

# Towards a Climate-smart and Resilient Agriculture in the Philippines

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# Outline of Presentation

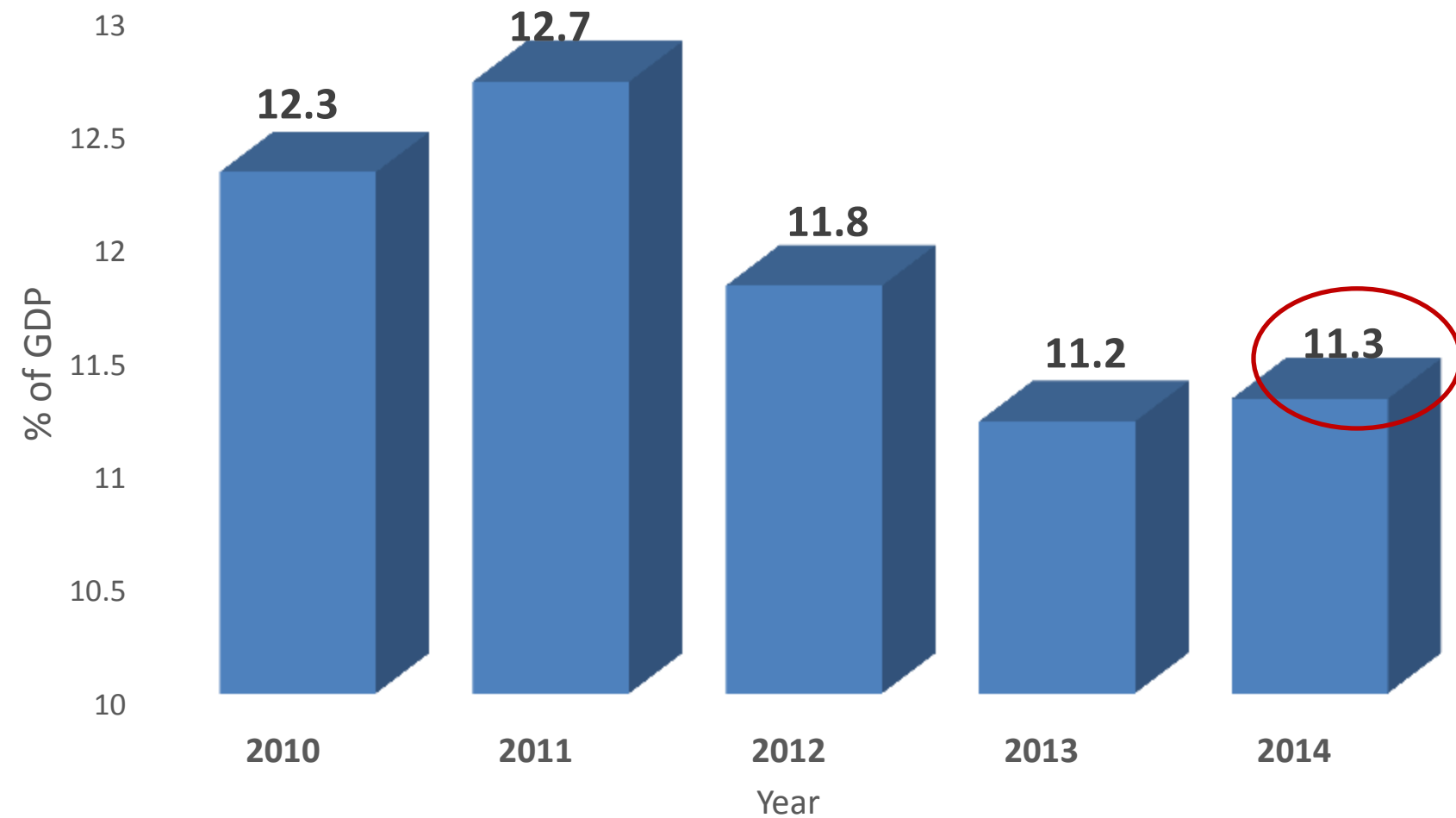
- Factors affecting sustainability of agriculture
- Climate hazards threatening agriculture and food
- Effects and impacts of climate hazards on crops and livestock
- Responses and interventions to climate hazards
- Issues and challenges to climate-smart agriculture

