Conservation Agriculture with Drip Irrigation in Siem Reap, Cambodia

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Introduction

Vegetable production is a women’s domain in Siem Reap, Cambodia. Women decide what and when to plant, what maintenance activities to do and when to harvest and how much to market and retain for family consumption.

Vegetables in Siem Reap comes from neighboring countries such as Vietnam and Thailand. Increasing Siem Reap farmers capacity to produce vegetables will make them compete successfully in the local market. By using conservation agriculture -- minimum soil disturbance, continuous mulch and diverse species -- which minimizes soil evaporation, reduces soil temperature, arrests soil erosion, and increases soil fertility from legume mulch farmers will conserve their soil resource and make their farming more productive and sustainable.

The addition of low cost drip irrigation will make Siem Reap women farmers produce well during the dry season (November to April). Even during the rainy season, irrigation is sometimes needed due to having sandy soils that dries up quickly in between rainfall occurrences.

CA with drip will lessen labor burden of women farmers in intensive vegetable production. When fully established, the cover crops or mulch in CA will prevent weed growth and lessen evaporation thus needing less water than exposed soils. Drip irrigation will make farmers control water given to plants minimizing water loss, diseases, and weeds. Also, sensitive crops such as cucumbers will not be prone to being hit by the sprinklers avoiding them from being aborted.

Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean number of marketable fruits (No./ha) ± S</th>
<th>Mean Yield of Marketable Fruits (t/ha) ± S</th>
<th>Mean number of Non-Marketable fruits (No./ha) ± S</th>
<th>Mean Yield of Non-Marketable Fruits (t/ha) ± S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation Agriculture</td>
<td>131,111 ± 14.0</td>
<td>48,889 ± 2.7</td>
<td>140,000 ± 13.4</td>
<td>37,776 ± 3.1</td>
</tr>
<tr>
<td>Conservation Agriculture with Drip</td>
<td>140,000 ± 13.4</td>
<td>37,776 ± 3.1</td>
<td>158,889 ± 14.8</td>
<td>46,667 ± 2.8</td>
</tr>
<tr>
<td>Tilled</td>
<td>160,000 ± 16.0</td>
<td>37,776 ± 3.1</td>
<td>180,000 ± 17.4</td>
<td>52,333 ± 4.8</td>
</tr>
<tr>
<td>Tilled with Drip</td>
<td>222,222 ± 19.7</td>
<td>54,444 ± 5.3</td>
<td>200,000 ± 20.5</td>
<td>66,666 ± 6.5</td>
</tr>
</tbody>
</table>

Discussion

In women help team, all treatments have an average marketable cucumber yield of 14.5 t/ha with 2.8 t/ha non-marketable yield. In peaceful women team cucumbers under T, TD and T have an average marketable yield of 16.7 t/ha. The CA, CAD and T have an average yield of 14.5 t/ha. TD gave more yield than CA of about 2.2 t/ha. Non-marketable yield of peaceful women have an average yield 1.3 t/ha.

Differences between CA and T and CAD and TD are expected to be different in favor of T and TD because of mineralization of organic matter during the first years. However, in this case they are not significantly different thus it implies that CA and CAD could give farmers the same amount of yield while practicing conservation agriculture. The drip irrigation did not show an effect during the first cropping season possibly due to the rainy months from May to September. Drip irrigation will likely increase farmers yield during the dry season.

Conclusion

The application of mulch in conservation agriculture did not significantly affect the yield of cucumbers in Siem Reap, Cambodia. Thus farmers can do conservation agriculture without significantly affecting their yield. On the other hand, drip irrigation did not give an effect possibly due to the rainy season on which the cucumbers were grown.

Future studies

The experiment will be extended to 5 more growing seasons to better see advantages of conservation agriculture with drip irrigation. Also, labor requirements in irrigation and conservation agriculture will be recorded to see labor differences among treatments.

Materials and Methods

Identification of women farmer partners in 3 villages

Conservation agriculture with drip seminar and workshop

Delivery of 500 Liter Water Tanks for Drip Irrigation

Installation of low cost drip irrigation

CA and drip irrigation experiment field lay-outing

Planting and harvesting

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