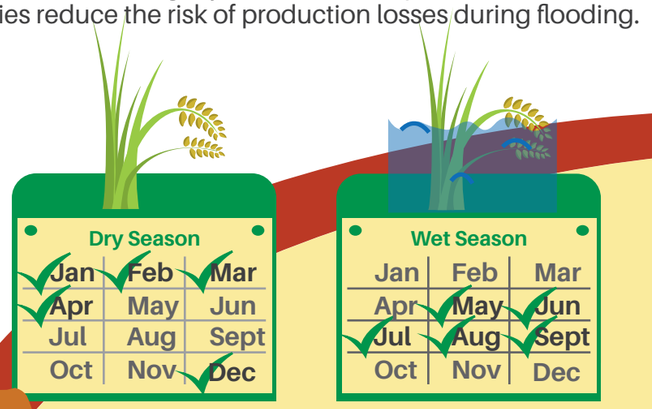
Context

The province of Oriental Mindoro is known to produce diverse key agricultural commodities, including rice, corn, calamansi and banana. Naujan, specifically, is one of the rice-producing municipalities in the province and covers 27% of Oriental Mindoro's total rice production area. With the changing climate, however, smallholder farmers are becoming increasingly vulnerable to climate hazards. Naujan is situated in a nearby lake that serves as a basin for several river systems of the province. Couple this with events of prolonged rains and changing rainfall patterns, smallholder rice farmers are faced with increased risks of flooding. Thus, selection of stress-tolerant rice varieties is becoming an essential adaptation option in rice farming.

Use of Stress-Tolerant Rice Varieties

The Philippines has a wide range of rice varieties developed to address the impacts of climate change. These include submergence-tolerant, drought-tolerant and early-maturing varieties. One of the early-maturing rice varieties is PSB Rc10 (Pagsanjan), which yields an average of 4.8MT per hectare. Farmers prefer to use this variety to shorten the planting season in periods of high flood risk. PSB Rc10 can be harvested as early as 106 days after seeding. It also has a good milling recovery of 66.62%.

The other variety that can withstand flooding is PSB Rc18 (Ala). It can survive in complete submergence for 5-7 days and can be harvested 123 days after seeding. This long grain variety produces an average yield of 5.1MT per hectare. Both rice varieties reduce the risk of production losses during flooding.



Use of Stress-Tolerant Rice Varieties

✓ *can replace:*

Traditional Rice Varieties
(high-yielding varieties)

✓ *uses:*

Early-maturing rice variety:
PSB Rc10 (Pagsanjan)

Submergence-tolerant rice variety:
PSB Rc18 (Ala)

Available Technical Briefs

LUZON

Cordillera Administrative Region (CAR)
- Water Harvesting Tank for Cabbage in Benguet
- Blight-Tolerant Potatoes in Benguet

Region I-Ilocos Region
- Mango Production in Ilocos
- Rice-Corn Crop Rotation in in Ilocos
- Rice-Tomato Rotation in Ilocos

Region II-Cagayan Valley
- Rice-Rice-Mungbean Crop Rotation/Diversification in Isabela
- Climate-Smart Rice in Isabela

Region III-Central Luzon
- Water Conservation Technology (AWD) in Tarlac
- Climate-Smart Rice in Tarlac
- Crop Rotation-Zero Tillage Combination in Tarlac

Region IVA-CALABARZON
- Coconut-based Integrated Farming System in Quezon
- Rainwater Harvesting in Vegetable Production in Quezon

Region IVB-MIMAROPA
- Rice-Onion Crop Rotation in Oriental Mindoro
- Stress-Tolerant Rice in Oriental Mindoro

Region V-Bicol Region
- Organic Corn Farming in Camarines Sur
- Climate-Smart Rice (Green Super Rice) in Camarines Sur

VISAYAS

Region VI-Western Visayas
- Sloping Agricultural Land Technology for Corn in Iloilo
- Small Water Impounding Project for High Value Crops in Iloilo

Negros Island Region (NIR)
- Use of Submerence-Tolerant Rice Variety in Negros Occidental
- Organic Red Rice Production in Negros Occidental

Region VII-Central Visayas
- Corn-Peanut Crop Rotation in Cebu
- Protected Vegetable Cultivation in Cebu

Region VIII-Eastern Visayas
- Alley Cropping Using Pineapple as Hedgerow in Upland Rice Production in Samar
- Protected Vegetable Cultivation in Samar

