be affected by any negative hazard or event.

Two Types of Assessment to Support Climate Change Adaptation

1. Climate Impact and Vulnerability Assessment

It is the assessment of key changes in climate, climate change impact on different sectors, and vulnerability of livelihoods for strategic planning. This is not to be confused with assessment of impact of adaptation interventions in project evaluation.

Two vulnerability frameworks

a. *Outcome vulnerability* – traditional concept in climate change work, top-down approach
b. *Contextual vulnerability* – emerging concept in climate change work, bottom-up approach, vulnerability of social-ecological systems is determined by multiple factors and processes, climate change is treated as one of the threats.

Examples of Outputs

1. *Top-Down Approach*
   It uses international to national level data which are analyzed using computer models so that these could be applicable in the grassroots/community level.
   E.g. Local climate models with the integration of PAGASA's climate observations that are computed and then placed in maps, and Historical Rainfall Reconstruction
2. *Bottom-up Approach*
   It means from the ground or from community/LGU level to higher levels that use participatory methods. E.g. Hazard maps and cropping calendars

Designing climate impact and vulnerability assessment

- Literature review
- Identification of stakeholders
- Assessment of information needs of stakeholders
- Design of assessments, including agreement of adaptation objectives by stakeholders

Adaptation goals

- There are different views on how to define "adaptation' to climate change (e.g DRR and CCA links)
- There is a need to define adaptation goals with the wide participation of different stakeholders.

Questions to ask when designing assessment

1. What is the target sector?
2. What is the temporal scale? The next 3 years? Next 10 years?
3. What is the spatial extent? Regional, provincial, local community or household?
4. What is the spatial resolution? Meters, kolometers, hundreds of kilometers, individuals, households, community, farm or watershed?

2. Climate Change Adaptation Options Assessment

- It is the assessment of different options' effectiveness to achieve adaptation to identify best options.
- It builds on climate impact and vulnerability assessment.
- It examines the extent to which different adaptation measures may achieve the adaptation options.
- It is done during the implementation of programs/projects. Good practice options should not only end in just mere implementation but is important to monitor these.

Two approaches for climate change adaptation options field-testing and assessments

1. Participatory Action Research

a. Identification of Options
b. Validation, prioritization and selection
c. Procurement and demo site establishment
d. Seasonal implementation and monitoring
e. End of season assessment

**Local Working Groups* - technical training and advice, monitoring and evaluation, lesson learning, and knowledge management

Considerations for launching community-based adaptation and disaster reduction processes:

a. Collate local, introduced and improved adaptation options.
b. Synthesize into potentially suitable adaptation options for location specific conditions.
c. Scientific validation of adaptation options
d. Local prioritization/selection of adaptation options for field testing
e. Field-testing; Monitoring and evaluation

2. Climate-Smart Farmer Field Schools

Considerations:

a. Impacts of climate change on agriculture
b. Food insecurity vulnerability analysis at household level
c. Livelihood adaptation to climate change
d. Institutional analysis and awareness raising

Climate-Smart Farmer Field Schools (FSS) Integration Framework

Climate Field School (Dumangas/Irosin Model by RWAN and PAGASA)	***Farmer Field School (PalayCheck by PhilRice and ATI)***
• Climate, Pest and Crop Growth and Development • Cropping Systems and Climate – Related Risks • Observation of Weather and Climate Parameters • Weather and Climate Information Products and Sources (Temperature, Rainfall, Evaporation Rate, Humidity) • Forecast Generation, Climate Forecast Interpretation, Translation and Communication • Incorporating Climate Forecast in Decision Making	• Use high quality seeds of a recommended variety. • No high and low soil spots after final levelling • Practiced synchronous planting after a fallow period. • Sufficient nutrients from tillering to early panicle initiation and flowering stages. • Avoided excessive water or drought stress that could affect the growth and yield of the crop. • No significant yield loss due to pests • Cut and threshed the crop at the right time.
• Topics and information on climate/weather outlooks, forecast, farm advisory, parameters and others are discussed every meeting in addition to key check systems. • Documented good practice options/adaptation strategies are introduced to participants for adoption/ testing • Focused on increasing farm productivity, reducing losses from climate related risks/hazards and minimizing food insecurity	

Session 4: Integrating Cross-cutting Concerns: Gender

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Sex vs. Gender

Sex

- Biological differences between men and women
- Determined at birth and is universal

Gender

- Socio-cultural construct
- Refers to roles, attitudes & values assigned by culture and society to women and men

Gender Socialization

This is the process by which norms and expectations in relation to gender are learned by women and men.

Ruth Hartley on Gender Socialization

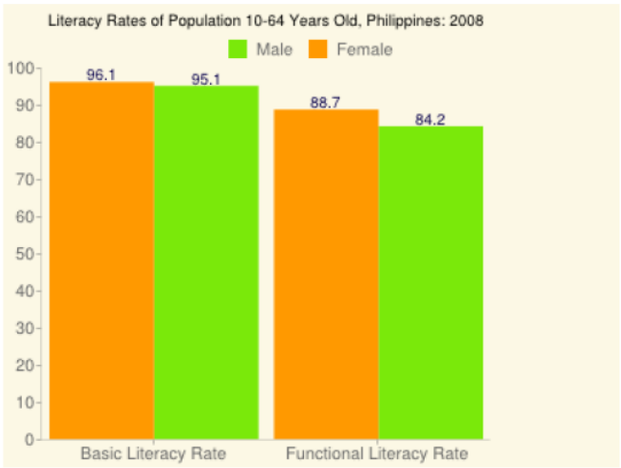
1. ***Manipulation –*** people handle girls and boys differently as infants.
   E.g. boy babies are tossed in the air; girl babies get more delicate handling
2. ***Canalization*** – means that people direct children's attention to gender-appropriate objects.
3. ***Verbal appellation*** – telling children what they are and what is expected of them.
   - Brave boy, pretty girl
   - Boys don't cry, girls don't hit playmates
4. ***Activity exposure*** – familiarizing children to their gender-appropriate tasks
   - Girls help their mother with housework.
   - Boys are encouraged to play outside the house.

Historical Experience of Women

- During pre-colonial times – high regard for women (engaged in trade, village chiefs, healers & high priestesses)
- Spanish times- emphasized the domestic value of women
- American era – introduced universal education social reforms
- Today – high level of education and relative independence in combining work and family

Filipino Women and Men's Education

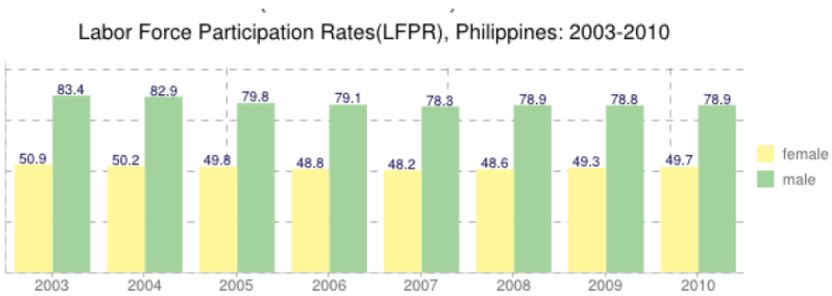
Source: 2008 Functional Literacy, Education and Mass Media Survey (FLEMMS)



BLR
Women-26M
(90 for every 100 women)
Men – 25M
(87 in every 100)

FLR
Women-20M
(69 in every 100)
Men-18 M
(63 in every 100)

		GIRLS/WOMEN	BOYS/MEN
SY 2010-2011	Completion Rate in Elementary	77.14%	67.65 %
	Completion Rate in High School	80.27 %	69.88%
SY 2005-2006	Graduates in College (263,634)	56.61 % (149,246)	43.39 % (114,388)



	EMPLOYMENT	WOMEN	MEN
Oct. 2010	Employed - 36.5M	14.2M	22.3M
	Unemployed - 2.8M	80.27 %	69.88%
	Unpaid family workers	2.4M (56.7%)	1.8M (43.3)

October 2010 Labor Force Survey (LFS)

Gender Bias

It is a form of prejudgment, bias or limitation given to roles and expectations of males and females.

Gender Bias against Men

- Inherently aggressive and violent
- Don't feel pain or incapable of experiencing human emotions
- Inherently expressive in their sexuality
- Don't need closeness, reassurance, and attention

Gender Stereotyping

- Women are weak, dependent, subordinate, indecisive, emotional and submissive.
- Men, on the other hand, are strong, independent, powerful, dominant, decisive and logical.

Gender Stereotype in Social Roles

- Men provide financially for the family, works as managers, construction builders, engineers, and portrayed as leaders.
- Women takes care of the house and children, works as nurse, teacher, secretary, and portrayed as followers

Gender Stereotype in Capacities

- Men are good in Math and Science, physically strong and firm decision-makers.
- Women are good in arts and less intellectual pursuits, physically weaker and fragile and wishy-washy or fickle minded in decision-making.

Marginalization

It happens when women are being considered a nonessential force in the economy despite their crucial role in production. Their contributions to development remain unrecognized or undervalued.

Subordination

This is submission, sometimes due to force or violence, or being under the authority of one sex.

Double Burden

A situation referring to the heavy workload of women and the many, overlapping tasks involved, which if computed in terms of hours would total more than 24 hours.

Discrimination

This is the practice, policy or procedure that denies equal treatment and status to women on the basis of being female.

Women lack voice in relevant decision-making and planning activities; hence, the need to empower, pursue equal opportunities for women and men and ensure equal access to

resources and development results, and abolish unequal structures and practices that perpetuate discrimination and gender inequality.
Not withstanding their major contributions to and potential influence on the country's economic and social progress, Women have remained largely disadvantaged are still poor, have less access to or control over resources, suffer from gender-based violence, and enjoy less political power than their male counterparts.

Gender and Development (GAD)

- Not a war between sexes
- Not anti-male
- Both women and men are victims although there are more women victims than men
- Both men and women have a stake in the struggle

Fairness and equity demand that everyone in society, whether male of female, has the right to the same opportunities to achieve a full and satisfying life.

Gender Mainstreaming

This incorporates women and men's issues, needs and interests into the organization's decision-making process, policies, structures, processes/systems, practices, plans, programs, projects, activities to attain the vision of gender equality and women empowerment.

International Mandates

- The United Conventions on the Elimination of All Forms of Discrimination against Women (UN-CEDAW) which promotes equality in all fields, affirmative action for women and protection of women from violence.
- The Beijing Platform for Action (PFA) of the Fourth World Conference on Women (FWCF) which calls for actions on 12 areas of concern affecting women.
- Commitments made in the following global meetings: UN Conference on Women, International Conference on Population and Development, the World Summit for Social Development and the Habitat Conference.

National Mandates

- Sec. 14, Art. II of the Philippine Constitution: "the State recognizes the role of women in nation building and shall ensure the fundamental equality before the law of women and men."
- RA 7192 - Women in Development and Nation Building Act: promotes the integration of women as full and equal partners of men in development and nation building.
- Sec. 28 of the GAA, 1995 – 2000: directs government entities to formulate a GAD plan, the cost of which shall not be less than five percent of their yearly budget (GAD Budget)
- EO 273: directs all government agencies and local levels to "institutionalize GAD efforts in government by incorporating GAD concerns in their planning, programming and budgeting processes.
- RA 9710 Magna Carta of Women: …shall endeavor to develop plans, policies, programs, measures and mechanisms address discrimination and inequality in the economic, political, social and cultural life of women and men.

