Protected Vegetable Cultivation

Protected cultivation technology using rain shelters has been introduced in Mantalongon, Dalaguete, Cebu to protect vegetable crops from erratic and high precipitation, strong winds and pests and diseases. Although there is no definite ideal size of rain shelters, farmers in Mantalongon have protected structures that can measure up to 1.5 meters in height, 2.5 meters in width and 20 meters in length. Average dimensions cover 150 sq. m. The frame is made of round steel pipes and is covered with polyethylene plastic. It can last more than ten years but the plastic cover, which costs PHP 5,000 on the average, is replaced every three (3) years. The plastic cover is installed at the beginning of the cropping period.

Benefits of Protected Vegetable Cultivation

- Can replace: Open field cultivation during wet season
- Can go well with: Excessive use of pesticides for crop protection
- Can be applied to: Watering system through the installation of drip irrigation

Available Technical Briefs

LUZON
- Cordillera Administrative Region (CAR)
  - Water Harvesting Tank for Carabao in Benguet
  - Right To Farm in Benguet
- Region I-Cagayan Region
  - Mango Production in Ilocos
  - Rice-Corn Crop Rotation in Ilocos
  - Rice-Tomato Rotation in Ilocos
- Region II-Cagayan Valley
  - Rice-Mungbean-Rice Crop Rotation/Interplanting 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 IV-Bicol Region
  - Crop Rotation Corn-Squash Corn Crop Rotation in Camarines Sur
  - Coconut-Yellow Corn Intercropping in Sibugay
  - Alternate Wet And Drying for Rice in Zamboanga Sibugay
- Region V-Visayas
  - Stopping Agricultural Land Technology for Corn in Iloilo
  - Protected Vegetable Cultivation in Negros Occidental
  - Organic Red Rice Production in Negros Occidental
- Region VI-Siargao Island Region
  - Use of Submeso-scale Tolerant Rice Varieties in Negros Occidental
- Region VII-Central Visayas
  - Slope Agriculture Technology for Corn in Cebu
  - Cropping System Impounding Projects for High Value Crops in Cebu
- Region VIII-Eastern Visayas
  - Alley Cropping Using Pineapple as Hedgerow in Negros Occidental Province
  - Protected Vegetable Cultivation in Samar
- Region IX-Zamboanga Peninsula
  - Allinclusive Delicately Drying for Rice in Zamboanga Sibugay
  - Crop Rotation with Integrated Nutrient Management in Cebu
  - Coral-Intercropping in Davao
- Region X-Northern Mindanao
  - Soybean and Corn Crop Rotation in North Cotabato
- Region XI-Davao Region
  - Crop Rotation in Nilabing Agta in Davao
- Region XII-Camiguin Island Region
  - Rice-Tomato Crop Rotation in Camiguin
- Regions XIII-Caraga
  - Integrated Rice-Intensification in Agusan Del Norte
  - Rice-Squash Corn Crop Rotation in Agusan Del Norte
- Autonomous Region of Muslim Mindanao (ARMM)
  - Crop Rotation Coconut-Intercropping in Lanao Del Sur
  - Coconut-Spinach Intercropping in Lanao Del Sur
- Autonomous Region of Muslim Maguindanao (AMRMM)
  - Crop Rotation Coconut-Intercropping in Lanao Del Sur
  - Coconut-Spinach Intercropping in Lanao Del Sur

Central Visayas
- Climate-Smart Rice in Cebu
- Crop Rotation Corn-Squash Corn Crop Rotation in Camarines Sur
- Coconut-Yellow Corn Intercropping in Sibugay
- Alternate Wet And Drying for Rice in Zamboanga Sibugay
- Integrated Rice-Duck Farming System (IRDFS) in North Cotabato
- Crop Rotation in Nilabing Agta in Davao
- Rice-Tomato Crop Rotation in Camiguin
- Integrated Rice-Intensification in Agusan Del Norte
- Rice-Squash Corn Crop Rotation in Agusan Del Norte
- Climate-Smart Rice in Cebu

References


About the Authors

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Ms. Paula Beatrice M. Macandog, Environmental & Natural Resource Economist
Dr. Erig Prince P. Gallo, Science Research Assistant
Ms. Patricia El-M. Legaspi, Research Assistant

This technical brief was produced through the VSU-CIAT-DA partnership under DA-SIP project titled “Climate-Resilient Agriculture (CRA) Assessment, Targeting & Prioritization for Adaptation and Mitigation Initiative in Agriculture (AMIA) Phase 2 in Cebu Province Central Visayas 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 VII and the financial support provided by the DA-Bureau of Agricultural Research (DA-BAR) and DA AMIA.