MINDANAO

Region IX-Zamboanga Peninsula
- Alternate Wet And Drying for Rice in Zamboanga Sibugay
- Coconut-Yellow Corn Intercropping in Zamboanga Sibugay

Region X-Northern Mindanao
- Biodynamics in Corn Production in Bukidnon
- Corn-Banana Crop Diversification in Bukidnon

Region XI-Davao Region
- Crop Rotation with Integrated Nutrient Management in Davao
- Cacao-Coconut Intercropping in Davao

Region XII-SOCCSKARGGEN
- Organic Rice Farming in North Cotabato
- Integrated Rice-Duck Farming System (IRDFS) in North Cotabato

Region XIII-Caraga
- Corn-Rice-Green Corn Crop Rotation in Agusan Del Norte
- Corn-Squash+Corn Crop Rotation in Agusan Del Norte

Autonomous Region of Muslim Mindanao (ARMM)
- Coconut-White Corn Intercropping in Lanao Del Sur
- Coconut-Banana Intercropping in Lanao Del Sur

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About the Authors

This technical brief was produced through the UPLB-CIAT-DA partnership under DA-BAR project titled "Climate-Resilient Agriculture (CRA) Assessment, Targeting & Prioritization for the Adaptation and Mitigation Initiative in Agriculture (AMIA) Phase 2 in Oriental Mindoro Province (MIMAROPA Region).

UPLB team

Ms. Elizabeth Supangco, Project Leader
Ms. Angelee Fame Ramal, Agriculture Specialist
Ms. Charis Mae Tolentino-Neric, Socio-Economist
Mr. Ralphael Gonzales, Research Assistant

CIAT team

Ms. Paula Beatrice M. Macandog, Environmental & Natural Resource Economist
Dr. Sekou Amadou Traore, Agricultural Economist
Dr. Godefroy Grosjean, Climate Policy Expert
Mr. Rowell C. Dikitanan, Socio-Economist
Ms. Maureen Agatha L. Gregorio, Research Assistant
Ms. Pattricia Eliz M. Legaspi, Research Assistant

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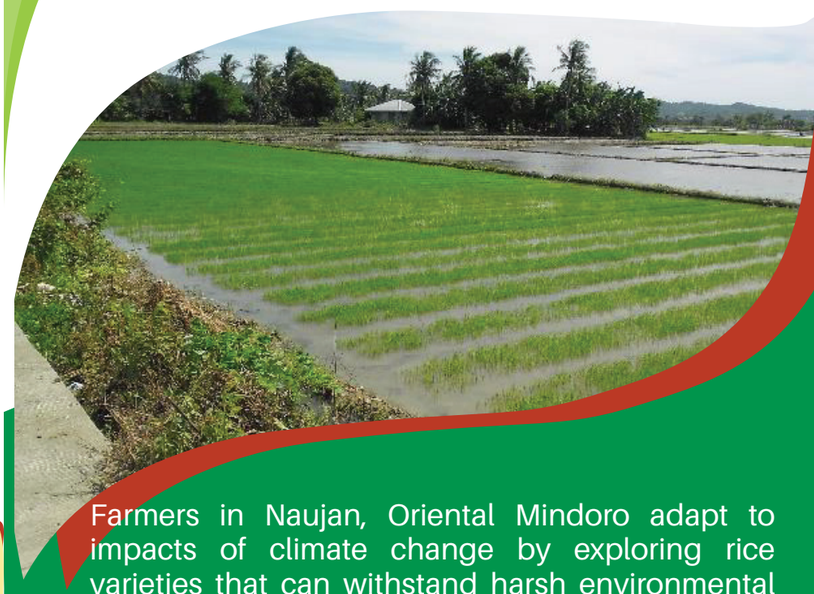
UNIVERSITY OF THE PHILIPPINES LOS BAÑOS

TECHNICAL BRIEF
on Climate-Resilient Agriculture (CRA)
MIMAROPA (Region IV-B)

Use of Stress-Tolerant Rice Varieties



Farmers in Naujan, Oriental Mindoro adapt to impacts of climate change by exploring rice varieties that can withstand harsh environmental conditions without compromising productivity. The use of stress-tolerant varieties reduces the risk of production losses of standing crops during flooding events.