# Agriculture accounts for about 11.3% of GDP

*(The World Bank)*



Value Added (% of GDP) from Agriculture Sector





# 25.8%

## Poverty Incidence

*(1<sup>st</sup> Sem 2014, NSCB)*



## About **57%** of the poor are in the agricultural households

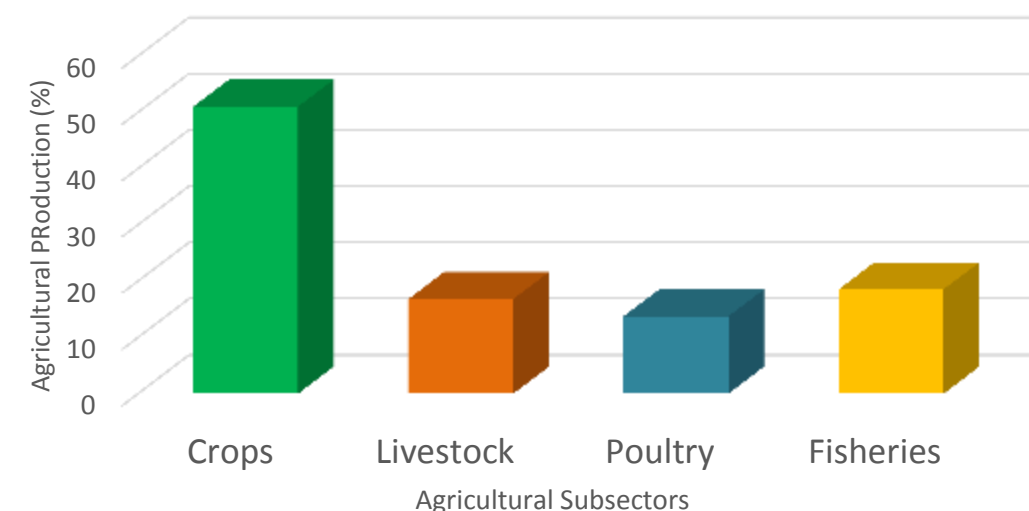
*(FIES, NSO/PSA)*





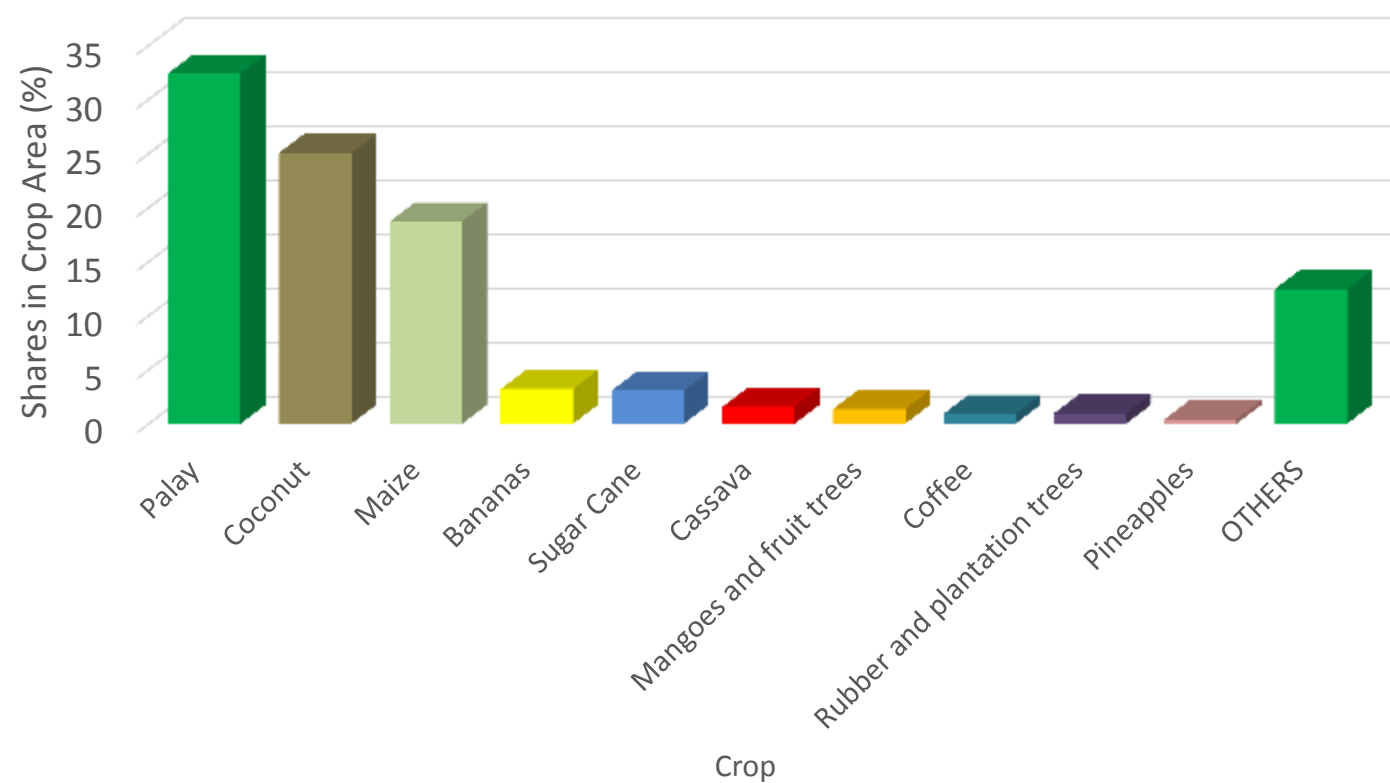
# Shares of Agricultural Subsectors to Total Value of Agri-Production

Agricultural Subsectors	2000-2014
Crops	51 %
Livestock	16.8
Poultry	13.7
Fisheries	18.5



Source: PSA/BAS

## Shares in Crop Area



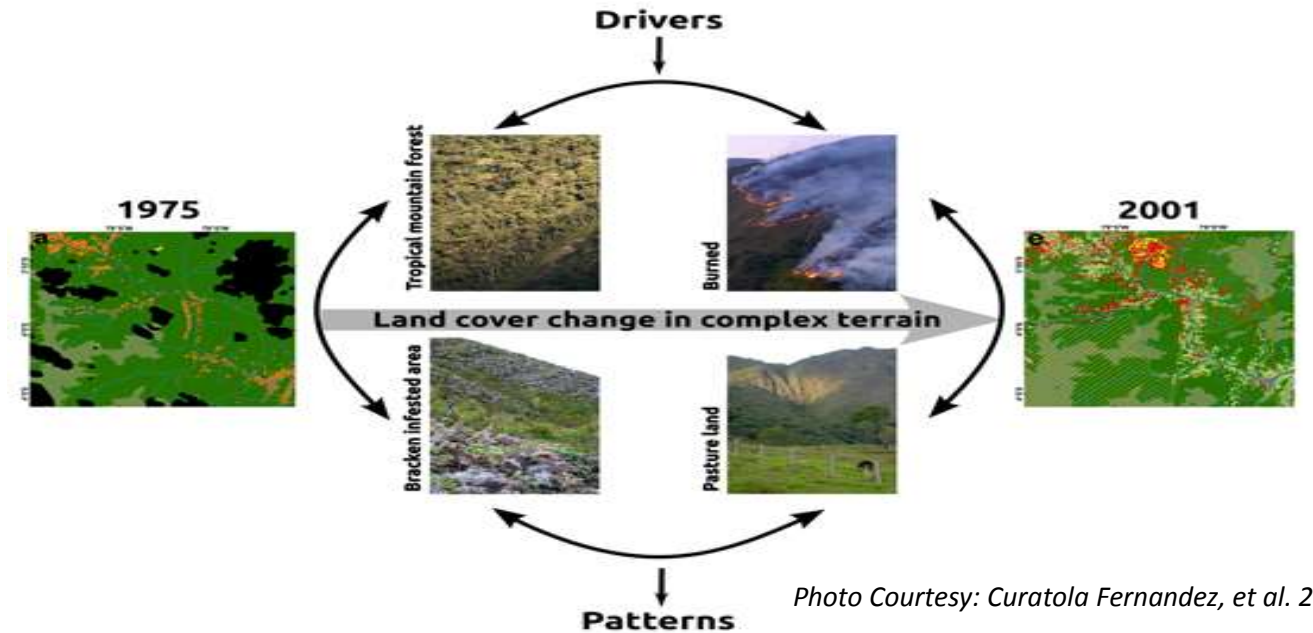
Crop	2000-2013
Palay	32.4
Coconut	25.05
Maize	18.7
Bananas	3.2
Sugar Cane	3.05
Cassava	1.55
Mangoes and fruit trees	1.35
Coffee	0.9
Rubber and plantation trees	0.95
Pineapples	0.4

Source: FAO

# Some factors affecting sustainability of agriculture



Accelerated Population Increase



Land Use and Land Cover Change



Rapid Urbanization and Migration from rural areas to urban centers



CHANGE

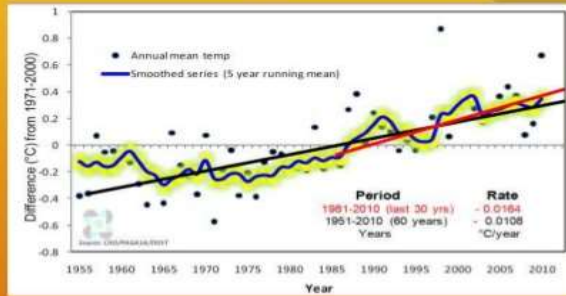


CLIMATE





## Philippine Changes in Temperature



**0.65 °C**

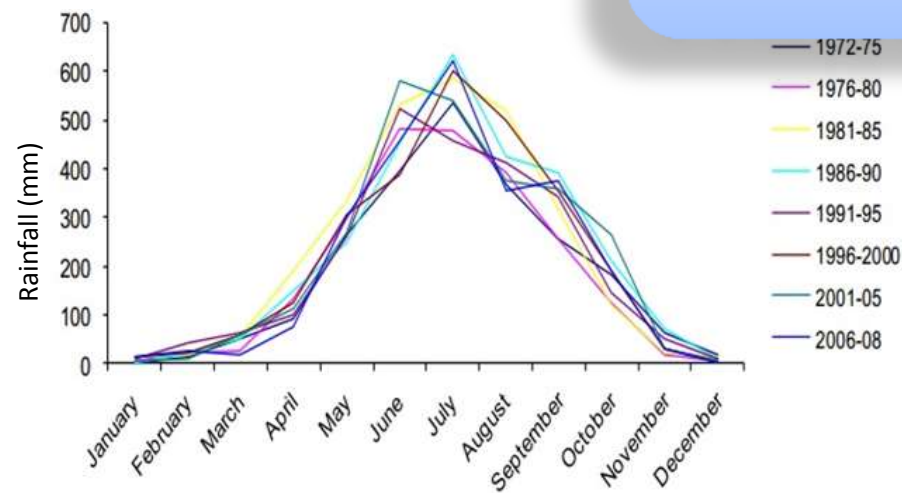
temperature increase from 1951 to 2010 (PAGASA, 2011)

