

Context

The municipality of Buguias is one of the main producers of highland vegetables in the province of Benguet. However, climate hazards such as persistent strong heavy rains, typhoons, flooding, and frost experienced by farmers are affecting productivity. Records from PAGASA Agro-meteorological station in La Trinidad, Benguet show that the effects of climate change include increase in temperature, warmer noon and colder afternoons, longer droughts and irregular rainfall pattern (Calora et al. 2011). Potato farmers in Buguias, in particular, face pest and disease issues such as blight and leaf miners. Late blight is the most devastating potato disease where fungicide spraying twice a week is necessary, especially during the wet season. Such frequent application adds up to about 50% of the total cost of production.

Use of Blight-Tolerant Potato Varieties

In Buguias, varieties that are resistant to pests and diseases are used by potato farmers in high elevation areas. The Igorota (LBR PO3), more commonly known to farmers as Late Blight Resistant (LBR), is a locally-bred potato variety, moderately resistant to late blight and leaf miner. This variety has a high dry matter content suited for both table and processing use. It matures in 110 days and has a potential yield of 25-35 tons per hectare.

The other variety, Solibao (LBR PO4), exhibits high levels of resistance to late blight showing negligible infection of 1% compared to other potato varieties. It has a maturity of 90-120 days, with an actual yield of 18-40 tons per hectare.

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 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



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 Submergence-Tolerant Rice Variety in Negros Occidental
- Organic Red Rice Production in Negros Occidental



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 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

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

Region XII-SOCCKSARGGEN

- 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-BSU-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 Benguet Province (Cordillera Administrative Region)".

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Acknowledgment

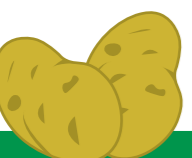
The authors would like to acknowledge the active participation of our farmer respondents, the local counterparts from the Local Government and the Department of Agriculture Regional Field Office - CAR and the financial support provided by the DA-Bureau of Agricultural Research (DA-BAR) and DA AMIA.

TECHNICAL BRIEF on Climate-Resilient Agriculture (CRA) Cordillera Administrative Region

Use of Blight-Tolerant Potato Varieties

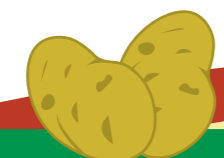


Adoption of blight-tolerant potato varieties is a strategy practiced by farmers in Buguias, Benguet to combat pest and disease infestations such as blight and leaf miner. The increased tolerance of potatoes to pests and diseases lessens the need to apply pesticides, providing farmers the potential to earn more.



**LBR PO3
(Igorota)**

matures in
110 days



**LBR PO4
(Solibao)**

matures in
90-120 days

Use of Blight-Tolerant Potato Varieties

can replace:

Traditional Potato Varieties

uses:

LBR PO3 (Igorota)

LBR PO4 (Solibao)