Protected Vegetable Cultivation

During the wet season, supply of vegetables drops because of the increased difficulty for farmers to produce quality vegetables. Protected cultivation technology utilizes rain shelters to protect crops from adverse climatic conditions such as high precipitation and strong winds. Farmers can potentially produce year-round supply of vegetables and increase their farm income by capturing higher market prices during unfavorable weather conditions.

TECHNICAL BRIEF on Climate-Resilient Agriculture (CRA)
Central Visayas (Region VII)

Productivity
- Increased average annual yield during wet season for every 150 sq.m. structure

Adaptation
- Reduced occurrence of pest and disease

Mitigation
- Reduced carbon emission and groundwater contamination due to reduced pesticide and fertilizer application
Financial Analysis

**Cost of Adopting CRA**

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>Initial Investment/ Structure &amp; Equipment</th>
<th>Labor &amp; Services</th>
<th>Inputs</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PhP 40,000</td>
<td>PhP 6,000</td>
<td>PhP 7,000</td>
<td>PhP 9,000</td>
</tr>
</tbody>
</table>

**Aggregate Impact**

- **Social and Environmental NPV**: PhP 58,505 (USD 1,140)
- **Social IRR**: 59%

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**Reasons to Invest**

1. Opportunity for farmers to produce quality vegetables even during the wet season
2. Better pest and disease management due to a controlled production environment
3. Higher potential farm income compared to traditional open field cultivation
4. Lower pesticide and fertilizer use leading to better soil and water quality
5. Contributes to curbing carbon emissions because of reduced use of pesticides and fertilizers

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**Sensitivity Analysis**

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

- Selling price of lettuce and french beans decrease by 70%
- Initial Investment/150sq.m:
  - PhP 40,000
- Payback Period:
  - 2 years
- Estimated Additional Annual Profit/150sq.m:
  - PhP 14,010 (USD 273)

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**Recommendations**

Adopt during wet season in places prone to heavy rains:
- Protected cultivation technology is best adopted during the wet season (June-December), especially in places that are prone to heavy rains such as municipalities of Dalaguete and Argao in Southern Cebu.

Plant other high value crops:
- Aside from lettuce and French beans, other high value crops that are vulnerable to strong winds and rain, such as tomatoes and bell peppers, will also benefit from protected cultivation during the wet season.

Small-scale farmers are encouraged to invest in the practice:
- Local government unit, the DA, and the private sector are also encouraged to extend financial and technical support to incentivize adoption among farmers.

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**Study Site**

Cebu Province

**Data Gathering**

1. Analysis of 18 case farms located in key vegetable producing areas in Dalaguete, Cebu
2. Conduct of Experts’ Workshop with experts from the academe (Visayas State University) and the government (Department of Agriculture Region 7) pooling knowledge and insights on emerging climate resilient farm practices
3. Conduct of workshop with 40 Municipal Agricultural Officers (MAO) to validate and add to results from Experts’ Workshop and case farms
4. Review and synthesis of secondary information

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**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

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Cost & Benefit

<table>
<thead>
<tr>
<th>Initial Investment/150sq.m</th>
<th>PhP 40,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payback Period</td>
<td>2 years</td>
</tr>
</tbody>
</table>

---

**Yield & Prices**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Scenario 1 (150sqm/yr)</th>
<th>Scenario 2 (150sqm/yr)</th>
<th>Selling Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>43 kg</td>
<td>105 kg</td>
<td>PhP 100/kg</td>
</tr>
<tr>
<td>French Beans</td>
<td>80 kg</td>
<td>131 kg</td>
<td>PhP 100/kg</td>
</tr>
</tbody>
</table>

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**Externalities**

- Social and Environmental NPV: PhP 58,505 (USD 1,140)
- Social IRR: 59%

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**Study Site**

Municipality of Dalaguete

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**Initial Investment Breakdown**

<table>
<thead>
<tr>
<th>Item</th>
<th>Initial Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhP 150/105/70/kg</td>
<td>PhP 100/90/70/kg</td>
</tr>
<tr>
<td>PhP 40,000</td>
<td>PhP 14,010</td>
</tr>
</tbody>
</table>

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**When & Where?**

Adopt during wet season in places prone to heavy rains.

---

**Who?**

Small-scale farmers are encouraged to invest in the practice.

---

**What?**

Plant other high value crops.

---

**Reasons to Invest**

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