Disaster does not discriminate children, women and men. High risk group includes people with disabilities, people with chronic diseases and the elderly. Involve them in the design and implementation of DRR and CCA in Agriculture.

Gender mainstreaming starts with capacity development is primarily aimed at addressing gender issues.

Capacity – the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals (UNISDR).

Capacity Development – the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time (UNDP).

Gender Issues and Gender Gaps

- Where gender division of labor brings with it inequalities in amount of work inputs or benefits received
- Where women and men face different opportunities to access, participate in, and control resources and benefits
- Where women and men are conceived or thought of as different and, thus, unequal
- Where there is systemic or structural bias, resulting in differential treatment (e.g., valuation/reward, access) given to individuals on the basis of their gender

Levels of Gender Equality and Women's Empowerment

Level	***Concern or Issue***
Control	Inequality in power relations so that increased women's access or productivity may not translate to improved welfare of women
Participation	Inequality in involvement of women and men in bodies that make decisions or policies affecting them; treatment of women solely as passive beneficiaries
Conscientization	Notional or belief gap re the nature of gender differences and relations
Access	Gender gap in the amount and quality of resources women and men can have access to
Welfare	Inequality in the material and physical well-being of women and men

Resources

- economic or productive resources such as land, cash and credit, employable or income-earning skills;
- political resources such as representative organizations, leadership, education and information, public sphere experience, self-confidence and credibility; and
- time.

Benefits

- provision of basic needs such as food, clothing, shelter, and income;
- asset ownership such as land and personal skills;
- education and training; and
- political power, prestige, status, and opportunities to pursue new interests.

Gender Roles Before, During and After Disaster

GENDER ROLES	BEFORE THE DISASTER		DURING THE DISASTER		AFTER THE DISASTER	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
Ensures food availability	√	√	√	√	√	√
Ensures food security		√	√	√	√	√
Does the farming	√	√		√		√
Does the fishing		√		√		√
Does the early harvest	√	√				
Secures the capital for the inputs	√	√	√	√	√	√
Attend trainings/ seminars on agriculture and fisheries	√	√		√	√	√
Evacuates animals/ livestock		√		√		√
ON FARMING						
Pasturing of livestock		√		√		√
Feeding of livestock	√	√		√	√	√
Feeding of poultry	√	√	√	√	√	√
Preparing land		√		√		√
Planting crops	√	√	√	√	√	√
Controlling weeds	√	√		√	√	√
Applying fertilizer		√		√		√
Controlling pests and diseases		√		√		√
Harvesting	√	√		√	√	√
Preparing/ Processing to market	√		√		√	
Selling of harvest	√		√		√	
Storing seeds		√		√		√
ON FISHING						
Sewing of fish net						

Matrix of Women's Role in Disaster Management (Rashid and Al Shafie, 2009)

COMMUNITY LEVEL ACTION STRATEGIES	IMPLEMENTATION		
	PREPAREDNESS	RESPONSE	RECOVERY
POLICY MAKING IN DISASTER MANAGEMENT			
Integrate women into the political and policymaking process and use their capacities and expertise to influence decisions in emergency management	√	√	√
Involve all groups in recovery operations to ensure non-discriminatory allocation of benefits	√		√
DEVELOPMENT OF HUMAN RESOURCES			
Develop training programs to increase women's knowledge, skills in disaster management. This could include leadership training, training on search and rescue, first aid, data collection and hazard and vulnerability analysis	√		
INFORMATION MANAGEMENT			
Involve women in collecting data to assess risk and identify resources within their communities	√		
Involve women in identifying and using formal & informal communication systems to expedite dissemination of information in a disaster situation	√	√	√
Involve women in collecting and using information for immediate-damage/ needs assessment		√	
MOBILIZATION OF WOMEN			
Organize women's groups to involve women in emergency response activities and general education within households, workplaces, and the community	√		√
Encourage maximum input from women's organizations and their members by recognizing them and assisting them in addressing women's special emergency related concerns	√	√	√
Form male and female micro-credit groups for long-term disaster risk reduction	√		

Agriculture, Fisheries and Forestry

Matrix of Issues, Strategies, Indicators, Targets, and Accountabilities

Strategic gender issues to be addressed

1. Limited access to and control over resources
2. Limited participation and representation in decision making

Gender equality outcome

- Improved women's access to and control over resources
- Wage differentials between male and female decreased
- Access of women to agricultural credit increased
- Increased women's participation in decision making
- Literacy rates for female farmers and fisherfolk increased
- Work participation rate for females increased

PDP 2011–2016 outcomes

Sector: Competitive and Sustainable Agriculture and Fisheries Sectors

Sector Outcome (Goal 4a): Improved food security

- Decrease in food subsistence incidence (in percent of population), from 10.8 percent in 2009 to 8.3 percent in 2015

Sector Outcome (Goal 4b): Increased incomes in the agriculture and fisheries sectors

- Increase in annual average income of families in the agriculture and fisheries sectors (in pesos, real terms), from PhP 17,582 in 2009 to PhP 19,412 to PhP 19,793 in 2015

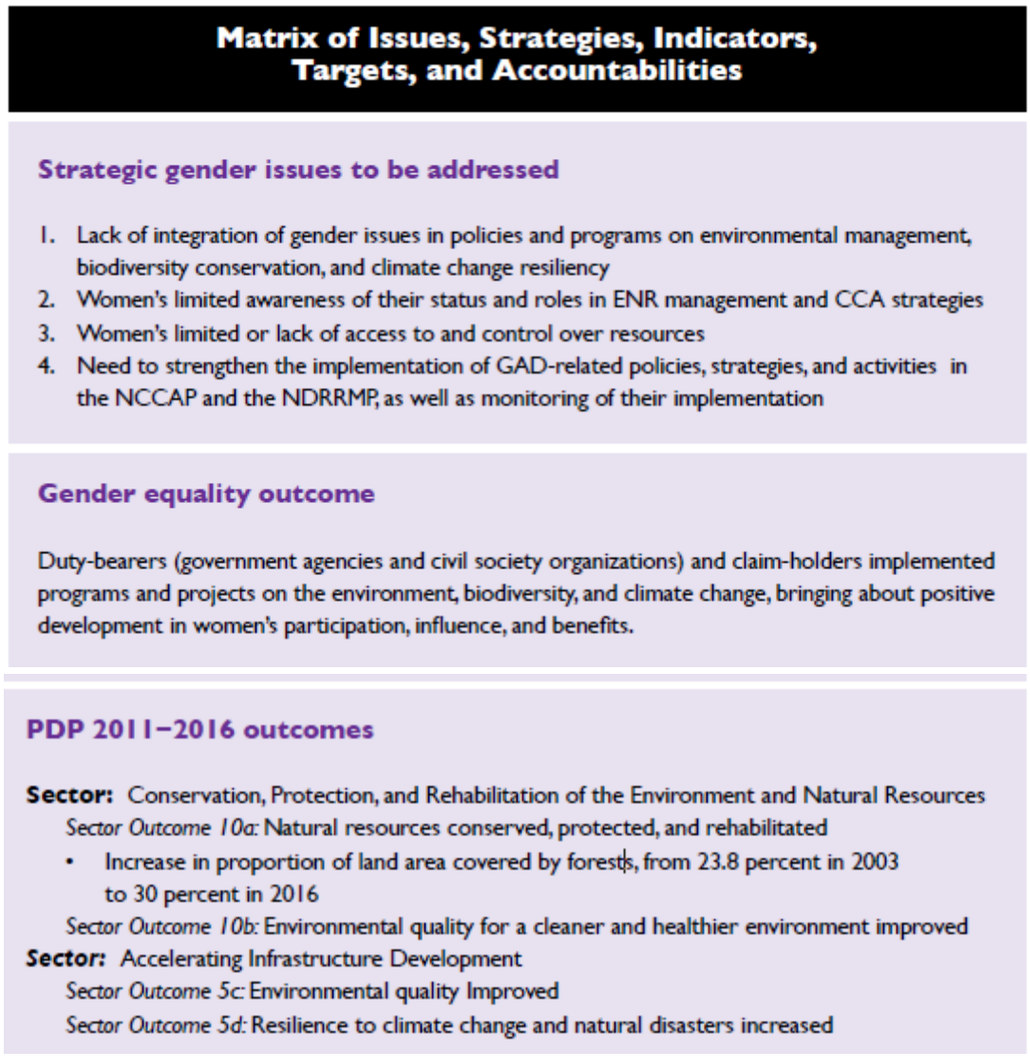
Sector Outcome (Goal 4c): Increased sector resilience to climate change risks

- Reduction in average annual agri-production loss due to weather and climate-related disasters (in PhP billion) of up to PhP 13.8 billion (2004–2010)

Sector Outcome (Goal 4d): Increased growth in the agriculture and fisheries sectors

- Increase in annual agriculture and fisheries gross value added (in PhP million at constant prices) from PhP 257,214 million in 2010 to PhP 331,132 to PhP 334,306 million by 2016
- Increase in annual value of agricultural export (in US$ million) from US$3,181 million in 2004–2010 to US$5,484 million to US$5,534 million in 2011–2016

Environment, Biodiversity, Climate Change and Disaster Risk Reduction



DRR and CCA is everyone's business. *"The more governments, UN agencies, organizations, businesses and civil society understand risk and vulnerability, the better equipped they will be to mitigate disasters when they strike and save more lives"*--- Ban Ki-Moon, UN Secretary-General

Session 5: Implementing Community-based Early Warning System for Agriculture

Lorenzo L. Alvina
Technical Staff, ORED
Department of Agriculture RFO – V

Agriculture and fishery profile have different hazards, among these hazards, the most devastating are related to the lack or abundance of water (hydro metrological hazards).

The DOST agency involved in hydro meteorological hazard is PAG-ASA while Biological man-made patheogeophysical hazards that are leaning to Disaster Risk Reduction is PHIVOLCS. Bicol has all kinds of hazards—volcanoes, earthquakes, storms, etc.

The rock sitting on a mountain slope may be considered a hazard. When it falls and injures people, it becomes a disaster.

In Agriculture, when talking about climate change, Early Warning System (EWS) is used in preparedness and adaptation

Benefits of Early Warning System (EWS) in Agriculture

There are many kinds of EWS—daily, seasonal, and weather forecasts 30—40 years from now. Forecasting what could happen in the future through modeling is Climate Change Adaptation. Definitely, the importance of knowing what could happen is a good factor in decision-making. Other factors in farmer decision-making include inputs (seeds, etc.) and labor. Usually money is the factor that affects the farmer's decisions. A farmer needs money to buy seeds and fertilizer, to pay labor.