**Temperature increase**

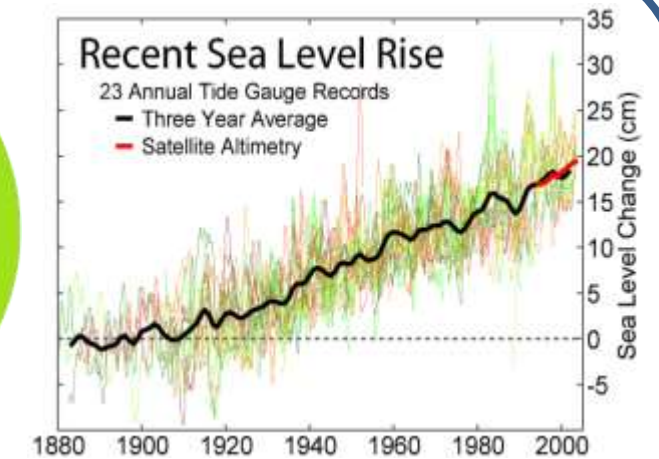


**More intense weather and climatic events**

# Climate Hazards Threatening Agriculture



**Erratic rainfall patterns**



**Sea level rise**



**Reduced crop yields**



**Disturbed crop growing seasons**



**Losses and damages due to extreme climate events (P26B per year, IFPRI-NEDA, 2015)**

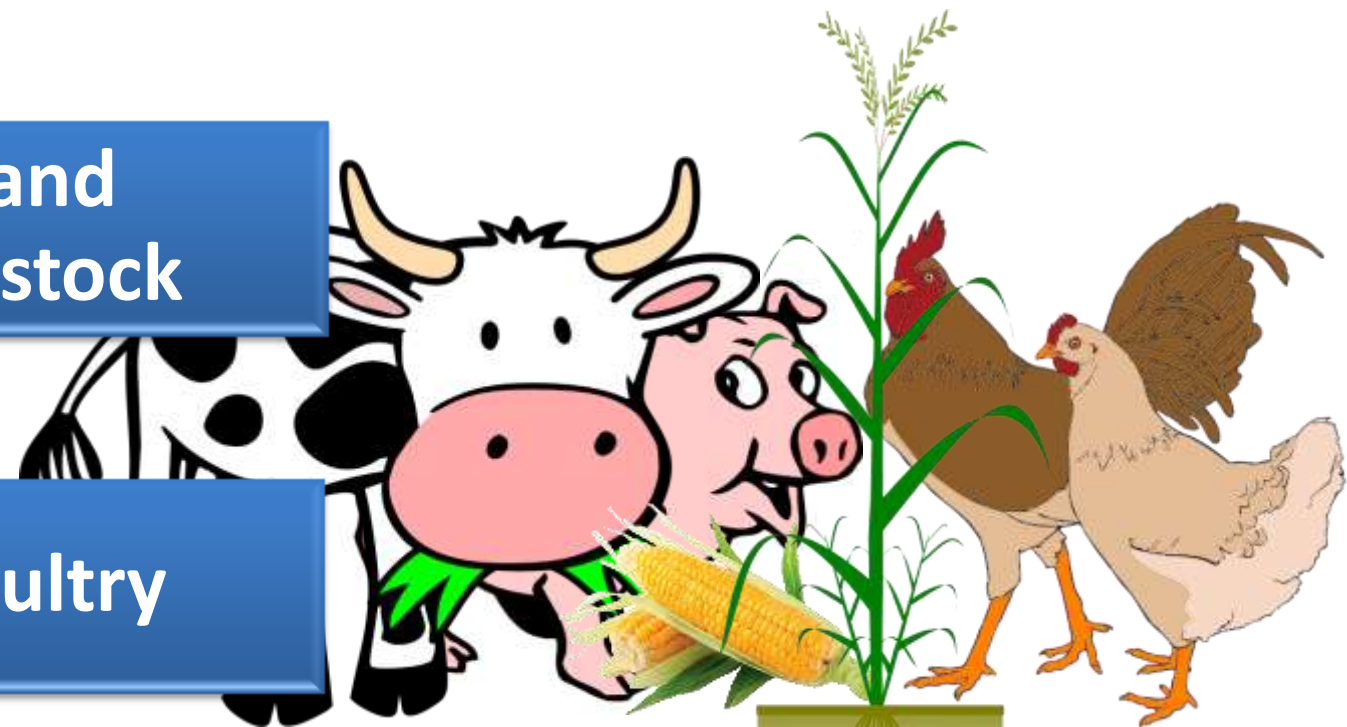


**Decreased weaning rate and increased mortality for livestock**



**Reduced growth rate of poultry**

# **Effects and Impacts of Climate Hazards on Agriculture (Crops, Livestock & Poultry)**





# Global Climate Change

## Climate Change Mitigation

Greenhouse gas emissions

Climate change Impacts

## Climate Change Adaptation

- Reduce magnitude of global warming
- Reduce greenhouse gas emissions
- Primary focus on energy, transport, land use

- Reduce vulnerability to CC impacts
- Reduce human and material losses
- Primary focus on climate-sensitive sectors and economic activities



# Responding to Changing Climate



Mitigation and  
Adaptation

Technological  
and Institutional  
Options

Structural and  
Non-structural  
Measures

Good  
agricultural  
practices



# Technological Measures

## Improved crop varieties

- heat-, drought-, flood-, salinity- tolerant;
- resistant to pests and diseases, etc.

## Improved species of livestock and poultry

## Improved agricultural water management

## Efficient nutrient management



# Use of improved crop varieties

- Resistant to temperature increase
- Drought-tolerant
- Resistant to stresses (e.g. floods)



Sub1 rice variety is flood-tolerant



# Improved water management

- Improve water use efficiency.
- Synchronized growing season with water availability based on seasonal forecasts.





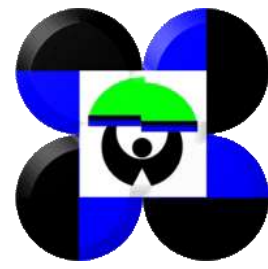
# Rainwater Harvesting through series of Farm Ponds for Fish and Crop Production (Lamut, Ifugao)