Productivity

Reduce risk of production losses caused by pest and disease infestations

Potential to attain maximum yield and higher income



Adaptation

Better pest and disease management



Mitigation

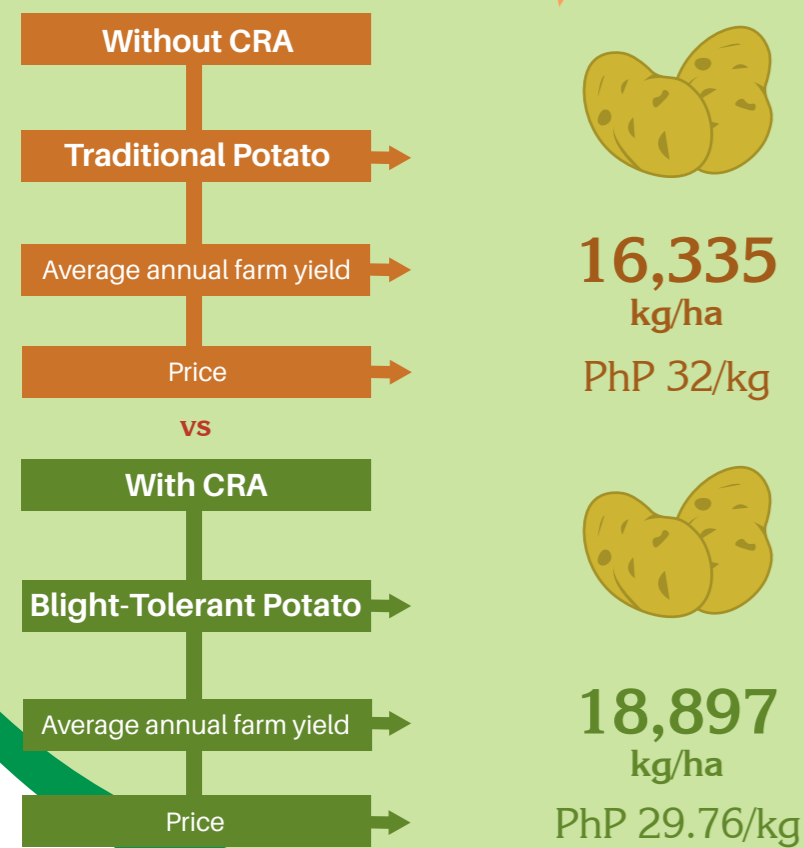
Lower chemical input use



Cost & Benefit



Yield & Prices



4 Reasons to Invest

- 1 Increased resistance to pests and diseases (i.e. blight and leaf miner)
- 2 Lower risk of production losses
- 3 Higher potential farm income
- 4 Reduced use of chemical inputs

Financial Analysis

Net Present Value	IRR
PhP 294,372 USD 5,736	152%

Sensitivity Analysis

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

↓ Yield of potato decreases by 8%

Externalities

Further research is needed to quantify the externalities.

Aggregate Impact*

*within the Province of Benguet

Current Adoption Rate	Projected Adoption Rate
5%	55%

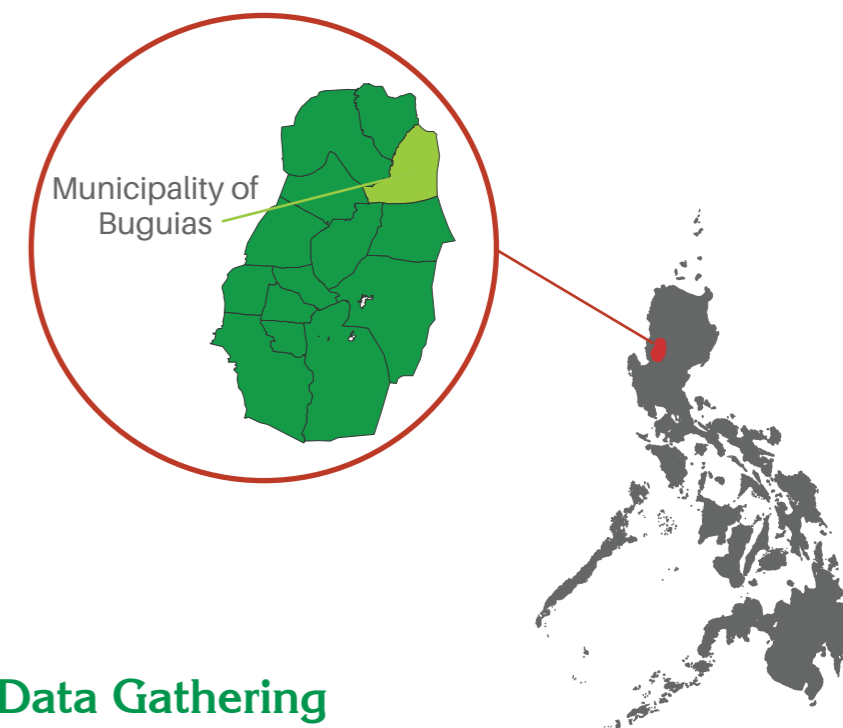
Total Area Planted (ha)	Aggregate NPV
3,895 ha	PhP 361 million

Assumptions:

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

Study Site

Benguet Province



Data Gathering

- 1 Analysis of experiences of 33 farmers in the municipality of Buguias in Benguet province.
- 2 Conduct of Experts' Workshop with experts from the academe (University of the Philippines Los Baños and Benguet State University) and the government (Municipal Agriculture Officers and Department of Agriculture - Cordillera Administrative Region) pooling knowledge and insights on emerging climate resilient farm practices
- 3 Review and synthesis of secondary information

Recommendations

- When & Where?** Use in high elevation areas especially during wet or rainy season.
- What?** Research on other potato varieties. Invest further in research on other potato varieties to evaluate yield potentials and resistance to other pests and diseases that are prevalent during the wet season, aside from late blight.
- Who?** R&D institutes, SUCs, LGUs and farmers should continually evaluate and test technologies for adaptation to the changing climate

Initial Investment Breakdown

- Initial Investment PhP 187,300
- Labor & Services PhP 71,500
- Inputs PhP 115,800

Cost of Adopting CRA

- Initial Investment Installation costs (Year 1) PhP 187,300
- Maintenance (Years 2-10) PhP 187,300
- Operations Irregular/ non-permanent costs PhP 26,000

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/>