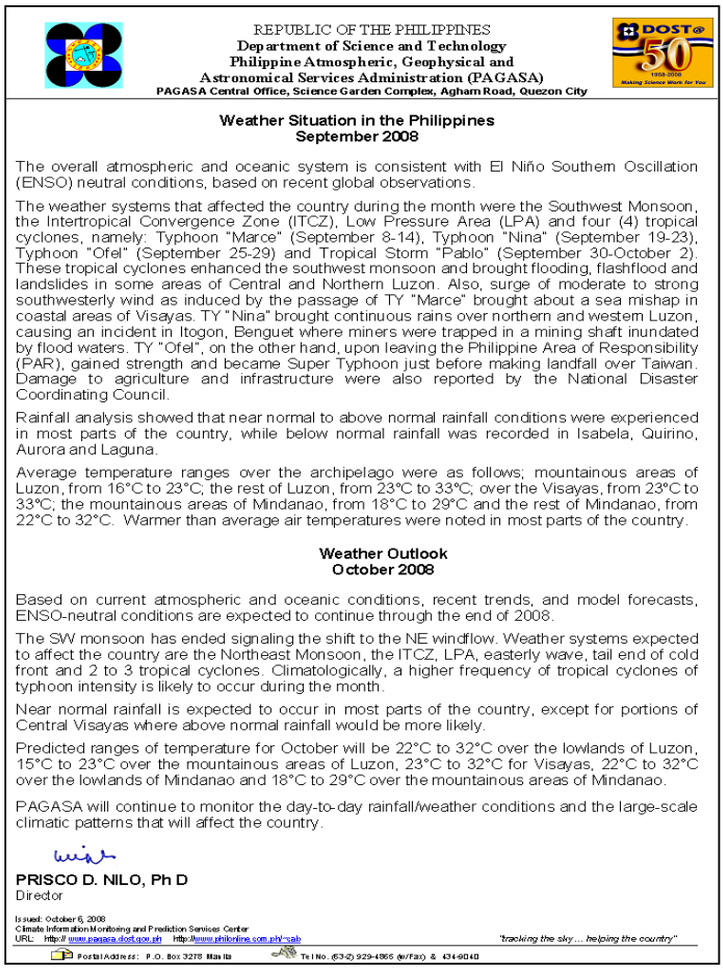
The service provided to the farmers thorough EWS is very important although there are other factors that affect their decision making. If the farmers know that the rainy season will be delayed, they will also delay planting and loaning.

These are the benefits ng EWS:

1. If tomorrow is cloudy with scattered rain shower, farmers are warned not to undertake
2. If rainfall next month is below normal, farmers will look for alternative sources of water next month
3. On set of rainy season will start in late November, farmers will prepare seeds in early November
4. El Niño to occur on the last quarter of the year, so this is what we are talking about, because the government has slow (4:14) and budgeting appropriation we need to know the probability that el nino is going to happen earlier, at least we will be prepared

Several sources of information for weather bulletins/advisories: radio, newspaper, television, internet. Where to get information is not a problem, the problem is whether it reaches the farmers. The problem is the medium. There is an issue on how to translate or "agriculturalize" the information for free for the farmers. It is part of our role.

E.g.: PAG-ASA (contains weather situation and weather outlook)



REPUBLIC OF THE PHILIPPINES
Department of Science and Technology
Philippine Atmospheric, Geophysical and
Astronomical Services Administration (PAGASA)
PAGASA Central Office, Science Garden Complex, Agham Road, Quezon City

Weather Situation in the Philippines
September 2008

The overall atmospheric and oceanic system is consistent with El Niño Southern Oscillation (ENSO) neutral conditions, based on recent global observations.

The weather systems that affected the country during the month were the Southwest Monsoon, the Intertropical Convergence Zone (ITCZ), Low Pressure Area (LPA) and four (4) tropical cyclones, namely: Typhoon "Marce" (September 8-14), Typhoon "Nina" (September 19-23), Typhoon "Ofel" (September 25-29) and Tropical Storm "Pablo" (September 30-October 2). These tropical cyclones enhanced the southwest monsoon and brought flooding, flashflood and landslides in some areas of Central and Northern Luzon. Also, surge of moderate to strong southwesterly wind as induced by the passage of TY "Marce" brought about a sea mishap in coastal areas of Visayas. TY "Nina" brought continuous rains over northern and western Luzon, causing an incident in Itogon, Benguet where miners were trapped in a mining shaft inundated by flood waters. TY "Ofel", on the other hand, upon leaving the Philippine Area of Responsibility (PAR), gained strength and became Super Typhoon just before making landfall over Taiwan. Damage to agriculture and infrastructure were also reported by the National Disaster Coordinating Council.

Rainfall analysis showed that near normal to above normal rainfall conditions were experienced in most parts of the country, while below normal rainfall was recorded in Isabela, Quirino, Aurora and Laguna.

Average temperature ranges over the archipelago were as follows; mountainous areas of Luzon, from 16°C to 23°C; the rest of Luzon, from 23°C to 33°C; over the Visayas, from 23°C to 33°C; the mountainous areas of Mindanao, from 18°C to 29°C and the rest of Mindanao, from 22°C to 32°C. Warmer than average air temperatures were noted in most parts of the country.

Weather Outlook
October 2008

Based on current atmospheric and oceanic conditions, recent trends, and model forecasts, ENSO-neutral conditions are expected to continue through the end of 2008.

The SW monsoon has ended signaling the shift to the NE windflow. Weather systems expected to affect the country are the Northeast Monsoon, the ITCZ, LPA, easterly wave, tail end of cold front and 2 to 3 tropical cyclones. Climatologically, a higher frequency of tropical cyclones of typhoon intensity is likely to occur during the month.

Near normal rainfall is expected to occur in most parts of the country, except for portions of Central Visayas where above normal rainfall would be more likely.

Predicted ranges of temperature for October will be 22°C to 32°C over the lowlands of Luzon, 15°C to 23°C over the mountainous areas of Luzon, 23°C to 32°C for Visayas, 22°C to 32°C over the lowlands of Mindanao and 18°C to 29°C over the mountainous areas of Mindanao.

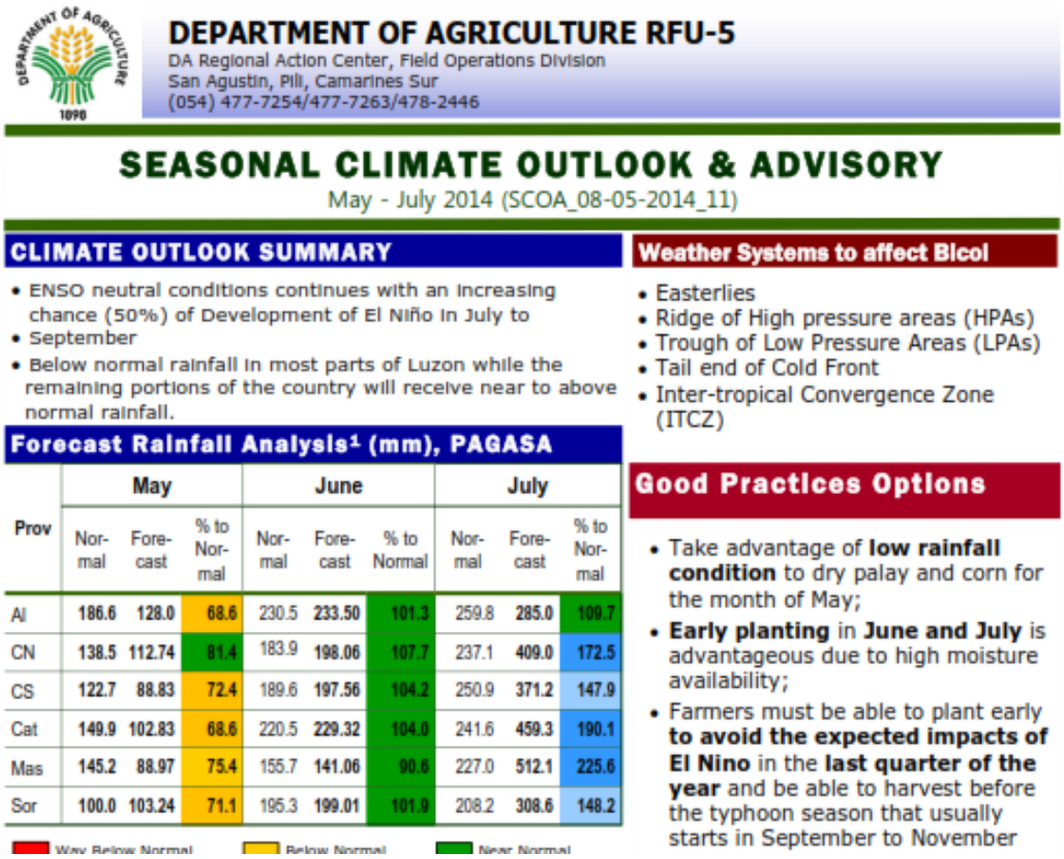
PAGASA will continue to monitor the day-to-day rainfall/weather conditions and the large-scale climatic patterns that will affect the country.

PRISCO D. NILO, Ph D
Director

Issued: October 6, 2008
Climate Information Monitoring and Prediction Services Center
URL: http://www.pagasa.dost.gov.ph http://www.philonline.com.ph/~cab
"tracking the sky ... helping the country"
Postal Address: P.O. Box 3278 Manila Tel No. (63-2) 929-4866 (w/Fax) & 434-9040

E.g.: SLPRSD – PAGASA

E.g.: DA RFO-V



DEPARTMENT OF AGRICULTURE RFU-5
DA Regional Action Center, Field Operations Division
San Agustin, Pili, Camarines Sur
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SEASONAL CLIMATE OUTLOOK & ADVISORY

May - July 2014 (SCOA_08-05-2014_11)

CLIMATE OUTLOOK SUMMARY

- ENSO neutral conditions continues with an increasing chance (50%) of Development of El Niño in July to
- September
- Below normal rainfall in most parts of Luzon while the remaining portions of the country will receive near to above normal rainfall.

Forecast Rainfall Analysis[1] (mm), PAGASA

Prov	May			June			July		
	Nor-mal	Fore-cast	% to Nor-mal	Nor-mal	Fore-cast	% to Normal	Nor-mal	Fore-cast	% to Nor-mal
Al	186.6	128.0	68.6	230.5	233.50	101.3	259.8	285.0	109.7
CN	138.5	112.74	81.4	183.9	198.06	107.7	237.1	409.0	172.5
CS	122.7	88.83	72.4	189.6	197.56	104.2	250.9	371.2	147.9
Cat	149.9	102.83	68.6	220.5	229.32	104.0	241.6	459.3	190.1
Mas	145.2	88.97	75.4	155.7	141.06	90.6	227.0	512.1	225.6
Sor	100.0	103.24	71.1	195.3	199.01	101.9	208.2	308.6	148.2