# Agro-Forestry - Vegetable - Rice Production System (Terracing in Kiangan, Ifugao)





# Project SARAI

**Smarter Approaches to Reinvigorate Agriculture as an Industry  
(SARAI) in the Philippines**

Adaptive Planting  
Calendar

Site-specific nutrient  
management

Pests and diseases  
advisories based on SCF

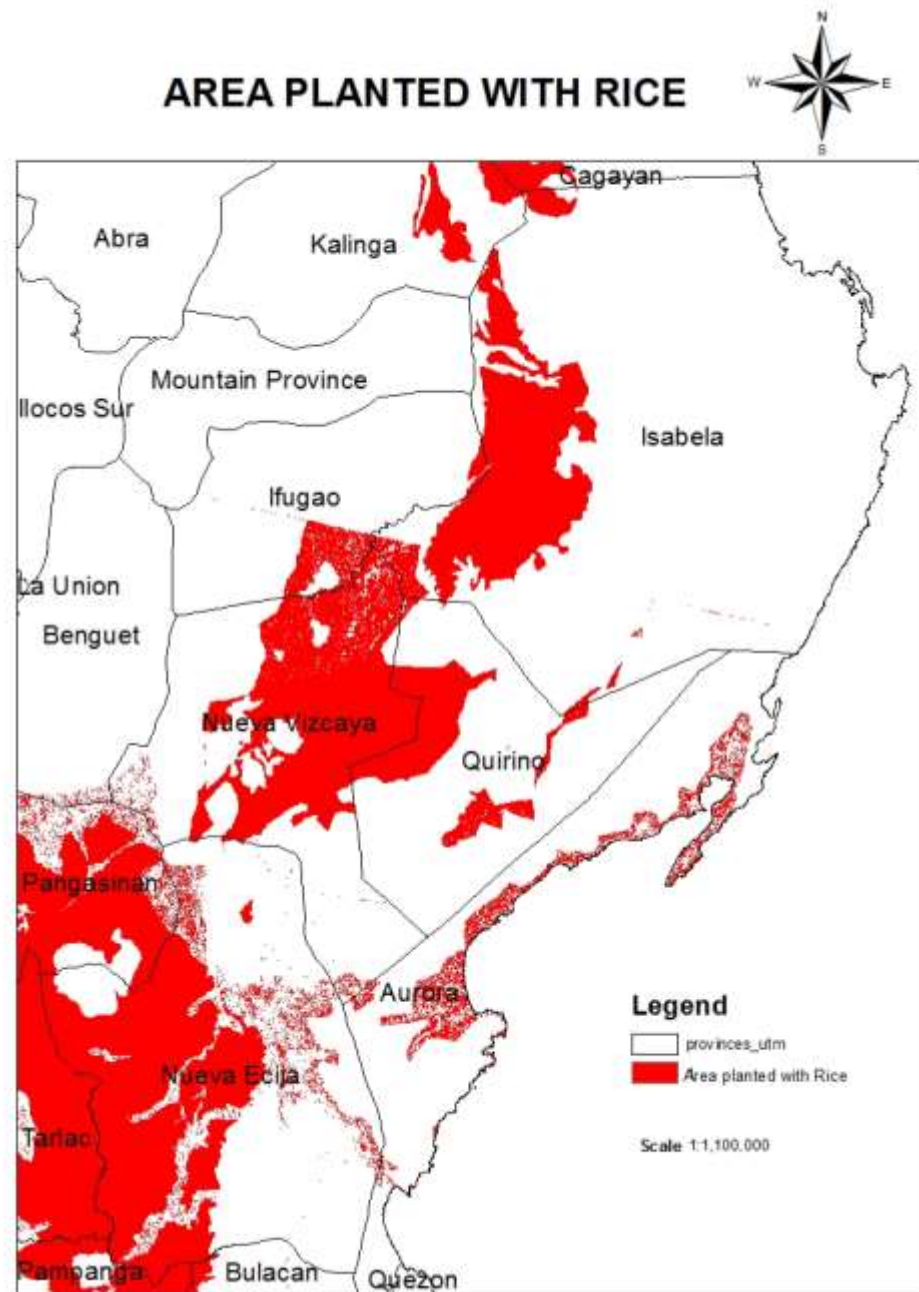
Alternative Cropping  
System

Improved water  
management

Crop suitability



# Project SARAI initiatives addressing food security and climate change issues in the Philippines



1. Crop forecasting system
2. Crop advisories for IPM, nutrient and water management to improve yield and revenue of farmers
3. Crop advisories for optimum planting calendar for rice and corn
4. Crop advisories related to optimum water management
5. Loss and damage estimation due to climate extremes (e.g. crop area mapped x estimated potential yield per area in specific locality)

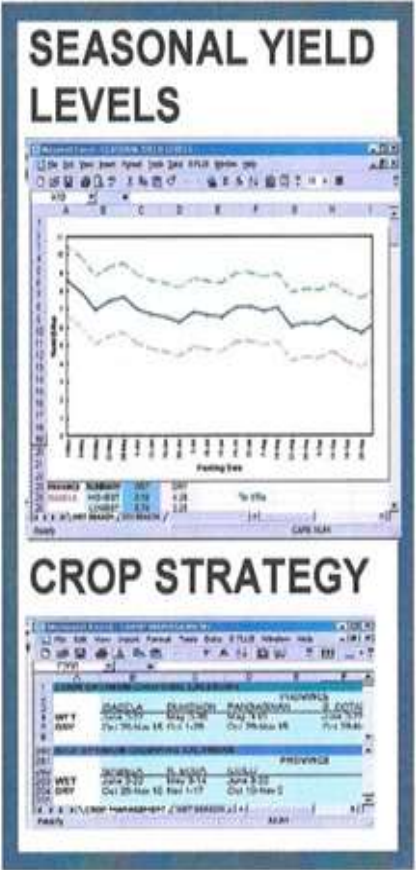
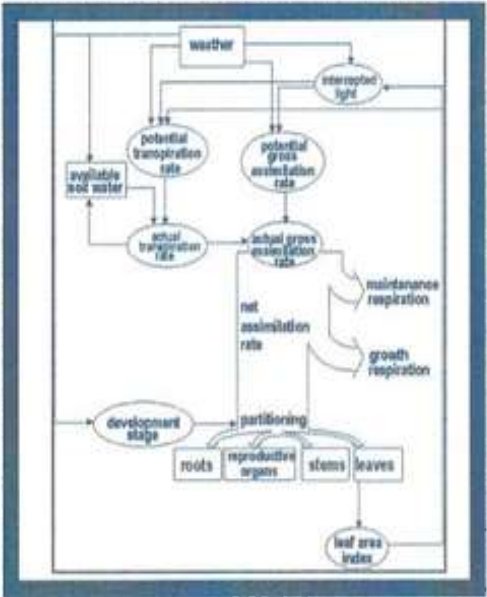
# CLIMATE FORECAST