Productivity

Can reduce risk of production losses during flooding

Adaptation

Can survive 5-7 days in complete submergence

Cost & Benefit

Initial Investment / ha
PhP 24,000

Payback Period
2 years

**On top of profit from conventional practice*

Estimated Additional Annual Profit / ha*
PhP 7,750
USD 151

Yield & Prices

Without CRA

Traditional Rice

Average annual farm yield
3,254 kg/ha

Price
PhP 16.05/kg

vs

With CRA

Stress-Tolerant Rice

Average annual farm yield
4,426 kg/ha

Price
PhP 16.88/kg

4 Reasons to Invest

1. Lower risk of production losses
2. Harvest in a short period of time
3. Withstand complete flood submergence
4. Higher potential farm income

Externalities

Further research is needed to quantify the externalities.

Financial Analysis

Net Present Value	IRR
PhP 45,983 USD 896	75%

Sensitivity Analysis

The CRA practice will still be **more profitable** than non-CRA practice even when:

Yield of rice decreases by **10%**

Aggregate Impact*

**within the Province of Oriental Mindoro*

Current Adoption Rate	Projected Adoption Rate
1%	100%

Total Area Planted (ha)	Aggregate NPV
30,136 ha	PhP 792 million

Assumptions:

Period of Analysis	Discount Rate	Exchange Rate
10 years	8.5%	$1 = PhP 51.32

Recommendations

When & Where?

Use in flood-prone areas during rainy season.

Use of stress-tolerant varieties is an effective strategy in farm areas experiencing flooding during the rainy season.

What?

Inform farmers of available rice varieties.

LGUs could strengthen information dissemination campaigns to inform farmers of available rice varieties that can adapt to climate risks in the locality.

Who?

Stakeholders such as LGUs, DA RFO and NGOs can invest in further developing CRA practices to support local farmers.

Initial Investment Breakdown

Initial Investment
PhP 24,000

Labor & Services
PhP 10,500

Inputs
PhP 13,500

Cost of Adopting CRA

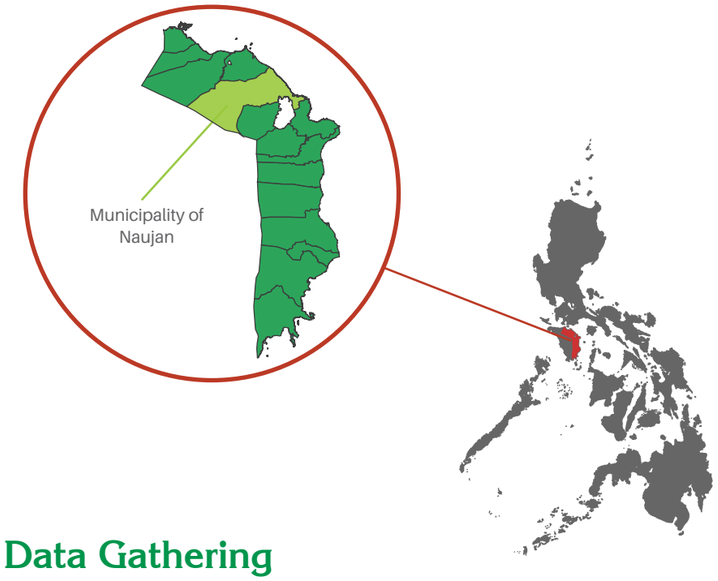
Initial Investment
Installation costs (Year 1)
PhP 24,000

Maintenance
(Years 2-10)
PhP 24,600

Operations
Irregular/ non-permanent costs
PhP 24,000

Study Site

Oriental Mindoro



Data Gathering

1. Analysis of experiences of 51 farmers in three barangays in the municipality of Naujan in Oriental Mindoro province
2. Conduct of Experts' Workshop with experts from the academe (University of the Philippines Los Baños) and the government (Municipal Agriculture Officers and Department of Agriculture Region 4B) pooling knowledge and insights on priority commodities and emerging climate resilient farm practices in the province
3. Review and synthesis of secondary information

The CIAT CBA Methodology

Cost-Benefit Analysis (CBA) is used to determine the relative profitability of alternative cropping practices, involving the comparison of the annual flows of incremental benefits with that of incremental costs. The CIAT CBA Online Tool analyzes the full benefits and costs of identified practices and adoption response at both individual farmer level and at aggregate level for a particular area.

Specifically, the tool can:

1. Quantify economic and some environmental trade-offs of adopting CRA practices.
2. Provide sensitivity analysis
3. Estimate the level of peak adoption

http://cbatool.ciat.cgiar.org/