Way Below Normal Below Normal Near Normal

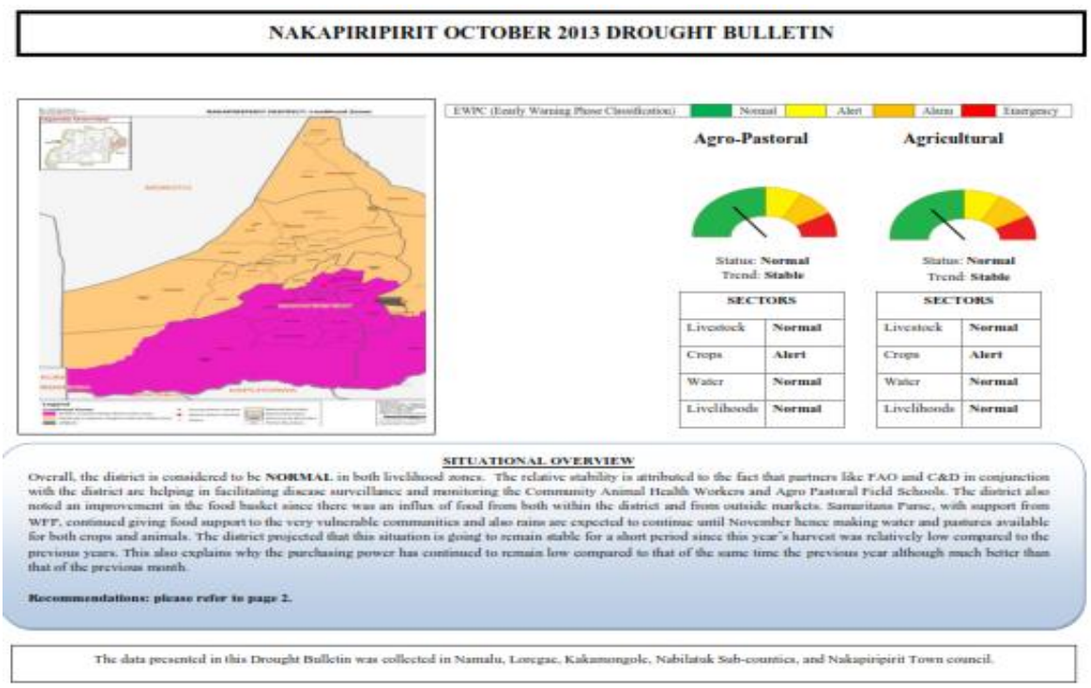
Weather Systems to affect Bicol

- Easterlies
- Ridge of High pressure areas (HPAs)
- Trough of Low Pressure Areas (LPAs)
- Tail end of Cold Front
- Inter-tropical Convergence Zone (ITCZ)

Good Practices Options

- Take advantage of **low rainfall condition** to dry palay and corn for the month of May;
- **Early planting** in **June and July** is advantageous due to high moisture availability;
- Farmers must be able to plant early **to avoid the expected impacts of El Nino** in the **last quarter of the year** and be able to harvest before the typhoon season that usually starts in September to November

E.g.: Uganda



NAKAPIRIPIRIT OCTOBER 2013 DROUGHT BULLETIN

EWPC (Early Warning Phase Classification): Normal | Alert | Alarm | Emergency

Agro-Pastoral

Status: **Normal**
Trend: **Stable**

SECTORS	
Livestock	**Normal**
Crops	**Alert**
Water	**Normal**
Livelihoods	**Normal**

Agricultural

Status: **Normal**
Trend: **Stable**

SECTORS	
Livestock	**Normal**
Crops	**Alert**
Water	**Normal**
Livelihoods	**Normal**

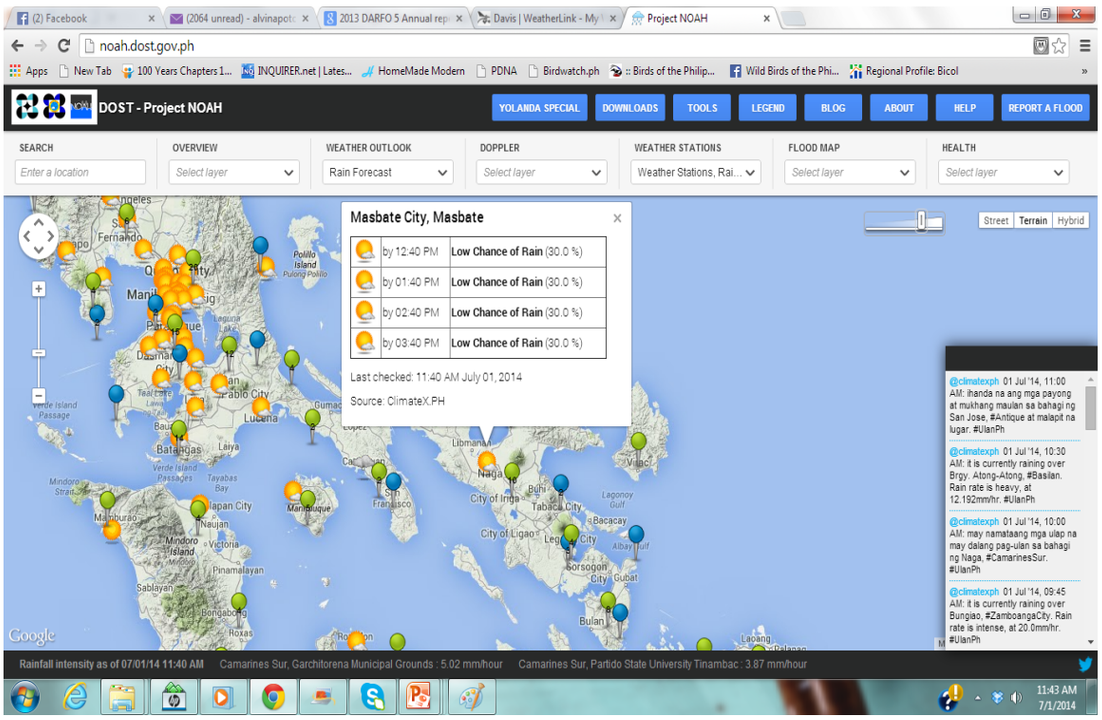
SITUATIONAL OVERVIEW

Overall, the district is considered to be **NORMAL** in both livelihood zones. The relative stability is attributed to the fact that partners like FAO and C&D in conjunction with the district are helping in facilitating disease surveillance and monitoring the Community Animal Health Workers and Agro Pastoral Field Schools. The district also noted an improvement in the food basket since there was an influx of food from both within the district and from outside markets. Samaritans Purse, with support from WFP, continued giving food support to the very vulnerable communities and also rains are expected to continue until November hence making water and pastures available for both crops and animals. The district projected that this situation is going to remain stable for a short period since this year's harvest was relatively low compared to the previous years. This also explains why the purchasing power has continued to remain low compared to that of the same time the previous year although much better than that of the previous month.

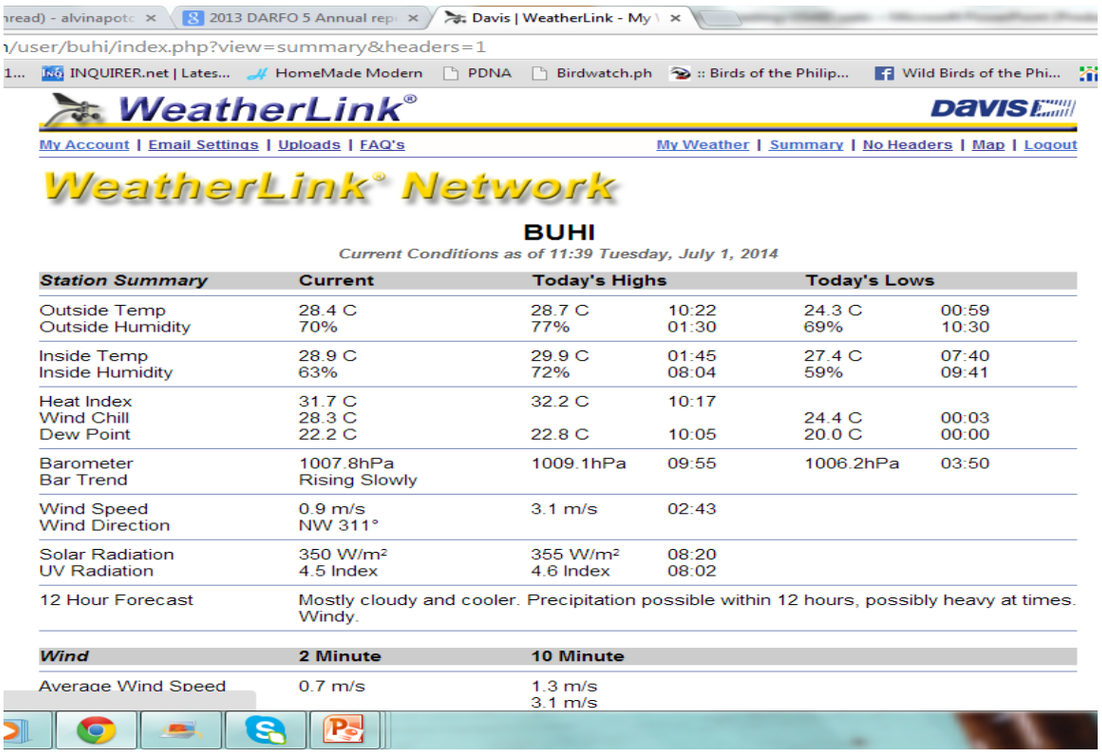
Recommendations: please refer to page 2.

The data presented in this Drought Bulletin was collected in Namalu, Loregae, Kakamongole, Nabilatuk Sub-counties, and Nakapiripirit Town council.

E.g. Project NOAH



E.g. Automatic Weather Station



Station Summary	Current	Today's Highs		Today's Lows	
Outside Temp	28.4 C	28.7 C	10:22	24.3 C	00:59
Outside Humidity	70%	77%	01:30	69%	10:30
Inside Temp	28.9 C	29.9 C	01:45	27.4 C	07:40
Inside Humidity	63%	72%	08:04	59%	09:41
Heat Index	31.7 C	32.2 C	10:17		
Wind Chill	28.3 C			24.4 C	00:03
Dew Point	22.2 C	22.8 C	10:05	20.0 C	00:00
Barometer	1007.8hPa	1009.1hPa	09:55	1006.2hPa	03:50
Bar Trend	Rising Slowly				
Wind Speed	0.9 m/s	3.1 m/s	02:43		
Wind Direction	NW 311°				
Solar Radiation	350 W/m²	355 W/m²	08:20		
UV Radiation	4.5 Index	4.6 Index	08:02		
12 Hour Forecast	Mostly cloudy and cooler. Precipitation possible within 12 hours, possibly heavy at times. Windy.				

Wind	2 Minute	10 Minute
Average Wind Speed	0.7 m/s	1.3 m/s 3.1 m/s

Farmers are not interested on what will happen 30 years from now, they are more concerned with what will happen tomorrow, and the next three days, and maybe the farthest that they would be thinking of is whether the dry season or wet season will come sooner or later than expected.

Our goal here is to develop our capacities at the local level how to interpret. We are not going to be forecasters but at least have an appreciation, understanding, and inclination not just/only related to agriculture but at least with risk management.

The normal rain fall of each province is different if it says that the rainfall in Masbate from February to March is above normal, it does not mean that it will flood there. It means that it is raining. The same case when we are talking about Sorsogon, it is naturally rainy in Sorsogon, December—more than 500 ml. When we say it is below normal in Sorsogon, it is still rainy. It depends on the actual/average rainfall of each province. So, be careful on the terminologies above normal and below normal.

MODULE IV
Participatory Monitoring and Evaluation for Disaster Risk Reduaction and Climate Change Adaptation in Agriculture

Participatory monitoring and evaluation for DRR and CCA in agriculture is both a tracking/documenting tool that evaluates results and a learning process that draws lessons on institutional and policy process. It is done in order to determine if a particular option should be prioritized or replicated. This module covers what are to be considered in the monitoring and evaluation process and how are data gathered if M&E is conducted with relevant actors in the community.