# CROP AREA ESTIMATION

# Crop Forecasting System for Rice and Corn

# DOWNSCALING

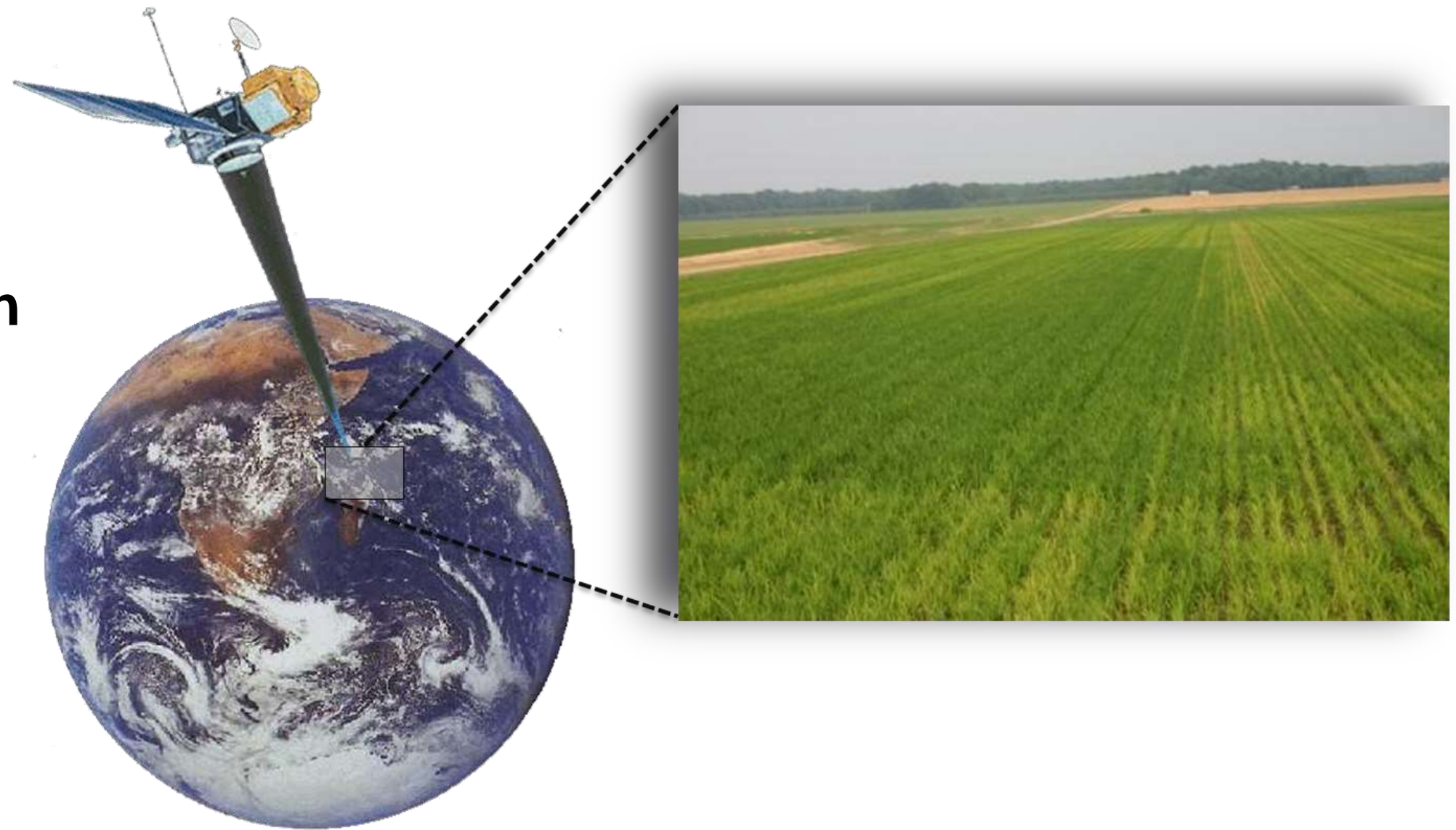


# CROP FORECASTS

# SIMULATED CROP YIELD



**Crop area estimation  
via remote sensing,  
GPS reading, and  
farmer interview**

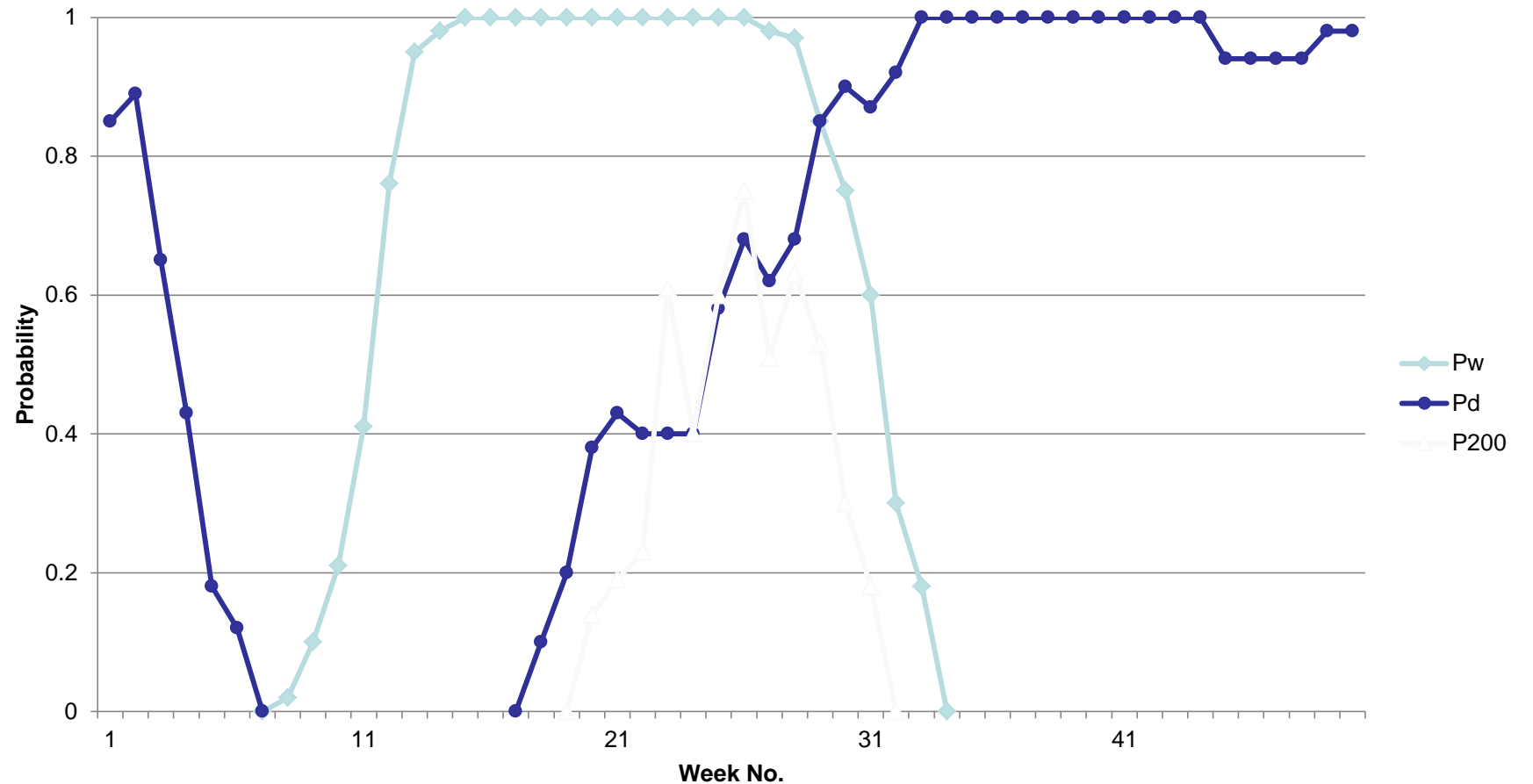


# Managing Climate Risk: Crop Calendar

## Determining weather-based dynamic cropping calendar

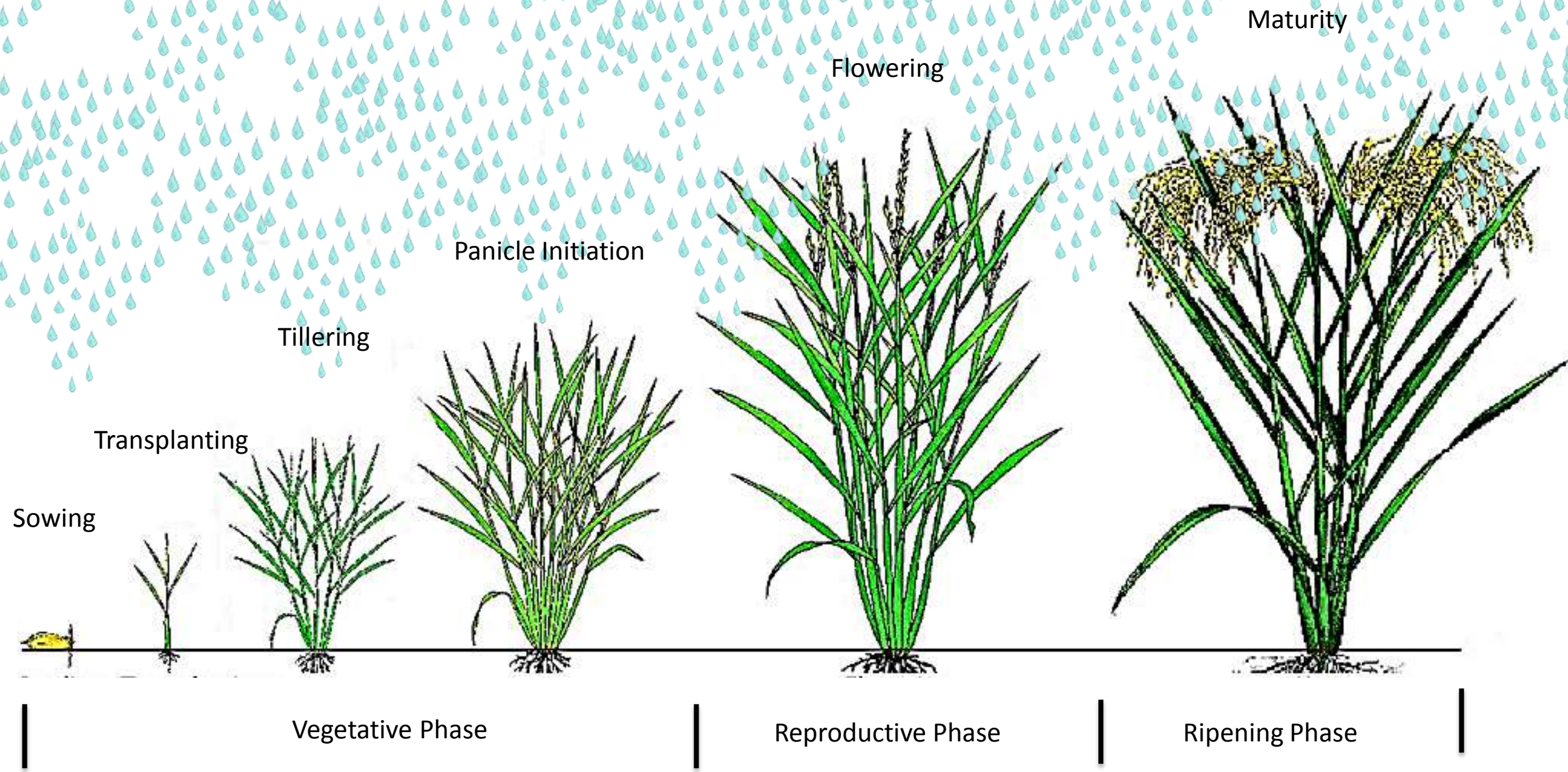
Irregularity of wet & dry seasons requires **updating of cropping calendar.**

