Climate-Smart Agriculture is an Approach Not a List of Practices: By the Numbers

Todd Rosenstock and Andy Jarvis, ICRAF, Nairobi and CIAT, Colombia; Christine Lamanna (ICRAF), Evan Girvetz (CIAT), Caitlin Corner-Dolloff (CIAT) and others
Conservation agriculture
Agroforestry
Organic fertilizer
Improved feeding of cattle
Manure management
Rotational grazing
Crop rotations
...

Rosenstock and Lamanna
Rosenstock et al. 2016a
STUDIES WITH INDICATORS FOR AT LEAST ONE COMPONENT OF CSA

Random sample of 815 studies
STUDIES WITH INDICATORS FOR ALL THREE COMPONENTS OF CSA

Need a new paradigm for research

Random sample of 815 studies
THE IMPORTANCE OF THE SOCIAL CONTEXT

**FARM & HOUSEHOLD CHARACTERISTIC**

**IMPACT ON ADOPTION**

**SIGNIFICANCE**

### Household demographics
- Education
- Age HH head
- HH size
- Female household head
- Farmer is a community leader

### Farm management
- Importance of livestock
- Proportion of ha irrigated
- Farm size
- Distance farm-HH
- Family labor
- Hired labor

### Income
- Importance of crop revenues in income
- Crop price index
- Off-farm income

### Wealth & Assets
- Crop insurance
- Access to electricity
- Private water supply
- Access to credit
THE IMPORTANCE OF BIOPHYSICAL CONTEXT

Potential CSA in the Sahel

Conservation Agriculture

Bayala et al. 2012

Pittelkow et al. 2014
# The Importance of Thinking About Impact

## CSA for Crop Production in TZ

<table>
<thead>
<tr>
<th>Practice</th>
<th>Effect</th>
<th>Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Fertilizer</td>
<td>0.7</td>
<td>15%</td>
</tr>
<tr>
<td>Water Harvesting</td>
<td>0.67</td>
<td>18%</td>
</tr>
<tr>
<td>Inorganic Fertilizer</td>
<td>0.52</td>
<td>32%</td>
</tr>
<tr>
<td>Zai Pits</td>
<td>0.48</td>
<td>18%</td>
</tr>
<tr>
<td>Green Manure</td>
<td>0.48</td>
<td>7%</td>
</tr>
<tr>
<td>Intercropping</td>
<td>0.33</td>
<td>57%</td>
</tr>
<tr>
<td>Mulching</td>
<td>0.32</td>
<td>34%</td>
</tr>
<tr>
<td>Reduced Tillage</td>
<td>0.26</td>
<td>24%</td>
</tr>
<tr>
<td>Improved Varieties</td>
<td>0.18</td>
<td>13%</td>
</tr>
<tr>
<td>Crop Residue</td>
<td>0.16</td>
<td>34%</td>
</tr>
<tr>
<td>Agroforestry</td>
<td>0.02</td>
<td>13%</td>
</tr>
<tr>
<td>Crop Rotation</td>
<td>0.02</td>
<td>36%</td>
</tr>
</tbody>
</table>
THE IMPORTANCE OF CONSIDERING MULTIPLE OBJECTIVES
THE IMPORTANCE OF CONSIDERING MULTIPLE OBJECTIVES, SPECIFICALLY
THE IMPORTANCE OF PRIORITIES FOR DETERMINING BEST FITS

Lamanna and Rosenstock in prep
Many interventions can be climate-smart somewhere, but none are likely climate-smart everywhere

Rosenstock and Lamanna
CSA-PLAN: A GUIDE TO SCALING CSA

**Situation Analysis**
- Risks and Enabling Conditions
  - Vulnerability & Impacts + Readiness
  - Stocktaking for CSA Action

**Targeting & Prioritizing**
- Practices, Programs and Policies
  - Trade-offs & Value for Money
  - CSA Investment Portfolios

**Programming Design**
- Guidelines & Implementation
  - Knowledge into Action
  - Taking CSA to Scale

**Monitoring and Evaluation**
- Across Scales and Systems
  - Evidence Based Results Framework
  - Learning from Experience
CLIMATE-SMART PROFILES

Situation Analysis
Risks and Enabling Conditions
Vulnerability & Impacts & Readiness

Stocktaking for CSA Action

• Indicators and targets to achieve
• Agricultural snapshot
• Future climate impacts
• Ongoing and promising CSA practices
• Institutions and policy entry points
• Finance mechanism
Selected CSA practices and technologies for production systems

**Key for food security in Senegal**

<table>
<thead>
<tr>
<th>Degree of Adoption</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Width of the bar is based on production system area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartness level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

- **Fodder banks**: Manure composting for fertilization (Intensification of cultivated pastures (Intensification of cultivated pastures
- **Livestock**: (Cattle and sheep)
- **Livestock**: (Cattle and sheep)
- **Drip irrigation**: Use of organic fertilizer
- **Horticulture**: Drip irrigation
- **Mango**: Use of organic fertilizer
- **Irrigated rice**
- **Alternative crops** (Cassava, cowpeas)
- **Stone bunds**
- **Groundnuts**: Certified short-cycle varieties
- **Use of organic fertilizer**
- **Composting using biogas systems**
- **Cereals**: (Maize, millet, sorghum)
- **Climate information systems**: (Crop calendars, seasonal forecasts and early warning systems)

<table>
<thead>
<tr>
<th>CSA practice</th>
<th>Region and adoption rate (%)</th>
<th>Predominant farm scale</th>
<th>Climate smartness</th>
<th>Impact on CSA Pillars</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Irrigated rice</strong></td>
<td>(25% of total harvested area)</td>
<td>Small scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System of Rice Irrigation</strong></td>
<td></td>
<td>Medium scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>River Valley</strong></td>
<td>(30 % of total harvested area)</td>
<td>Large scale</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Productivity**: Increases yield by maintaining optimum condition of plant development.
- **Adaptation**: Promotes the efficient use of scarce water resources.
- **Mitigation**: The practice may contribute to reductions in emissions when replacing mechanized by manual planting and when saving energy used in irrigation pumps. It may also contribute to reducing methane emissions.

- **Productivity**: Salinity reduction can lead to optimum conditions for plant development and production.
- **Adaptation**: Management of soil salinity through drainage and flooding, ridges and furrows, addition of organic matter etc., increases nutrient availability and decreases crop exposure to climate risks.
- **Mitigation**: Additions of organic matter can increase soil carbon stock.
Thank you.

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