Objectives

At the end of the module, the learner should be able to:

1. Describe the scope, purposes, frameworks and concepts of participatory M&E
2. Demonstrate how baselines are defined and measured
3. Enumerate criteria and indicators
4. Discuss data gathering methods
5. Frame contributions to resilience
6. Discuss externalities and ancillary impacts

Methodology

Lecture – discussion

Session 1: Concepts in Participatory Monitoring and Evaluation for Disaster Risk Reduction and Climate Change Adaptation in Agriculture

Arthur Estrella, Ph.D.
Director for Research
Central Bicol State University of Agriculture

Vladimir R. Foronda
Director, Information and Communication Technology
Central Bicol State University of Agriculture

Goal of Participatory Monitoring and Evaluation

The goal of participatory monitoring and evaluation is to develop a resilient farming villages by reducing the vulnerability of people and their respective community to hazards by improving their capacity to anticipate, cope with and recover from the socio-economic impacts of disaster.

Monitoring and Evaluation

Monitoring is a continuing function that aims primarily to provide the management and main stakeholders of an ongoing intervention with early indications of progress, or achievement of results. Meanwhile, evaluation is "an assessment, as systematic and objective as possible, of completed project or policy, its design, implementation and results (Outputs and Outcomes)".

Inputs	***Activities***	***Outputs***	***Outcomes***	***Impact***
• The financial, human, and material resources used for the development intervention. • Technical Expertise • Equipment • Funds	• Actions taken or work performed. • Training workshops conducted	• The products, capital goods, and services that result from a development intervention. • Number of people trained • Number of workshops conducted	• The likely or achieved short-term and medium-term effects or changes of an intervention's outputs. • Increased skills • New employment opportunities	• The long-term consequences of the program – may be positive and negative effects. • Improved standard of living (Contribution to the Society)

Criteria Used for Evaluation and Monitoring

- ***Relevance*** – Do the objectives and goals match the problems or needs that are being addressed?
- ***Efficiency –*** Is the project delivered in a timely and cost-effective manner?
- ***Effectiveness –*** To what extent does the intervention achieve its objectives? What are the supportive factors and obstacles encountered during the implementation?
- ***Impact –*** What happened as a result of the project? This may include intended and unintended positive and negative effects.
- ***Sustainability –*** Are there lasting benefits after the intervention is completed?

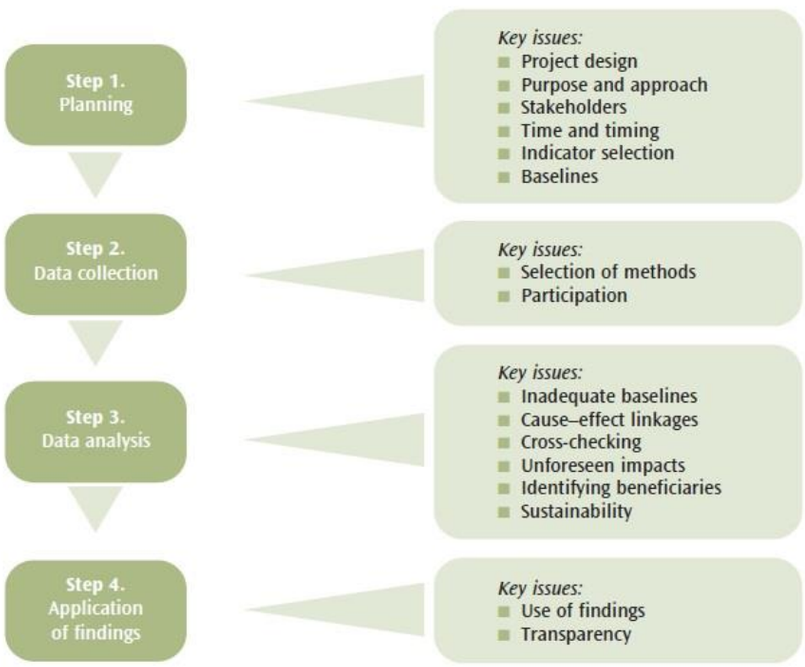
Value of Doing Monitoring and Evaluation

- Determine how a project or program progressed
- Improve future policy, programs and projects through feedback of lessons learned
- Seek to learn lessons from their work and incorporate them into policy and practice
- Organizational learning (through evaluation) is a prerequisite for knowledge transfer between agencies
- Means of retaining and building institutional memory (contribution to the society)

Components of Evaluation in DRR Initiatives

Thematic area	*Main components*
Governance	■ Policy and planning ■ Legal and regulatory systems ■ Resources and capacities ■ Integration with development ■ Institutional mechanisms, capacities and structures ■ Political commitment ■ Accountability and participation
Risk assessment	■ Hazards/risk data and analysis ■ Vulnerability and impact data/indicators ■ Early warning systems ■ Scientific and technical innovation
Knowledge and education	■ Information management and sharing ■ Education and training ■ Public awareness ■ Learning and research
Risk management and vulnerability reduction	■ Environmental and natural resource management; climate change adaptation ■ Sustainable livelihoods ■ Social protection ■ Financial instruments ■ Structural and technical measures ■ Planning regimes
Disaster preparedness and response	■ Organisational capacities and coordination ■ Preparedness and contingency planning ■ Emergency response mechanisms ■ Participation and voluntarism

Steps in Evaluating Disaster Risk Reduction Initiatives



Critical Factors for a Successful Momitoring and Evaluation in Disaster Risk Reduction

- Realistic and practical planning, with clear aims and objectives.
- Adequate resources (time, personnel and budget) allocated to M&E in project planning.
- Use of a mix of data collection methods that are appropriate to the project and the aims of the evaluation.
- Involvement of key stakeholders, especially beneficiaries, in evaluation – as genuine participants in the process, not merely providers of information.
- Identification and selection of relevant indicators, which demonstrate impact as well as cause–effect relationships between project processes (activities and outputs), outcomes and impact.
- Recognition that project benefits may not be shared equally; identification of impacts on different sections of the community.
- Application of lessons learned to improve practice and project or institutional policies.
- Sharing of findings with other stakeholders.

Selecting Indicators for Monitoring and Evaluation

- Indicators are objective ways of demonstrating that progress is being made. Indicators can be quantitative or qualitative.
- Selection of appropriate indicators is central to project design and evaluation. They can be used to assess progress and outputs or outcomes and impact, relating to the project's aims and objectives.

Sample of Results-based Framework for Disaster Risk Reduction

Program Goal– Reduced national disaster vulnerability of urban populations, infrastructure, lifeline facilities and shelter in Asia; (Asian Urban Disaster Mitigation Program)

Program Objectives – Establishment of sustainable public and private sector mechanisms for disaster mitigation in Asia;

Indicators:

- 1 Number of operational plans developed with resources identified by national collaborating institutions to carry out mitigation measures after demonstration activities end;
- 2 Number of replications or adaptations of mitigation skills and procedures promoted in AUDMP demonstration activities by other organizations, communities or countries in Asia;
- 3 Amount of investment from non-AUDMP funding sources attracted by program and demonstration activities; and
- 4 Number of households potentially benefiting from AUDMP-sponsored activities to reduce disaster vulnerability.

Result No. 1 – Improved capacity of municipal officials to manage risk and apply mitigation skills and technologies

Indicators

1.1 Number of new or improved assessment methods and guidelines/standards used for public and private sector development

1.2 Number of emergency preparedness and response plans written or revised to reflect improved information on hazards and vulnerability

Result No. 2 – Improved access to hazard mitigation information and skills (e.g., techniques, methodologies, experience) throughout the region

Indicators

2.1 Percent of public and private sector professionals with AUDMP-initiated disaster mitigation training who are employed and using knowledge gained in fields impacting disaster management or urban development

2.2 Number of institutions where AUDMP initiated training and professional development course modules are institutionalized

2.3 Level of participation in the AUDMP regional information and contact network

Result No. 3 – Improved policy environment for disaster mitigation

Indicators

3.1 Number of policies established or revised to facilitate action, regulation, enforcement and/or incentives

Data Collection Methods for DRR Evaluation

Formal surveys of beneficiaries and other stakeholders

- Survey of builders and occupants of hazard-resistant housing to ascertain application of skills and increased security
- Household survey on food production, availability, concumption and marketing to identify patterns and shifts in vulberability

Structures and semi-structured interviews with staff, partners, beneficiaries and other stakeholders

- Individual stakeholder interviews building-up picture of level of understanding of the project, agency – community working relationships, effectiveness of coordination mechanisms and outcomes of DRR interventions

Group discussion with stakeholders, especially beneficiary communities (e.g. participatory workshops, focus groups)

- Beneficiary workshop to identify and assess benefits to particular DRR interventions and unforeseen impacts
- Expert workshop to assess potential effectiveness of new DRR methods or approaches
- Feedback workshop with beneficiaries and other stakeholders to test/confirm evaluation findings

Rapid assessments

- Post-disaster telephone or field survey to indicate effectiveness of warning and response mechanisms and factors affecting them

Direct observation and visual survey

- Visual surveying of structural mitigation measures to determine quality of design and workmanship, take-up of technologies or techniques – disaster resilience inferred from this or assessed through post-diaster surveys

- Observation of coping strategies and other risk-reducing behavior – before, during and after disasters

Case studies

- Personal or group accounts of use of skills, materials and organizational capacity acquired from disaster management training courses during subsequent events

Simulations

- Group simulation or exercises (table-top or field) or disaster management activities or responses to disaster events, to test plans, skills, equipment, etc.

Documentary evidence

- Content analysis of educational material on risk reduction and management produced by project
- Quantitative and qualitative data about project delivery, effectiveness, impact and cost, from project documentation
- Secondary data collection to complement or validate information collected by the evaluators in the field

Participatory Mode and Other Approaches

- Adoption of a participatory approach does not prohibit the use of more formal, extractive data collection methods such as secondary data, project documentation, questionnaire surveys and formal interviewing.
- These can complement information gathered through participatory processes or help to validate it.
- Each method should be selected according to its value in helping to understand the project's impact.