Optimal planting window based on **medium-range weather forecasts.**

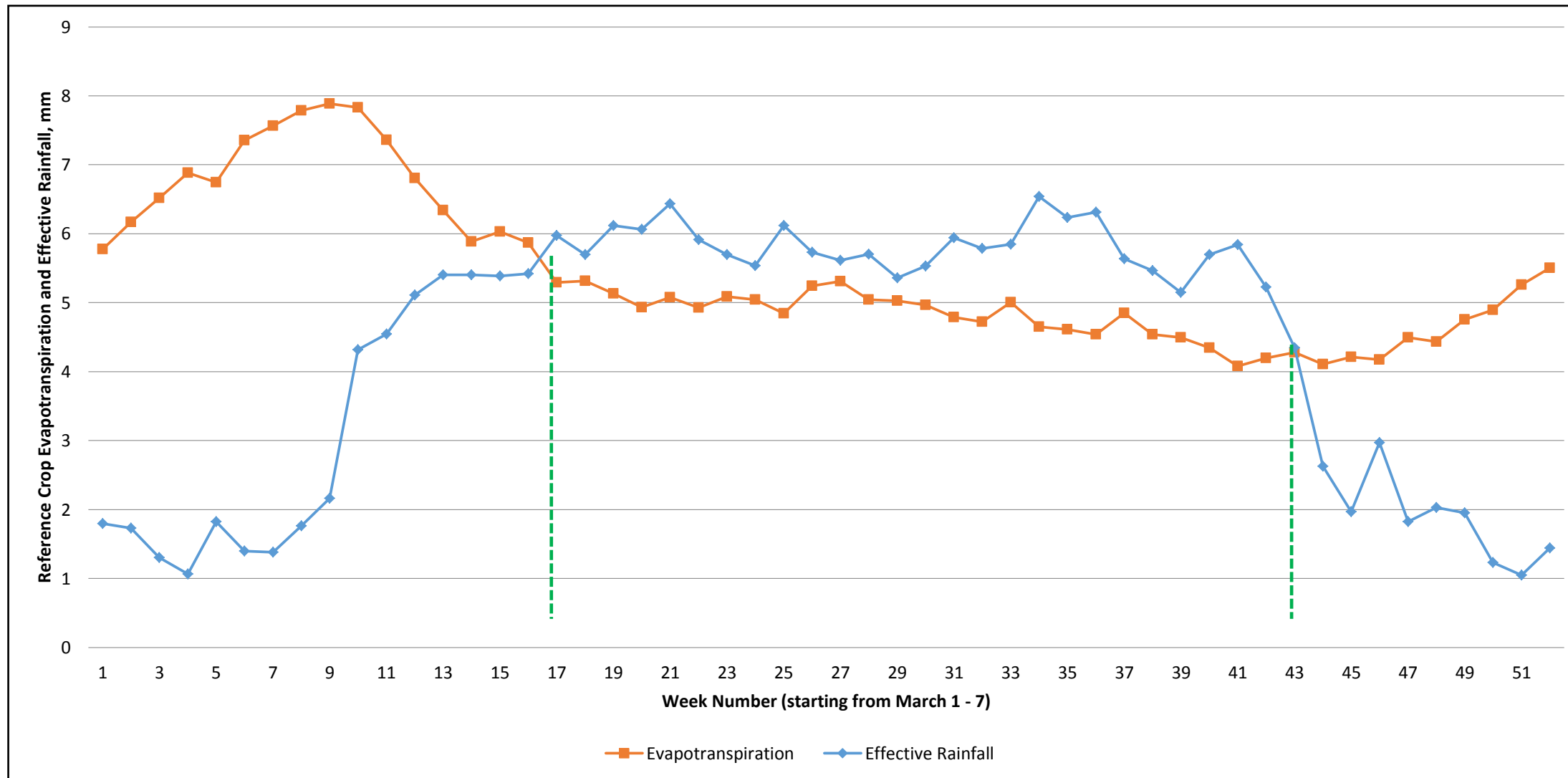




# Adaptive Planting Calendar: Rainfall Requirement for Growth



# Development of Adaptive Planting Calendar



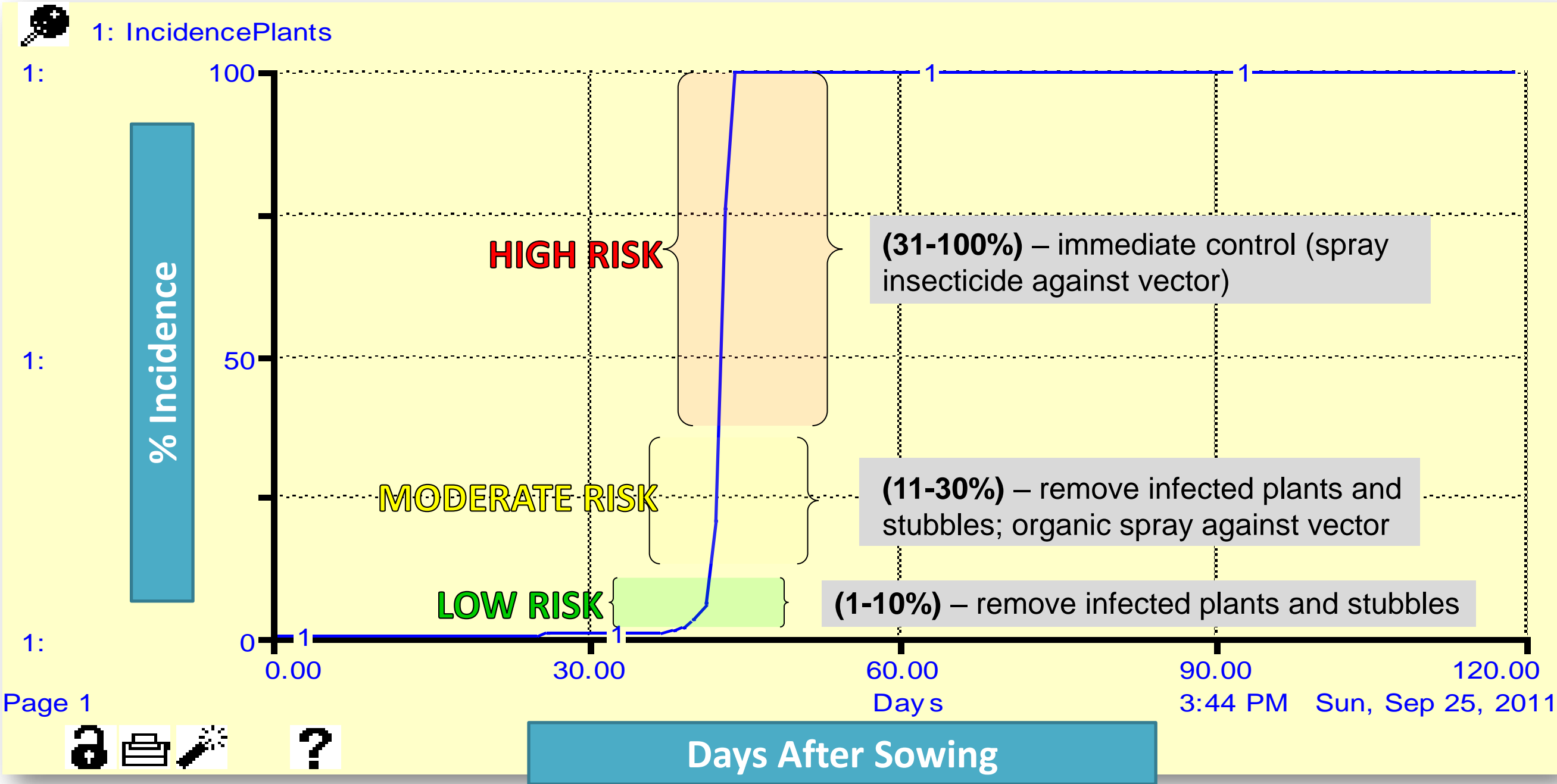
Farmers can be advised to plant on **Week 16** and **Week 43** to optimize the evapotranspiration and maximum effective rainfall, thus minimize the irrigation costs.

