Evaluations

Initial evaluation

The first observation trial was conducted with rice cultivar CO43. The treatments included two methods of crop establishment (wet seeding of sprouted seeds, and transplanting of 10-day-old seedlings) and five plant densities (4, 8, 16, 32 and 64 plants/m²). The plots were irrigated in the evening and drained in the following morning. Though there were no spectacular yield differences, the study confirmed that flooding was not necessary to maintain yield.

Detailed study

This experiment was conducted during August 2001 to January 2002. Some of the components of SRI cultivation practices were compared with conventional practices for transplanted rice. Four factors were evaluated, with treatment combinations replicated four times.

For the modified SRI practice: (1) seedlings were raised in the ‘dapog’ manner, and 14-day-old seedlings were placed on the surface of a puddled field; (2) up to the flowering stage, irrigation was given to a depth of 2.5 cm after surface cracks developed in the soil; after flowering, irrigation was similar to conventional practice; (3) all weeds were incorporated into the soil during weeding with a conoweeeder, and prior to transplanting, green manure at 6.25 t/ha was incorporated into the soil.

For conventional practice: (1) 23-day-old seedlings were planted; (2) irrigation was given to a depth of 5 cm one day after the disappearance of surface water; and (3) weeds were manually removed.

In both practices, a plant density of 25/m² was used compared to a conventional plant density of 50/m² in order to permit use of the conoweeeder. Also single seedlings were planted per hill with both practices. Since these are both essentially SRI practices, the evaluation
was really of “modified” SRI, assessing the effects of only three of the six basic SRI practices. The “control” fertilization treatment was a conventional N, P, K plus Zn application, with the experimental treatment being this plus incorporation of green manure and an additional N application, which is not really an SRI practice.

Location: Wetland Farm, Tamil Nadu Agricultural University
Design: Strip plot
No. of replications: 4
Plot size: 6 x 4.4 m
Variety: CORH2 (hybrid)
Planting density: 20 x 20 cm (25/m²)

**Treatments**

*Planting*  
P1: Conventional: standard nursery, 24 d old seedlings, 2-3 seedlings/hill  
P2: Modified SRI: dapog nursery, 14 d old seedlings, single seedling/hill

*Irrigation*  
I1: Conventional: irrigating to 5 cm depth after disappearance of ponded water  
I2: Modified SRI: irrigating to 2 cm depth after surface cracks develop up to flowering and thereafter as in I1

*Weeding*  
W1: Conventional: hand weeding at 18, 34 and 38 DAT
W2: Modified SRI: incorporating weeds and aerating soil with conweeder at 15, 26, 36, 47 and 57 DAT

*Nitrogen*  
N1: Recommended applications of N, P, K and Zn
N2: Recommended N, P, K and Zn applications + *dhaincha* green manure (6.25 t/ha) prior to planting + 25 kg N/ha at tillering

**Soil Characteristics**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Clay</td>
<td>470 g/kg</td>
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<tr>
<td>Organic carbon</td>
<td>8.2 g/kg</td>
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<tr>
<td>Silt</td>
<td>90 g/kg</td>
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<tr>
<td>KMnO₄</td>
<td>232 g/kg</td>
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<td>Sand</td>
<td>440 g/kg</td>
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<tr>
<td>Olsen-P</td>
<td>32 g/kg</td>
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<tr>
<td>Bulk density</td>
<td>1.18 g/cc</td>
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<tr>
<td>NH₄-OAc</td>
<td>740 g/kg</td>
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<tr>
<td>pH</td>
<td>8.3</td>
</tr>
<tr>
<td>Elec. conductivity</td>
<td>0.54 dS/m</td>
</tr>
</tbody>
</table>

**Climate**

The experiment was conducted during the northeast monsoon season. Weather conditions prevailing during the crop growth period are summarized in Table 1 below.

**Results**

Grain yields for the sixteen treatments varied from 5059 kg/ha to 7612 kg/ha. The results showed that by adopting the modified SRI irrigation practice, there was a water saving of 56% under conventional planting and 49.8% under modified SRI planting without any significant effect on grain yield when compared with conventional practice.

The maximum yield (7612 kg/ha) was obtained for the modified SRI practice with younger seedlings, restricted irrigation, addition of green manure, and incorporation of weeds with soil aeration.

With green manure application and conventional weeding, water-saving irrigation practices reduced yield compared with conventional irrigation practices, but not significantly. *In situ* incorporation of weeds of the modified SRI practice significantly increased the yield (6737 kg/ha) when compared to conventional weeding (6076 kg/ha).

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**Table 1. Weather conditions prevailing during the crop growth period**

<table>
<thead>
<tr>
<th>Crop growth period</th>
<th>Max. temperature (°C)</th>
<th>Min. temperature (°C)</th>
<th>Rainfall (mm)</th>
<th>Solar radiation (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P2</td>
<td>P1</td>
<td>P2</td>
</tr>
<tr>
<td>TP-AT</td>
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<td>31.6</td>
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<td>AT-PI</td>
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<td>PI-FL</td>
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<tr>
<td>FL-HT</td>
<td>28.3</td>
<td>28.5</td>
<td>19.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

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Learning

• Irrigating fields up to the flowering stage to a depth of 2 cm after surface cracks developed, and thereafter irrigating conventionally, was found to give a similar yield compared to conventional irrigation, with a 50 to 56% saving of water.

• Incorporation of weeds is more beneficial for increasing the grain yield than removing them from the field, though part of this effect might be attributed to the soil aeration achieved with the cono-weeder.

• Younger single seedlings per hill and 25 hills/m² produced yield similar to 3-week-old seedlings, 2-3 per hill, and 50 hills/m². This new practice could reduce farmers’ seed cost, especially for hybrid seeds.

Prospects

Modified SRI methods offer scope for considerable reduction in the water requirement and in seed requirements, with an increase in yield attributable in large part to the incorporation of weeds in the soil and to soil aeration along with different plant management practices.