Session 2: Considerations for Assessment, Monitoring, and Evaluation for Results – based Adaptation Planning

Robert Sandoval Jr., Ph.D.
Climate Change and Food Security Specialist
Food and Agriculture Organization of the United Nations

Assessment, monitoring and evaluation are integral parts of climate change adaptation planning and implementation. They are also **crucial for learning** and for conducting policy reviews. Monitoring and Evaluation activities set baselines, define indicators, measure progress and evaluation successes and setbacks in adaptation interventions

Overview of the Planning, Monitoring, and Evaluation in Learning Cycle

- Conceptualization—risk and hazard assessment
- Preparation and appraisal
    - Identifying contribution to adaptation—increasing adapting capacity, training, providing alternative income/livelihood, linking to insurance; or, inputs to good practice options (training + fertilizers/multi-stress tolerant varieties); or, long term sustainability in a long term change, training after two years for additional skills to diversify farming systems. what we can do with the limited resources
    - Forming an adaptation hypothesis in theory of change—outlining possible good practice options, expected benefits, changes, and expected benefits, outcomes and incomes
    - Developing adaptation associated indicators—if we know our good practice options we can make excellent indicators physical, inputs.
    - Developing results based management— We should also consider the number of females/males, were the farmers able to follow instructions in applying fertilizers, what are the application methods of the fertilizers, etc. we should always focus on the results not only table of activities, financial breakdowns, and number of trained
    - Carrying our appraisal—while finalizing, we should review the design, and feasibilities, efficiency, and safeguards. They should not cause additional problems
- Implementation of adaptation actions
- Evaluation

Learning as an Important and Continuous Process in Monitoring and Evaluation

- Promotion of participatory planning methods
- We get data from lessons learned
- Learning helps build a sense of ownership
- Because of the uncertainties of climate change feedback is important from learning because it helps in adaptation management. If there is an uncertainty and our approach is participatory, we have feedbacks and learning that we can use to easily adjust the good practices
- To adjust in line to hazard and new risks

Challenges Particular to Climate Change Impacts and Adaptation Assessment, Monitoring and Evaluation

1. ***Definition and goals***—what will we call the CSFFS, climate resilient, climate proof, etc.
2. ***Multicultural issues and engagement to stakeholders***—internal dynamics in the community, political dynamics, support from NGOs, LGUs
3. ***Scales, axillary and facts***—unintended defects
   - *Negative externality*—ex. Misunderstanding between farmers regarding the water. Those downstream cannot access water because of the misunderstanding. There are those suffering from other peoples' actions. E.g. You give too many seeds and too much fertilizer
   - *Positive externality*—if the farming communities upstream are organized, and those downstream can access water. Others benefit from your actions
   - *Time scale*—timing of monitoring and evaluation
     E.g. How are you going to evaluate an agroforestry good option if you planted coffee and you can evaluate it after you can harvest in 3 years compared to vegetable and rice production. Leading indicator: sapling survival rate. Medium term, long term vs. immediate
   - *Evaluating CCA and DRR option without relying on the yield performance/income:*
     - Technological suitability
     - Agriculturally/ecologically sound
     - Environmental profits
     - Socio-cultural, economic acceptability
4. ***Availability of data and information***
   - Be careful with data overload (e.g. too much information with too little useful analysis); maximize use of existing systems;
     - E.g. using existing data from other activities for M&E, AESA FFS results to be used as indicators
     - E.g. Dealing with climatic/weather data availability issues
5. ***Working with uncertainties***
   - Uncertainty is to be managed—understand the nature of the uncertainty and resulting limitations
   - Take account of uncertainties and be flexible in planning adaptation strategies that withstand unpredictable futures in a robust way (e.g. by complementing it with robust bottom-up assessments and no-regrets options)
   - Assumptions and their sensitivities should be explicitly stated and communicated
     E.g. GCM choice and downscaling methodology; just two seasons of CCA testing versus more seasons, etc.
6. ***Attribution difficulty***
   (Up to what degree is it possible to attribute results to a project intervention rather than to other external causes?)
   E.g.: i) is the increased adoption of CSA forestry practices a direct result of the project or intervention, or is it influenced by a larger programme or other external activities? ii) is the decrease in the number of people living below the poverty line may be due to migration or wider economic forces?
   - Can be addressed through robust sampling when setting baselines and use of control areas (e.g. not covered by other projects, etc.)
7. ***Inadequate capacity for assessment and monitoring and evaluation***
8. ***Practicality of Methods and Tools***

MODULE V
Climate –Smart Agriculture and Good Practice Options

In Module 1, it was established that the goal of food and nutrition security is to ensure stability in the availability, access and utilization of food. At both global and local levels, this means that quality and diverse food should be available and accessible to everyone and anywhere physically and economically. However, even if this is attained at present, its future may be not be secured given the present consumption pattern and population growth of people and the direct and indirect impacts of climate change to agricultural food production.

It is also a fact that while agriculture is one of the sectors vulnerable to climate change; it is also significantly contributing to the emission of greenhouse gases from land use/ conversion and production inputs (fertilizer, energy, and livestock).

Hence, integrated systems and sustainable intensification and resource efficiency in agricultural production is needed. Climate-smart agriculture as an approach enables this while attaining sustainable agricultural development under climate change.

Objectives

At the end of the module, the learner should be able to:

1. Explain the concept of climate-smart agriculture
2. Discuss improved technologies and approaches in crop production, forestry and fisheries
3. Describe institutional support needed for climate-smart agriculture

Methodology

Lecture – discussion

Session 1: Introduction to Climate-Smart Agriculture and Good Practice Options

Robert Sandoval Jr., Ph.D.
Climate Change and Food Security Specialist
Food and Agriculture Organization of the United Nations

Edgardo B. de la Torre
Field Extension Worker
Freelance Consultant

Climate—Smart Agriculture is just an application of the concepts learned and discussed and its applications on good practice options that is needed to be identified in the farming bulletin, mitigation plan and the drafting of the DRRM plans. Because there are so many efforts regarding adaptation to climate change, there are many organizations involved, there are also many concepts or branding of approaches toward climate change adaptation that are being brought out.

For example, FAO promotes climate—smart agriculture but one of its division also promotes the save – and – grow concept. When analyzed, both have the same purpose—the efficiency of use of resources, the use of stress tolerant varieties, etc. The only difference is the terminology.

The term "climate—smart" does not literally want to outsmart the climate. Climate—smart is used because we want to consider the climate in such a way that we change our practices to address the uncertainties of climate change.

Climate—Smart Agriculture, as proposed by FAO is agriculture that sustainably increases productivity, resilience; reduces or removes greenhouse gases and enhances achievement of national food security and development goals.

When we evaluate the key words, we find out that "increases productivity" means increase in productivity given the uncertainties of climate variability and climate change. We already talked about resilience earlier.

"Reduces or removes greenhouse gases" in the context of agriculture in developing countries is not that much of a requirement. There might be a practice wherein one could help in the reduction of greenhouse gases such as minimum tillage, the productivity of the farm might be jeopardized or compromised. The context of the phrase is to promote practices that can produce co—mitigation benefits. Mitigation is not the real focus but it is better if there are good practice options that can be taught to the farmer, which is not costly and won't compromise his/her productivity but can reduce greenhouse gas contributions. Some international agencies call this the pro—poor mitigation/mitigation co-benefits (help the farmer use practices that can reduce greenhouse gas emissions, but we won't push them too hard or not cause them to be poorer).

Simply, there are four major components or concepts underlying Climate—Smart Agriculture based on the concept of promoting synergy. These are as follos:

1. Adaption of sustainable crop verieties – experimenting and testing other varieties and crops that can be planted
2. Farming system adjustment – improving trainings

3. Crop diversification – diversifying agriculture systems at par with risks (when you diversify, you spread the risk). *You have a high risk because you only plant rice, but when you have other crops; your risks are being spread out. If you are going to have a failure with rice, you have other crops that you can depend on. You are not only dependent on one. Inter-cropping is the underlying principle of spreading the risk. If you are going to be hit by a hazard, the negative impact will be lessened because of diversification.*
4. Diversifying agriculture systems—the other models used in diversifying agriculture systems is the rice and corn, apiculture, homestead gardening, among others.

The basic premise of Climate—Smart agriculture is its formalized definition. There are already many practices that are being done in the field that already adhere to the principles of climate—smart agriculture. Having this label facilitates easy communication and increase the acknowledgement to the fact that the agriculture sector is doing something.

Identified Portfolio of Upland Good Practices Options against Strong Wind, Typhoon, Continuous Rain, Flash Flood and Drought

1. Strip cropping
2. Mixed cropping
3. Small farm reservoir (SFR)
4. Wide row spacing for rainfall multiplication
5. Tillage practices (zero and minimum tillage)
6. Coconut leaf pruning
7. Sloping Agricultural Land Technology (SALT - 1)
8. Vetiver grass technology
9. Alley cropping

Identified Portfolio of Lowland Irrigated Good Practices Options against Floods/Flashflood, Typhoon and Saline Intrusion

1. Early - Maturing Rice Varieties
2. Submergence Rice variety (NSIC Rc-194)
3. Salt - tolerant Rice variety (NSIC Rc-108)
4. Timing of planting/Ratoon
5. Rice + Duck Farming Systems
6. Rice + fish farm system
7. Synchronized planting/controlled irrigation
8. Floating garden

Session 2: Sustainable and Organic Agriculture Systems for Climate-Smart Agriculture

Carmelita N. Cervantes, Ph.D.
Assistant Professor IV
Central Bicol State University of Agriculture

The Philippine Sustainable Agriculture Coalition (PhilSAC), the UPLB Sustainable Agriculture R & D Committee and CBCP-NASSA SA Network defines sustainable agriculture as a philosophy, system, method, technique and technology of production that makes agriculture ecologically sound, economically viable, socially just and humane, culturally appropriate and grounded on holistic and natural science.

Ecological Principles in Farming

- ***Diversity is the Law of Nature*** – Nature consistently integrates plants, animals, microorganisms into a diverse landscape. Conversion from simple monoculture to a higher level of diversity
- **Keep the soil covered, all the time** – Under natural conditions, the soil remains covered with living and non-living plant materials that prevents and moderates temperature extremes, increases water penetration and storage, and enhances soil aeration and to protect the living soil.
- ***Stir, not invert the soil*** –The top soil layers contains most of the soil organic matter and a broad diversity of soil organisms. Deep plowing and turning over of the soil using a moldboard plow will cause considerable damage to the soil and disrupts the natural soil ecology.
- ***Recycle and utilize available local resources*** – Through decades of promotion and over reliance on chemical fertilizers, many farmers have taken for granted locally available resources that could be used for production.
- ***Recycle and utilize available local resources*** – Through decades of promotion and over reliance on chemical fertilizers, many farmers have taken for granted locally available resources that could be used for production

Lessons Learned from Organic Farming Communities

Communities and farming families have:

1. High dependence on external production system;
2. Low cropping diversity and livelihood mix;
3. Poor access to financial and technical support; and
4. Poor resiliency against stresses.

The System of Rice Intensification (SRI) Success Story

The SRI is a good practice option that is characterized by planting of early with 1 seedling per hill, a wider spacing of 25 cm x 25 cm and more. Intermittent flooding is flooding is practiced including rotary weeding and organic fertilization. One of the success stories is that of Sumant Kumar of India who harvested a total of 448 cavan/ha. In the Philippines, the highest recorded yield is 336 cavan/ha. The average yield under Bicol region condition is 105 cavan/ha.

Session 3: Developing Sustainable and Inclusive Food Value Chains

Hanilyn A. Hidalgo
Director, OSAS
Central Bicol State University of Agriculture

Value in business is opportunity that allows consumers to enjoy choices, convenience, comfort, and sophisticated products and service.

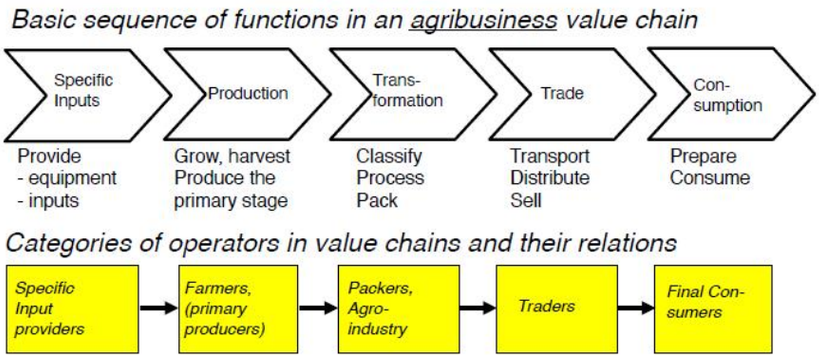
Value Chain

Value chain is value is added to preliminary products through combination of other resources. Hence, as the product passes through several stages of the value chain, the value of the product increases.

