Rice-Onion Crop Rotation

Rice-onion crop rotation is an indigenous cropping scheme that aims to utilize remaining nutrients from the rice field for onion production while disrupting the cycle of pests and diseases. Onion grows in friable and well-drained soil, which is similar to the type of soil in Bulalacao. The dry climate and moderately high temperature are also suitable for growing onion since the crop’s water requirement is low. Moreover, rice and onion have the same periods of maturity, which adheres to the cropping seasons.

The traditional users plant rice for only one season and leave their rice fields unplanted for the next season, while the CRA users plant rice during the first season and onion in the next cropping season. Seasonal rotation of onion in rice fields can significantly intensify land use during prolonged dry seasons. It can optimize production by enhancing soil fertility and preserving the productive integrity of the soil. This practice can deliver higher income to farmers annually as it is proven to be cost-efficient through reduced input cost from irrigation, chemical fertilizers and pesticides.

**Available Technical Briefs**

### LUZON
- Cordillera Administrative Region (CAR)
  - Water Harvesting Tank for Cabbage in Benguet
  - Hybrid and Early Hybrid Potatoes in Benguet
- Region I (Northern Luzon)
  - Mango Production in Ilocos
  - Rice-Corn Crop Rotation in Ilocos
  - Rice-Tomato Rotation in Ilocos
- Region II (Cagayan Valley)
  - Rice-Onion Mungbean Crop Rotation/Onion Placement in Ilocos
  - Climate-Smart Rice in Ilocos
- 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)
  - Stopping Agricultural Land Technology for Corn in Iloilo
  - Impounding Projects for High Value Crops in Iloilo
- Negros Island Region (NR)
  - Use of Submergence Tolerant Rice in Negros Occidental
  - Organic Red Rice Production in Negros Occidental

### Mindanao
- Region IX (Zamboanga Peninsula)
  - Allium Plant for Drying for Rice in Zamboanga Sibugay
  - Coconut Yellow Corn Intercropping in Zamboanga Sibugay
- Region X (Northern Mindanao)
  - Biotechnology in Corn Production in Bukidnon
  - Banana-Corn Intercropping (Bacolod)
- Region XI (Davao Region)
  - Crop Rotation with Integrated Nutrient Management in Davao
  - Cacao-Red Corn Intercropping in Davao

### Mimaropa (Region IV-B)
- Coastal Barley Administration Region (CBAR)
  - Coastal-based Integrated Farming System in Quezon
- Region IVB (Mimaropa)
  - Rice-Onion Crop Rotation in Oriental Mindoro
  - Stress Tolerant Rice in Oriental Mindoro
- Region V (Visayas)
  - Rice-Onion Crop Rotation in Camarines Sur
  - Climate-Smart Rice (Green Super Rice) in Camarines Sur

### References

- Department of Interior and Local Government. 2014. Climate-change in the Philippines.
- Provincia Commodity Investment Plan Region 10. Department of Agriculture, Philippine Rural Development Project.

### About the Authors

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- Mr. Charles Macatangay, Socio-Economist
- Ms. Trisha Aroto, Socio-Economist
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### Technical Brief on Climate-Resilient Agriculture (CRA)

**Rice-Onion Crop Rotation**

Rice-onion crop rotation is practiced by farmers in the municipality of Bulalacao in Oriental Mindoro province to optimize production inputs through nutrient cycling and to intensify land use during dry season. Bulalacao is known to be highly vulnerable to drought. Producing rice during the dry season is becoming increasingly difficult. These climatic conditions, however, are suitable for onion production as it requires moderately high temperature and low precipitation. In response, rotating production from rice to onion allows farmers to efficiently cultivate their and even during dry spells.

**Productivity**

Preserve quality and productive integrity of the soil leading to higher crop yield.

**Cost-efficient production leading to potentially higher income.**

**Adaptation**

Rotation of crops to minimize production risks and losses in drought-prone and/or rainfed areas.

**Better pest and disease management.**

**Mitigation**

Lower chemical input use leading to better soil quality.
**Cost & Benefit**

**Initial Investment / ha**
- PhP 97,600

**Payback Period**
- 3 years

**Estimated Additional Annual Profit / ha**
- PhP 38,750
  - USD 755

**Yield & Prices**

<table>
<thead>
<tr>
<th>Without CRA</th>
<th>With CRA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st cropping season</strong></td>
<td><strong>1st cropping season</strong></td>
</tr>
<tr>
<td><strong>2nd cropping season</strong></td>
<td><strong>2nd cropping season</strong></td>
</tr>
<tr>
<td><strong>Average annual farm yield</strong></td>
<td><strong>Average annual farm yield</strong></td>
</tr>
<tr>
<td>PhP 14.91/kg</td>
<td>PhP 14.85/kg</td>
</tr>
<tr>
<td>PhP 22.58/kg</td>
<td>PhP 22.58/kg</td>
</tr>
</tbody>
</table>

**5 Reasons to Invest**

1. Intensified land use and increased production during prolonged dry season
2. Reduced input cost leading to higher income
3. Reduced chemical input use leading to better soil quality
4. Enhanced soil productivity
5. Better pest and disease management

**Externalities**
Further research is needed to quantify the externalities.

**Financial Analysis**

**Aggregate Impact**

<table>
<thead>
<tr>
<th>Current Adoption Rate</th>
<th>Projected Adoption Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3%</td>
<td>53%</td>
</tr>
</tbody>
</table>

**Net Present Value**

| PhP 201,585 |
| USD 3,928 |

**IRR**

| 47% |

**Assumptions**

<table>
<thead>
<tr>
<th>Period of Analysis</th>
<th>Discount Rate</th>
<th>Exchange Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 years</td>
<td>8.5%</td>
<td>$1 = PhP 51.32</td>
</tr>
</tbody>
</table>

**Data Gathering**

1. Analysis of experiences of 59 farmers in six barangays in the municipality of Bulalacao 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

**Recommendations**

**Plant in rainfed areas especially during the dry season.**
Full advantage of this practice can be obtained in rainfed areas especially during the dry season. This is also an effective strategy in areas with prolonged dry season (October-June).

**Plant other high value crops.**
With the climatic conditions of Bulalacao, high value crops such as onion, garlic, watermelon, squash and legumes can be grown during dry season.

Farmers are often challenged in securing the investment capital. A comprehensive crop insurance could help the farmers sustain this practice by reducing the risk from climate variability.

**LGUs should empower farmers to adopt the rice-onion crop rotation.**
LGUs together with the municipal and provincial agriculturist should empower farmers in practicing rice-onion crop rotation to adapt to the impacts of drought. They are encouraged to help farmers avail appropriate crop insurance products.

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**Study Site**

**Oriental Mindoro**

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**Initial Investment Breakdown**

<table>
<thead>
<tr>
<th><strong>Initial Investment</strong></th>
<th><strong>Cost of Adopting CRA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>PhP 97,600</td>
<td>PhP 97,600</td>
</tr>
<tr>
<td></td>
<td>PhP 123.1 million</td>
</tr>
</tbody>
</table>

**Costs**

- Labor & Services: PhP 59,000
- Maintenance costs: PhP 97,600
- Operations: PhP 14,500

**Further Research**

Further research is needed to quantify the externalities.