\* For irrigated farms

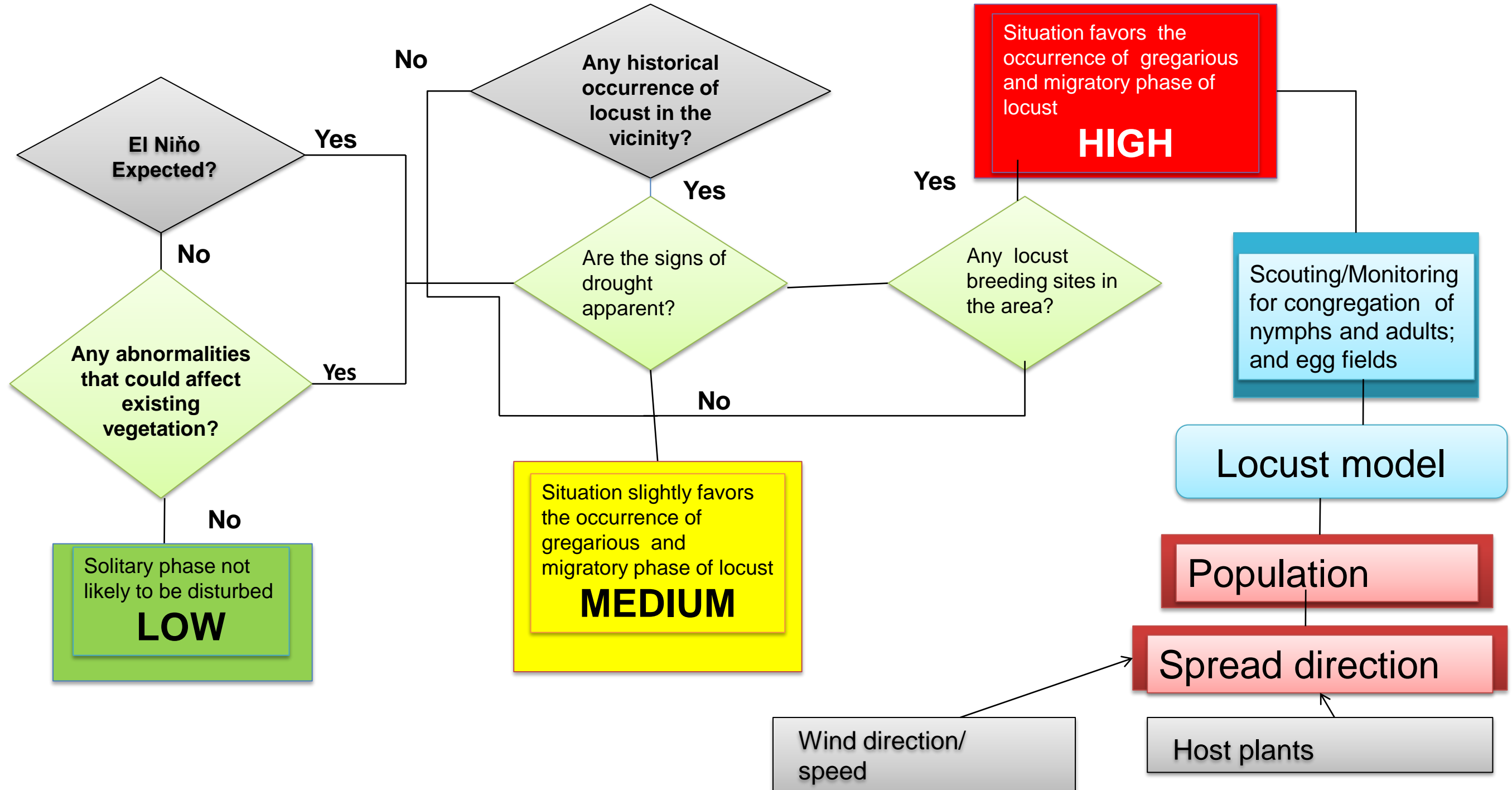




# Sample run of RTVMOD rice tungro virus disease model



# Crop advisory for IPM: Locust Advisory





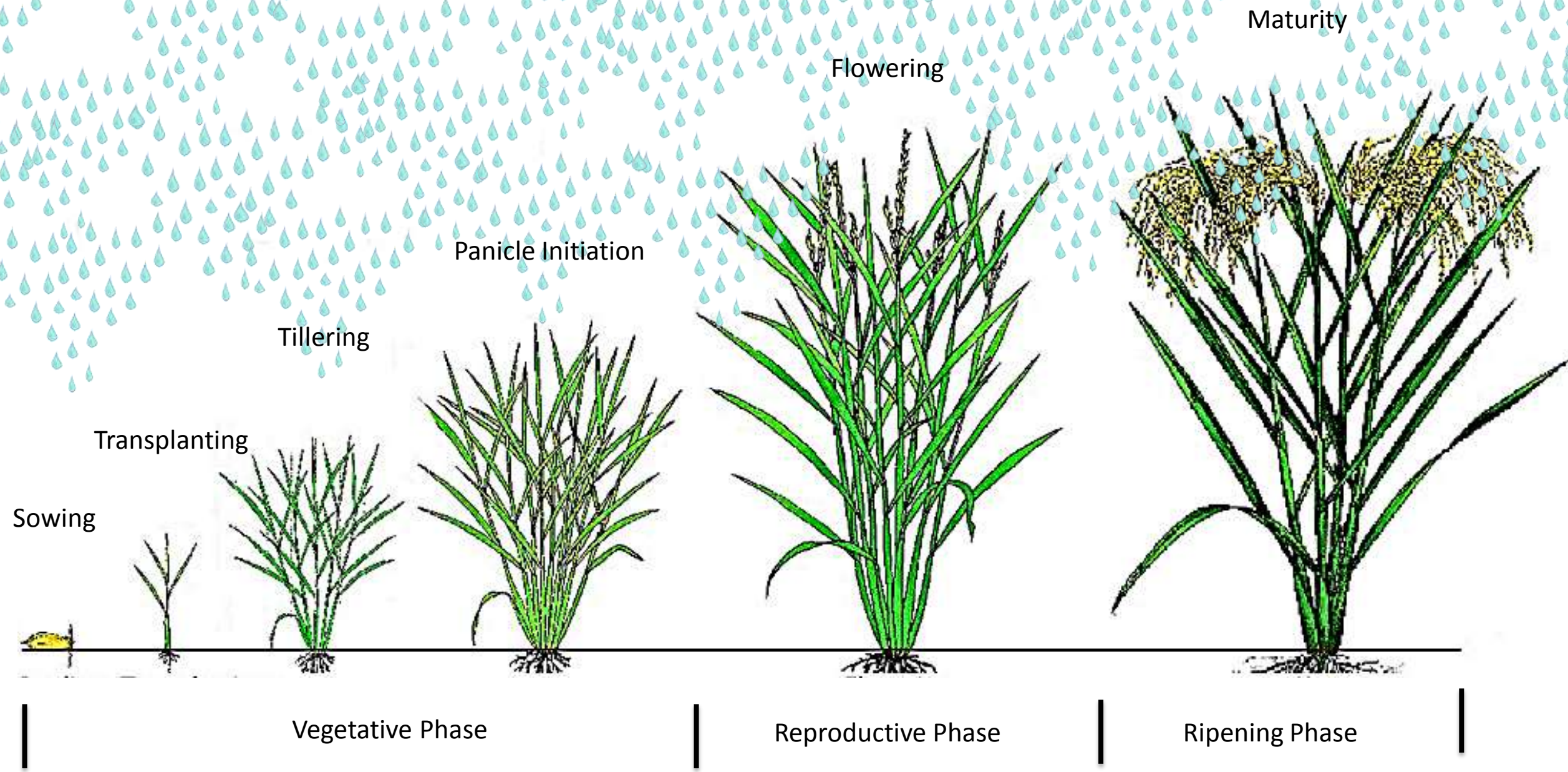
# Climate Risk Sharing & Transfer through Agri-Insurance Program

PCIC traditional agri-insurance products

Weather index-based insurance (WIBI) products

- Development of weather-based index
- Implementation issues e.g. weather stations

# Adaptive Planting Calendar: Rainfall Requirement for Growth



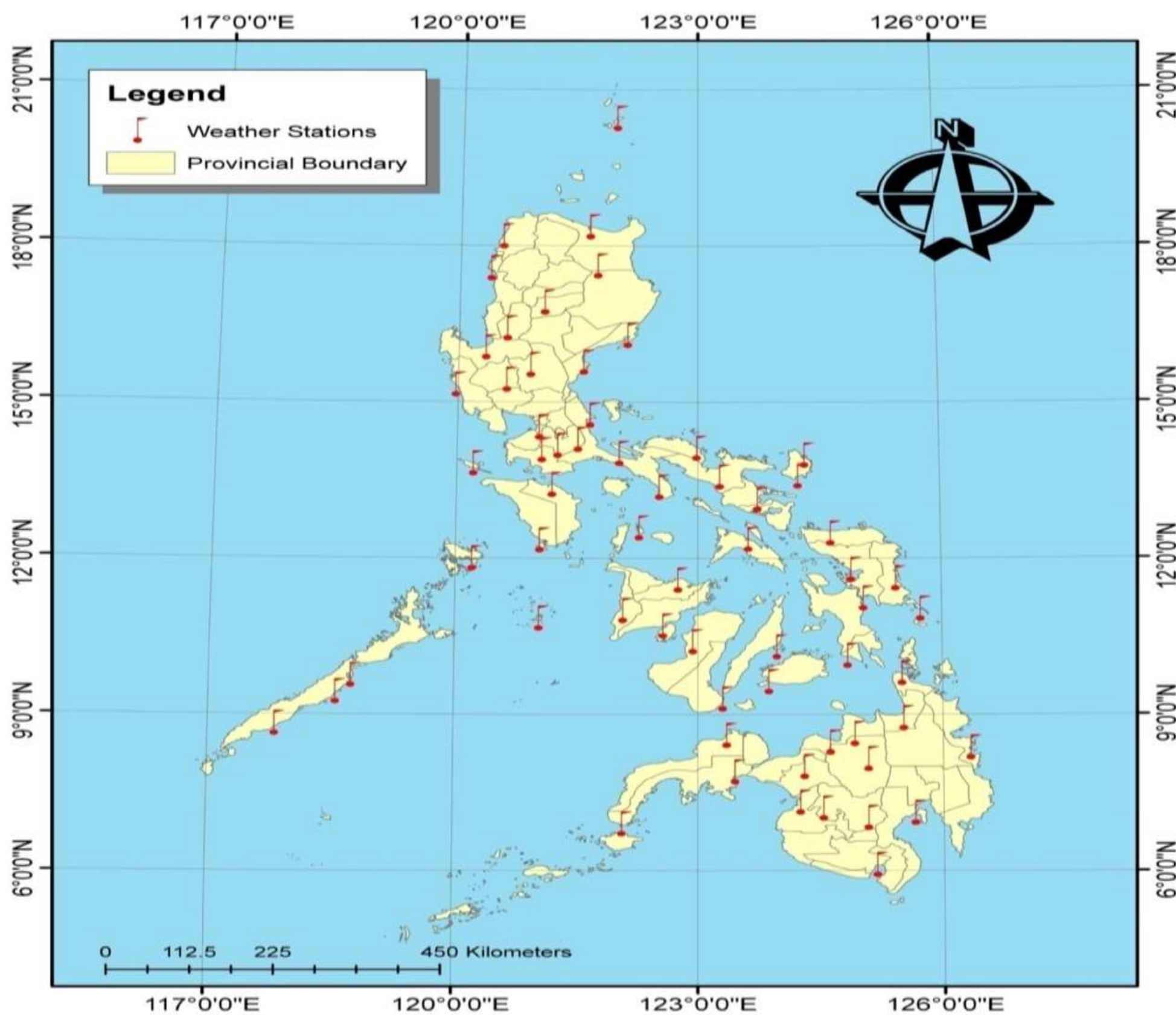


# Some Implementation Issues in Agri-Insurance Program

Availability of reliable weather-based indices for agri-insurance products - e.g. indices based on rainfall, temp, etc.

Inadequate weather gauging network especially in agricultural production areas

High premium for insurance coverage



**Location map of existing network of weather gauging stations in the Philippines. (PAGASA, 2011)**



**Effective and responsive agricultural extension program (e.g. DA and LGUs)**

**Mainstreaming and sustainability of climate adaptation initiatives**

**Good agricultural practices (GAPs) are also CCA options that may be promoted**

**Effective coordination among agencies involved, e.g. training programs, extension activities, etc.**

## **Some Issues and Challenges in Climate-smart Agriculture**

# Concluding Remarks

- Anthropogenic activities (including unsustainable practices) and **climate hazards** threaten sustainability of agriculture, and, indirectly, food security.
- Advances in S & T provide opportunities to address the adverse impacts of climate change.
- Climate-smart agriculture involves use science-based technologies and interventions to address climate hazards as part of CRM, e.g. WIBI products.





**Thank you for your attention.**

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