

Context

The production of high value vegetables in Samar province and the greater Region 8 is highly affected by the region's Type IV high annual rainfall pattern. The area is characterized by a distinct wet season (from July to January) and a significant amount of rainfall for the remainder of the year. The frequent typhoons that occur in the region make vegetable farming more difficult, often resulting to shortages of supply (Gonzaga et al. 2013). The use of protective structures can save vegetables from damages caused by heavy rainfall and strong winds, thereby, protecting farmers from incurring losses.

Protected Cultivation of High Value Vegetables

Protected cropping system utilizes permanent structures covered in plastic to achieve year-round production of high value vegetables such as cauliflower, lettuce and sweet pepper. Complementing the system with drip irrigation made up of 3 pieces of drip irrigation hose, metal pipes, and 1 plastic barrel water tank allows the farmer to use water more efficiently as little water is lost due to evaporation or runoff. In the study site, a typical permanent structure stands 3.5 meters tall, is fabricated with an aluminum frame and has an effective cultivation area of 100sq.m. It allows farmers to plant vegetables up to five times a year. The structure can last for 10 years but the drip irrigation hose and the covering materials made of fine mesh requires replacement every 5 years.

Aside from crop damage caused by heavy rainfall and strong winds, farmers also encounter problems of pest infestation with open field cultivation of vegetables, which often lead to higher application of pesticides. With structures, pest and disease infestation is lessened resulting to a reduction in the use of pesticides, thereby, potentially lowering carbon emissions while also improving water quality.



Protected Cultivation of High Value Vegetables

can replace:

- Open field cultivation
- Excessive use of pesticides for crop protection

uses:



can be applied to:



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-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

TECHNICAL BRIEF on Climate-Resilient Agriculture (CRA) Eastern Visayas (Region VIII)

Protected Cultivation of High Value Vegetables



Protected cultivation of high value vegetables such as cauliflower, lettuce and sweet pepper is a CRA practice that makes use of permanent structures covered in plastic with drip irrigation systems installed. This system enables the production of high value vegetables year-round. Compared to open field cultivation, farmers adopting the CRA practice can increase yield and income while producing clean and safe vegetables. Protected cultivation technology can result to reduced nutrient leaching and fertilizer and pesticide use.

References

Gonzaga Z. C., Capuno O. B., Loreto M. B., Gerona R. G., et al. 2013. Low-cost protected cultivation: enhancing year-round production of high-value vegetables in the Philippines. In Oakeshott J. and Hall D. (eds) 2013. Smallholder HOPES—horticulture, people and soil. Proceedings of the ACIAR-PCAARRD Southern Philippines Fruits and Vegetables Program meeting, 3 July 2012, Cebu, Philippines. ACIAR Proceedings 139. Australian Centre for International Agricultural Research: Canberra. 298 pp.

PLGU-Samar. 2016. Provincial agricultural profile.

Santosh D., Tiwar K., and Singh V. 2017. Influence of different protected cultivation structures on water requirements of winter vegetables. *International Journal of Agriculture, Environment and Biotechnology* 10(1) pp 93-103.

About the Authors

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VSU team

- Dr. Pastor P. Garcia, Project Leader
- Dr. Fe M. Gabunada, Agricultural Economist
- Prof. Alan B. Loreto, GIS Expert
- Dr. Dionesio M. Bañoc, Farming System Expert
- Engr. Kim Ralph D. Rosal, 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. Patricia Eliz M. Legaspi, Research Assistant

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Productivity

Increase in frequency of planting of vegetables per year from three to five times



Adaptation

Production of high value vegetables year-round
Reduced occurrence of pests and diseases



