Africa RISING in the Ethiopian Highlands

Soil and water managements and landscapes: Africa RISING science, innovations and technologies with scaling potential from the Ethiopian highlands

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Key messages

- Complementary LRWH technologies implemented across the landscape enhanced synergies and reduced trade-offs. (Fig. 1).
- Reduction in soil loss and increase in baseflow due to LRWH interventions provide sustainable intensification options for dry season production.
- Information on irrigation scheduling advice (e.g. WFD) increases crop & water productivity in the dry season (Fig. 1B).
- Solar and service provision of water are feasible technologies for smallholder irrigation in the Ethiopian highlands.

Objectives and approach to improve sustainable system productivity across landscapes

- Problem identification through participatory approaches with stakeholders
- Biophysical and socio-economic gender disaggregated data collection during rainfed and irrigated cropping seasons
- Seasonal feedback meetings and exchange visit with stakeholders
- Evidence generation at different scales using different approaches (Fig. 2).
- Comparison of technology performance against control/baseline

Key results

- Model estimation showed average soil loss of 15 t ha⁻¹ year.
- Terraces with trenches on cropland reduced runoff and soil loss by 44% and 52%, respectively.
- Integrated soil and water conservation practices at landscape level can reduce soil loss by over 80% and baseflow by 30%.
- Vegetable yields increased by 55%-%83% with drip versus hoses or watering cans whilst access to irrigation advice increased vegetable yields by 20% & vetch yield by 50% (Table 1).
- Solar & water provision are both economically feasible technologies.

Significance and scaling potential

- Implementing complementary technologies across the landscape continuum enhances synergies while reducing tradeoffs.
- Implementing technologies that provide economic, environmental and social benefits at household and community levels enhances adoption and out-scaling.
- Climate smart interventions at landscape level both directly benefit communities and simultaneously provide ecosystem services and enhance options for dry season intensification.
- The upscaling of solar pumps throughout the country is currently being explored by a private-public partnership whilst the scheduling advice is going to be used to update national ICT advice.

Table 1: Comparison of the produces grown with different water lifting technologies (rope & washer (R&W), solar, tractor mounted pump) and irrigation scheduling (without (FP) and with (WFD)).

<table>
<thead>
<tr>
<th>Yield (t ha⁻¹)</th>
<th>Control</th>
<th>R&amp;W</th>
<th>Solar</th>
<th>Tractor &amp; drip</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WM</strong></td>
<td><strong>FP</strong></td>
<td><strong>WFD</strong></td>
<td><strong>FP</strong></td>
<td><strong>FP</strong></td>
</tr>
<tr>
<td>Cabbage</td>
<td>40 ± 11</td>
<td>41 ± 12</td>
<td>48 ± 6</td>
<td>49 ± 4</td>
</tr>
<tr>
<td>Carrot</td>
<td>36 ± 8</td>
<td>37 ± 10</td>
<td>43 ± 7</td>
<td>38 ± 10</td>
</tr>
<tr>
<td>Oats¹</td>
<td>-</td>
<td>6 ± 1</td>
<td>7 ± 1</td>
<td>5 ± 1</td>
</tr>
<tr>
<td>Oats²</td>
<td>-</td>
<td>13 ± 3</td>
<td>13 ± 2</td>
<td>-</td>
</tr>
<tr>
<td>Vetch²</td>
<td>-</td>
<td>4 ± 2</td>
<td>6 ± 1</td>
<td>-</td>
</tr>
</tbody>
</table>

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