Value Chain Process







Value Chain Development (VCD)

The value chain development (VCD) is all about making the consumer/customer at the end of the chain happy. It is all about improving cooperation and coordination along the chain. The question is what can local stakeholders do, to make their sector more competitive and integrate it into value chains and market? The consumer is king! The market has very specific requirements that are often not known to local stakeholders. Compliance with market requirements and demand conditions is an important precondition for local enterprises and sectors to successfully integrate themselves into markets and become more competitive.

The aim of VDC is to find out market requirements, compliance of local business stakeholders, reason of compliance, and how do they meet these requirements. The local VCD also aims to put the local sector in a better position compared to competitors. These competitors often would be located in different regions in the same country.

Five Triggers of Value Chain Development

These are system efficiency, product quality and specifications, product differentiation (competition), social and environmental standards, and enabling business environment.

Session 4: Climate-Smart Forestry

Aries O. Ativo
Instructor
Central Bicol State University of Agriculture

Synergies of Agriculture and Forests

The forest is composed of both timber products and non-timber products. It is the home of rich fauna and most indigenous peoples. However, as a resource base, it is being pressured by the following activities: clearing vast tracks of forest lands for agricultural purposes, timber poaching, resource extraction, and upland migration.

Deforestation is the largest contribution of agriculture to climate change. Thus, agriculture must be managed not to be just to be Climate-Smart but also to be Forest-Smart as well. Food security must reconcile with environmental conservation. This is when the role of forest in the agricultural sector must not go unnoticed.

What Must Be Done

1. Stop forest conversion
2. Engage in watershed management
3. Promote the landscape approach which focuses not just on the productive capacity of the forest but also look into its protective capability.
4. Involvement and empowerment of indigenous peoples and other migrants

MODULE VI
Communicating Climate Change Smartly

Knowledge is power but in communication, that power is only realized if the knowledge is appropriate and if it benefits the intended user. This is especially so in communicating climate change. While the popular call is to popularize or 'laymanize' its concepts, it still demands for precision. One minor mistake and it can create misdirection. During extreme weather events like typhoons, weather forecasts disseminated through the media are important in warning the public about impending threats. Farm weather forecasts and fishing advisories if shared widely and appropriately can help prevent losses thereby protecting income. As planners and implementers, it is important to talk about climate change confidently and to put across its concept with clarity and simplicity without necessarily sacrificing information integrity.

This module covers topics that would provide the learner practical tips in communicating climate change and its jargon, strategies for effective advocacy and risk communication.

Objectives

At the end of the module, the learner should be able to:

1. Identify and address information and knowledge gaps among farmers
2. Discuss advocacy strategies
3. Describe risk communication
4. Demonstrate techniques and methods in translation and popularization

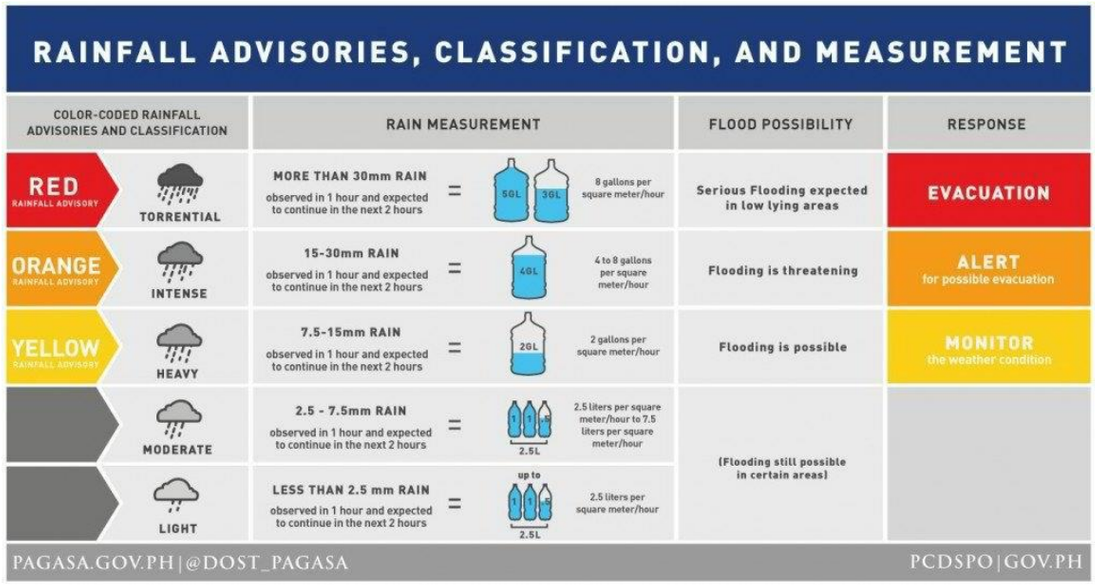
Methodology

Lecture – discussion

Session 1: Risk Communication

Frannie A. Belarmino
Instructor/Public Information Officer
Central Bicol State University of Agriculture

One of the most important lessons after typhoon "Yolanda" was how the word "storm surge" was understood by the people. It clearly points to the importance of communication by first understanding the language being used. This may start by the proper yet simple presentation of advisories such as this color-coded advisory from PAGASA.



Lessons Learned
(Based on previously experienced disaster)

1. ***Poor Communications –*** there were no alternative failsafe systems (e.g. radio, with links to local authorities in primary cities and towns) and there were no backup power systems.
2. ***Public was not adequately prepared*** – there were no plans for worst case scenarios.
3. ***Poor education on hazard information and Early Warning System (EWS) –*** people, particularly local leaders and those in rural areas, have yet to be properly educated about hazards, risks and vulnerabilities.
4. ***Lack of clarity and timeliness –*** information dissemination, its clarification, and call to swift action especially at the local levels, could be done better.
5. ***Slow availability and accessibility of information –*** quick access to information about hazards, risks, and disasters remains to be a huge challenge. Hazard information may be available from PAG-ASA , NDRMC, DSWD, Manila Observatory, Rappler.com, social network sites such as Twitter, Facebook, however, bringing the information to communities-at-risk , especially those in rural areas, is a serious concern because of limited internet connectivity and electric power failure. Availability, accessibility and understandability of information to all stakeholders remain to be issues of concern.

Risk Communication

Risk communication is the process of exchanging information among interested parties about the nature, magnitude, significance, or control of a risk. It can be understood to mean, a process of exchanging and sharing information about climate-related risks between various knowledge holders and decision-makers and the public. It is seen as the cross between managing information and managing meaning during all three stages of prevention, response, and post-crisis learning (Coombs, 2010).

Risk Communication vs. Crisis Communication

Risk communication focuses is on on developing and conveying messages prior to and during an event. On the other hand, crisis communication focuses on doing so post-event. A crisis is a specific incident with a short time frame, while a risk is often more nebulous and evolves over time. Risk communication tends to utilize messages from experts and scientists while crisis communication typically utilizes messages from authoritative figures.

Why Communicate about Risks

The emphasis on shared choice and informed decision-making where those directly at risk are involved in making choices as to the most appropriate and desirable course of action. It is important to communicate that there are more than one adaptation option available and that each option has different risk and benefit profiles (not to mention costs) and long lasting consequences. Risk communication is critical to fostering the learning needed to address the challenges of climate change, to build new knowledge in different people.

Key Considerations for Communicating Climate Change Risks

1. ***Role of community members –*** they are the most effective communicators and motivators for preparedness. Therefore, provide guidance and share information about what actions they have taken against risks
2. ***Community engagement –*** this is to achieve knowledge generation and sharing, higher understanding, sense of commitment, sense of stakeholder ownership, and engendered capacity for action. The process involves two-way participatory dialogue between the communicators and the receivers and workshops and learning sessions encourage learning and exchange of knowledge. This process of social learning will promote the development of strategies that are relevant (in the context of the receiver) and effective.
3. ***Multiple sources and channels -*** preparedness information must come from multiple sources and frequent repetition. People are more likely to follow evacuation messages when they received multiple warning messages over diverse communication channels. Multiple messages should be crafted to reach multiple publics. Integral use of social media pre-crisis can increase resilience of publics. Traditional and social media should work together, as necessary supplements to one another.

    Traditional media utilizes interactive communication strategies such as theatre, role-play, music and group discussions. Community members are involved in debating climate risks and possible solutions to cope with climate change

Print and broadcast media utilizes TV and radio broadcasts (national and regional levels), reports, concept notes, brochures, magazines, and formal presentations and workshops (policy makers at the local and national levels).

4. ***Receptiveness –*** the short period of time following an event is when people are most receptive to preparedness messages. This is considered a "window of opportunity" because "traumatic experience can be the best motivator to prepare for future disasters" (Mileti, Bourque, Wood and Kano, 2011).

5. ***Risk Judgement –*** experiential precedes the analytical. Strong emotional experiences related to hazards may increase the public's perceptions of risks. It is important to involve community members in disseminating preparedness messages, ensure that information come from multiple channels and repeated often, and understand how public's perceive risks prior to disseminating risk messages.

Myths in Public Warnings

Myths	***Reality***
Myth #1: The public is prone to panic	• It is rare for individuals to panic until they believe there is no escape from a life-threatening situation (Wessely, 2005). • However, the public can adapt their behaviors to expose themselves and others around them to a greater risk than the original hazard they seek to avoid. This is often referred to adverse avoidance and adaptive behaviors (Sheppard, 2011).
Myth #2: The need to keep messages simple	• The concept of keeping messages short and simple applies to advertising, not public warnings; otherwise warned people will become "information starved" (Mileti, 2010, p. 35). • If the warning does not contain sufficient information, individuals will seek out information from alternative sources, and confusion may result (Mileti, 2009).
Myth #3: The dangers of crying wolf	• False alarms can be productive for future response if explained although people can ignore sirens if they are sounded or tested frequently (Mileti, 2009).
Myth #4: Public's general willingness to respond to warnings	• A single warning is not sufficient to get people to believe and respond and poorly crafted warnings and lack of understanding of how the public may respond to a warning will undermine a warning's effectiveness.

Bridging the Gap

Understanding local context and local perceptions on climate risk – risk communication strategies have to be reflective of the social and cultural norms under which the receivers operate.

Acknowledge local know-how on climate risk – conduct assessments that determine the baseline status of stakeholder knowledge on climate risk, understand the local perceptions on climate risk, and determine the sources of knowledge within the communities.
Assess knowledge at community level – can be conducted through household surveys and participatory group discussions. Knowledge assessment of policy makers can be conducted through individual meetings, interviews and formal workshops.

Advocacy Strategies

Advocacy is about is about persuading people to make changes that improve conditions for vulnerable people. It is about speaking for others, working with others and supporting others to speak for themselves, and taking community voices to a different level of decision making.

The people themselves know the risks that they face. They must be primary actors in advocacy efforts. Neglecting risk reduction leads to more deaths and damage. There is a moral obligation to prioritize risk reduction. Climate change is unavoidable and the risk of climate-related disasters is ever increasing. We can prepare and we must adapt.