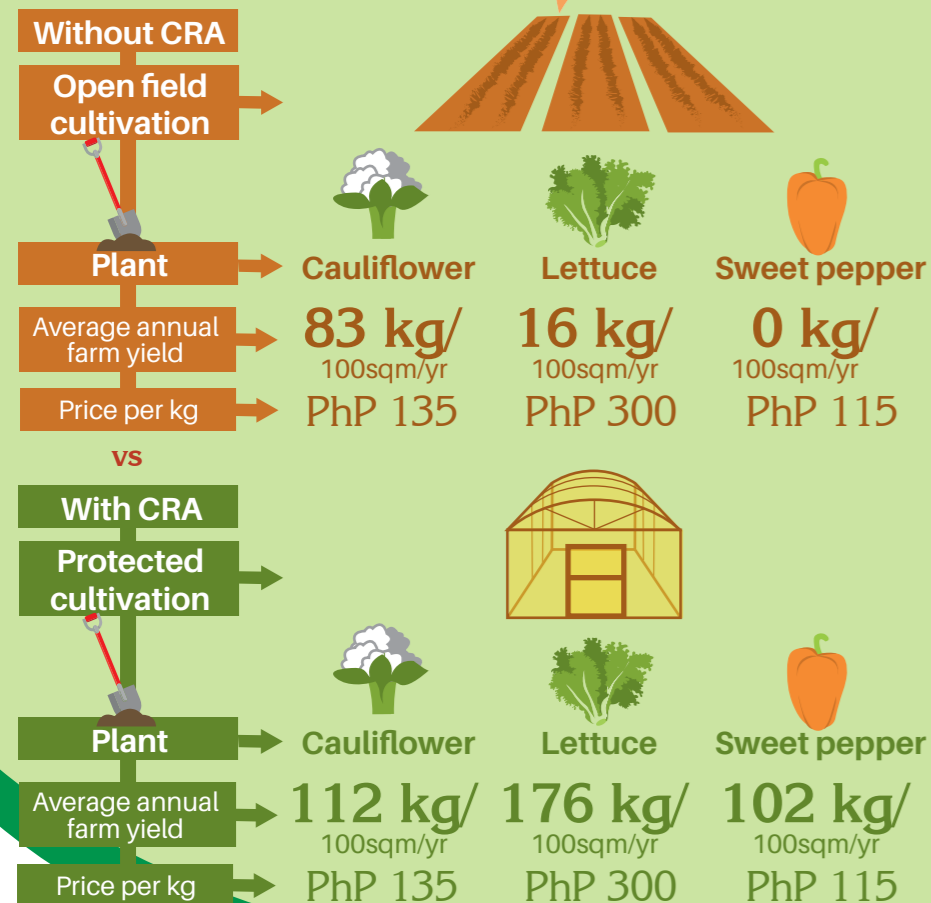
Mitigation

Reduced carbon emission and groundwater contamination due to reduced pesticide and fertilizer application

Cost & Benefit



Yield & Prices



7 Reasons to Invest

- 1 Opportunity to produce off-season high value vegetables
- 2 Reduces crop damage caused by heavy rainfall and strong winds
- 3 Higher potential farm income compared to traditional open field cultivation
- 4 Reduces nutrient leaching leading to better soil condition for plant growth

- 5 Contributes to curbing carbon emissions because of reduced use of pesticides and fertilizers
- 6 Efficient water use through drip irrigation

Externalities

- 7 Improves water quality through the reduction of pesticide and fertilizer application

Financial Analysis

Net Present Value	IRR
PhP 206,050 USD 4,015	50%

Sensitivity Analysis

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

↓ Yield of cauliflower, lettuce and sweet pepper decrease by 55%

Aggregate Impact*

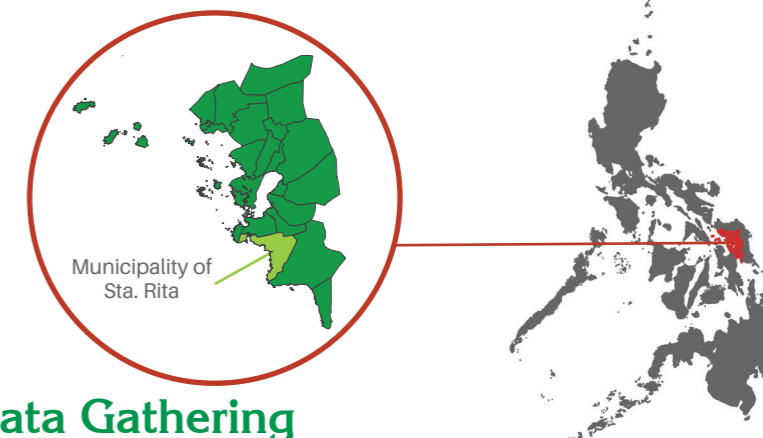
*within the Municipality of Sta. Rita, Samar

Current Adoption Rate	Projected Adoption Rate	
5%	30%	
Total number of structures	Aggregate NPV	
2,200 structures	PhP 66.2 million	
Assumptions:		
Period of Analysis	Discount Rate	Exchange Rate
10 years	12%	\$1 = PhP 51.32



Study Site

Samar Province



Data Gathering

- 1 Analysis of experiences of 2 case farms in the municipality of Sta. Rita, Samar
- 2 Validation of KIIs using results of field trials in the region by the Yamang Lupa Program (YLP)
- 3 Conduct of Experts' Workshop with experts from the academe (Visayas State University) and the government (Department of Agriculture Region 8) pooling knowledge and insights on emerging climate resilient farm practices
- 4 Conduct of workshop with Municipal Agricultural Officers (MAO) to validate and add to results from Experts' Workshop and case farms
- 5 Review and synthesis of secondary information

Recommendations

- When & Where?** Protected cultivation of high value vegetables is profitable year-round in the province of Samar, especially in the vegetable-producing areas.
- What?** Aside from growing cauliflower, lettuce and sweet pepper, farmers adopting the CRA practice can also plant other vegetables like chili pepper and tomato.
- Who?** Farmers engaged in vegetable production are encouraged to invest in the practice. The Government is encouraged to promote the adoption of the CRA practice and ensure programs to provide financial support for the establishment of permanent protected structures. Moreover, to help reduce uncertainty in the evaluation of the impacts of the CRA practice, the government may continuously finance research programs that deepen the knowledge on CRA practices, yield impacts and environmental externalities.

Initial Investment Breakdown

- Initial Investment PhP 113,500
- Labor & Services PhP 7,000
- Structure & Equipment PhP 100,500
- Inputs PhP 6,000

Cost of Adopting CRA

- Initial Investment Installation costs (Year 1) PhP 113,500
- Maintenance Annual costs (Years 2-10) PhP 18,500
- Operations Irregular/ non-permanent costs PhP 27,000

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