Advocacy process

- Identifying advocacy issues
- Understanding issues and collecting evidence
- Identifying targets
- Tailoring the message for target audience
- Delivering the message
- Monitoring and evaluation

'See + Action' formula

- Simple statement
- Evidence
- Use a personal story as an example, illustrating your case with a human element
- Put your message into action

Elements of Climate-Risk Information

1. ***Salience –*** timely and suitable for the context, meets a need
2. ***Legitimacy –*** limited bias from sender and acceptance by receiver
3. ***Credibility –*** trust and track record of demonstrated ability and consistency
4. ***Value –*** contributes to understanding
5. ***Adequacy –*** covers sufficient information
6. ***Effectiveness –*** can be successfully utilized

Communication Challenge

The language around risk associated with climate change is fairly new and is in many ways still evolving, which makes risk communication particularly tricky. The audience may not be familiar with climate risk terminology and risk analysis methodologies. Also, it is a challenge to convey meaning between people with different knowledge domains and attitudes, based on their type and level of education, area of work, cultural references, belief systems, etc. Other barriers to

effective communication are inaccurate interpretation, selective perception, linguistic impact (**style, tone and speed in which the message is delivered)**, and semantics (**different meanings attached to the same word by the sender and receivers).**

Session 2: Techniques and Methods in Translation and Popularization

Frannie A. Belarmino
Instructor/Public Information Officer
Central Bicol State University of Agriculture

Making the message clear is simply transforming complicated scientific and technical information into communication materials that your audience can relate to and understand.

Simple Tips to Keep in Mind

1. ***Know your audience***
   - Identify the intended audience and define the key problem/s or interest/s
   - Get to know the intended audience to help determine their key characteristics

2. ***Determine key messages***
   - Determine the best way to communicate messages to the audience (i.e., print, audio, video)
   - Determine how to distribute the materials to your audience
   - The key messages should be clear, relevant and appropriate

3. ***Give the most important information***
   - Tell them what actions to take
   - Explain why it is important to them
   - Limit then number of messages
   - Stick to one idea at a time

4. ***Consider culture***
   - Culture affects how people understand and respond to messages
   - Culturally appropriate materials engage members of the target audience early on in the communication planning phase.

5. ***Use terms that your audience uses and/or is comfortable with***
   - Groups may have different needs, values, and beliefs that will affect how they interpret your message

Taking the Message Further through Translation

Messages that work well with an English-speaking audience may not work for audiences who speak another language. Hence, developing a material in the language in the language of the audience is equally important.

Translation involves finding out the audience values, beliefs and cultural perspectives. This can be done through individual interviews, focus groups, or other kinds of audience research,

including secondary research (i.e., literature reviews). Working with the community people in the intended areas provides valuable insight about your audience.

Translating texts is not easy. One-on-one translation exists between the words and phrases of different languages. A good translator is not only bilingual but “bicultural”.

Important Tips in Doing Translations

1. ***Be accurate –*** reproduce as exactly as possible the meaning of the source text.
2. ***Be natural –*** use natural forms of the receptor language in a way that is appropriate to the kind of text being translated.
3. ***Be communicative –*** express all aspects of the meaning in a way that is readily understandable to the intended audience.
4. ***Use back translation –*** Once the material has been translated to the intended language, translate it back to English. (This step should be done by someone other than the original translator.) Check to see if the meaning and tone of the message have stayed the same.
5. ***Field-test materials***

Evaluation Results

The following are the summarized results from the General Evaluation Form answered and submitted by the participants at the end of the training.

1. What I appreciated in the training

- Comprehensive
- Very useful and related to our work
- All topics because these are useful in our CrFS part especially the topic on Farm Weather Forecasting
- Cropping and hazard calendars
- The presenters were very intelligent, factual, and realistic in their presentations
- I learned new information and I appreciated the importance of our food and livestock not just saving lives
- The awareness that not only humans and property are vulnerable to hazards but also the crops of the farmers that humanity are dependent with
- The training provided information that is very important in the field of agriculture. Although some terms are new to me, I am very willing to learn more to be effective in my area of work.
- I appreciated the topics on DRR and CCA, the food served and the accommodation
- The training is relevant to my work. I acquired additional information on DRR and CCA measures that I believe are highly applicable in our locality
- Well-rounded facilitators
- Technical knowledge regarding DRR and CCA in agriculture
- Impacts of DRR to CCA that is useful to my work
- The close coordination and involvement of all agencies especially in the selection of topics presented. The expertise of Dr. Sandoval in the whole aspects of DRR and CCA is very evident. Topics that are not in the original schedule but were inserted during the actual training because of the need of such is very much appreciated.
- It opened further my understanding on climate change, its impact on decreasing food production (crops and animals), the dis-integrated actions of different agencies of the government and the needed political action/ support to solve the impact of climate change.
- Seasonal outlook and advisory/ forecasting

2. What I did not appreciate in this training

- Time is very limited considering that some topics are highly technical and new to some of us
- Lecture delivery is very fast and we cannot catch up. We should have been provided with reading materials before the series of lecture

- Some of the terminologies are hard to understand
- Other terms used were confusing and needs further explanation
- The facilitators are not time conscious
- No good signal for telecommunication
- Remoteness of the venue

3. My suggestions for improvement

- More diagrams and illustrations to have a more concrete presentation of concepts
- More illustrations regarding crop growth in relation to weather condition
- Provide reading materials before the lecture proper
- Training must start on the scheduled time
- Spacious venue and working tables
- Accessible signal for telecommunication (e.g. Smart signal)
- Give more presentations of good practices from other areas and communities
- More time allotment for workshops

4. Suggested topic for the future

- CC mitigation in agriculture
- How to determine the level of toxic gases in our environment and how will the crops respond to these toxic GHG
- Other relevant topics so that we will be able to translate well the new information to the farmers
- Topics that gives additional knowledge in the preparation of CCA and when calamities arise
- Active or past disasters and documentation of lessons learned giving emphasis on timeline, interventions and impacts to the beneficiaries

5. My assessment on the following items

PARTICULARS	JUST RIGHT	NEEDS IMPROVEMENT	REASON IF ANSWERED "NEEDS IMPROVEMENT"
Time allocation per session	10	9	• We need actual 'exposure' to the topics • Topics are still new so time allotment should be longer • Participants are not advised to shorten their workshop output presentation
Duration of the training	17	2	• Extend duration

6. My overall rating for this training/ activity

1- P *(poor)*
2-F *(fair)*
3- S *(satisfactory)*
4- VS *(very satisfactory)*
5- E *(excellent)*

COMPONENT	P 1	F 2	S 3	VS 4	E 5
a) Meeting of my expectations			2	15	2
b) Attainment of the training objectives			5	11	3
c) Course Content/ Topics			3	14	2
d) The SLEs and workshops included			5	12	2
e) Methodologies used			4	14	1
f) Delivery		1	4	11	3
g) Choice of resource persons			3	13	3
h) Training management team			3	12	4
i) Training facilities and services		3	3	9	4

<u>Other remarks from the daily evaluation forms submitted</u>

- Be sensitive to your participants. Give energizer if you notice that the discussion is already dragging.
- Simplify things in an approachable way in order for the participants to get a clearer focus. Also, please be sensitive; it is not appropriate to make “green jokes”. There are some other ways to make the participants laugh.
- It would be good if participants will have a hands-on exposure to AWS and actual weather observation (outside the training hall). The lecturer also failed to identify cloud formation that creates rain.

Links to Online Reference Sources

Module	*Reference Title*	*Online Link*
Module I	**Raihan, M.S., Huq, M.J., Alsted, N.G., Andreasen, M.H**. 2010. *Understanding climate change from below: practical experience and learning from a community-based adaptation project in Bangladesh*. ActionAid Bangladesh (AAB). Dhaka, Bangladesh. Pp. 7-11, 18-19, 23-25, 29-35, 46, 53	http://indiaenvironmentportal.org.in/files/understandingccfrombelow.pdf
	FAO. 2008. *Climate change and food security: a framework document.* Pp. 1-12, 20-41	http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf
	FAO. 2011. *Resilient Livelihoods – Disaster Risk Reduction for Food and Nutrition Security Framework Programme.* Pp. 2-34,	http://www.fao.org/docrep/015/i2540e/i2540e00.pdf
	Ministry of Agriculture and Cooperatives – Nepal. 2011. *Priority framework for action – climate change adaptation and disaster risk management in agriculture.* P. 3	http://www.fao.org/docrep/015/an713e/an713e00.pdf
	FAO Online. *Planning for Community based adaptation to climate change.* Module I – II	http://www.fao.org/climatechange/24444-0ed5117aa4b7b6355bca46e0cf60eb161.pdf
Module II	**FAO Online.** *Planning for Community based adaptation to climate change.* Module III: Session 5	http://www.fao.org/climatechange/24444-0ed5117aa4b7b6355bca46e0cf60eb161.pdf
	Locatelli, B., Herawati, H., Brockhaus, M., Idinoba, M., Kanninen, M. 2008. *Methods and tools for assessing the vulnerability of forests and people to climate change.* Working Paper No. 43. Center for International Forestry Research (CIFOR) and Agricultural Research Center for International Development (CIRAD)	http://www.cifor.org/publications/pdf_files/WPapers/WP43Locatelli.pdf
	CARE International. 2009. Climate vulnerability and capacity assessment handbook.	http://www.careclimatechange.org/cvca/CARE_CVCAHandbook.pdf

	Asian Disaster Preparedness Center. 2005. Training modules for climate and flood forecast applications in agriculture.	ftp://ftp.fao.org/docrep/fao/008/af967e/af967e00.pdf
Module III	**FAO. 2008.** *Climate change and food security: a framework document.* Pp. 71-73	http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf
	FAO-AMICAF. 2013. *National institutional analysis workshop on mainstreaming climate change adaptation (CCA) and disaster risk reduction (DRR) into agriculture and related sectors.* Workshop proceedings	Check e-copy with PMO
	FAO. 2011. *Resilient Livelihoods – Disaster Risk Reduction for Food and Nutrition Security Framework Programme.* Pp. 38-45	http://www.fao.org/docrep/015/i2540e/i2540e00.pdf
	United Nations Development Programme. 2010. Gender, climate change and community-based adaptation. UNDP, New York.	http://www.gender-climate.org/Content/Docs/Publications/A35_undp_Gender_Climate_Change_and_Community_Based_Adaptation.pdf
	CGIAR, CCAFS, FAO. 2012. Gender and climate change research in agriculture and food security for rural development. Training Guide.	http://www.fao.org/docrep/015/md280e/md280e.pdf
	FAO Online. *Planning for Community based adaptation to climate change.* Module III	http://www.fao.org/climatechange/24444-0ed5117aa4b7b6355bca46e0cf60eb161.pdf
Module IV	**FAO Online.** *Planning for Community based adaptation to climate change.* Module IV	http://www.fao.org/climatechange/24444-0ed5117aa4b7b6355bca46e0cf60eb161.pdf
	FAO - MDGF 1656 Outcome 3.1. 2012. *A framework for monitoring and evaluation of good practice climate change adaptation options in agriculture*	E-copy with RC Sandoval
Module V	**FAO.** 2013. Climate-smart agriculture: sourcebook	http://www.fao.org/docrep/018/i3325e/i3325e.pdf
	FAO. 2011. *Climate-smart agriculture: smallholder adoption and implications for climate change adaptation and mitigation*	http://www.fao.org/docrep/015/i2575e/i2575e00.pdf
	FAO. 2012. *Mainstreaming climate-smart agriculture into a broader landscape approach*	http://www.fao.org/docrep/016/ap402e/ap402e.pdf
Module VI	**FAO. 2008.** *Climate change and food security: a framework document.* P. 34	http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf