Building Productive, Resilient & Sustainable Maize-Legume Cropping Systems in Africa: Achievements, challenges and opportunities and looking forward

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Harare, Zimbabwe

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- Phase 1-2010-2013
- SIMLESA2 2014-2018

PARTNERS-NARS
- EIAR, KARI, DRD,DARS , IIAM, spill over NARO,RAB, DAR
- Regional/International
- QAAFI, ARC, ASARECA, ILRI,CIAT
- CCARDESA(phase2),

Target and Spillover countries
Approaches

3+3- Is
INTEGRATION
(SYSTEMS)
INNOVATION
PLATFORMS
IMPACT
ORIENTATION
Information
Inputs
Institutions/policy
Complimentary
projects: DTMA, TL-II
ACIAR/AIFSC- AP, ZIMCLF, FACASI, TF-ICRAF

Vision of Success

To increase maize and legume yields by 30% while sustaining the environment through:

• Conservation agriculture practices
• Improved maize and legume varieties
• Development of markets and value chains, from input supplies to output markets.

To reduce downside yield risks by 30%

To benefit 650,000 farm households within 10 years.
overview of SIMLES A II: 2014 – 2018

Focus on CA-based sustainable intensification, (cop-livestock) integration, scaling and impact

Objective 4: Outscaling & Innovation Systems

30% yield risk reduction + 30% productivity increase among 650,000 farms by 2023
SIMLESA - Achievements

• characterized the maize-legume production and value chain systems in the study sites
• tested promising smallholder maize-legume cropping systems;
• Attempted to increase the range of maize and legume varieties available for smallholders;
• Piloted scaling out by developing and employing local innovations platforms and now launched CGS
• Facilitated a strong capacity building of agricultural research partners.
Yield impacts

• Across ESA, results clearly demonstrate yield benefits from the use of rotations in CA based SI systems
  – with maize yield increases averaging 1.5t/ha
    – With yield increase for legumes average 0.8t/ha
  – Reduction of down size yield risk by 45%
Germplasm for climate smart farming systems

Stress tolerant maize and legumes

More than 50 new drought tolerant maize varieties have been released.

Stress varieties of cow pea, pigeon pea, beans.
Gender Integration in R4D activities

What was achieved:

- Leadership and coordination skills for GFP strengthened
- Identification of core activities for gender integration
- Development of M&E Indicators
- Gender capacity strengthening strategy developed by ARC
- Gender in Communication
A brief snapshot: some key research from SIMLESA

Is there a value proposition in CA for farmers?

The productivity (yield) advantages of CA compared to farmer practices has been demonstrated in research done the SIMLESA project. For example,

- **Malawi**
  - Increase in maize yield while planting in basins relative to the conventional flat seeding on tilled seed bed.
  - Increase in maize yield in lowland agro-ecology.

- **Ethiopia**
  - The average increase in grain maize yield under CA options compared with farmers’ practice.

- **Mozambique**
  - Increase in maize yield in Gorongosa under direct seeding.
# 2016 Adoption Monitoring technologies/practices

<table>
<thead>
<tr>
<th>Country</th>
<th>Target</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>33,870</td>
<td>28,449</td>
<td>5,421</td>
<td>33,871</td>
<td>100.00%</td>
</tr>
<tr>
<td>Kenya</td>
<td>28,878</td>
<td>17,379</td>
<td>26,684</td>
<td>44,063</td>
<td>152.60%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>28,878</td>
<td>21,756</td>
<td>10,135</td>
<td>31,891</td>
<td>111.00%</td>
</tr>
<tr>
<td>Malawi</td>
<td>25,991</td>
<td>18,454</td>
<td>19,185</td>
<td>37,639</td>
<td>145.50%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>25,991</td>
<td>18,770</td>
<td>7,299</td>
<td>26,069</td>
<td>100.30%</td>
</tr>
<tr>
<td>Total</td>
<td>143,607</td>
<td>104,808</td>
<td>68,724</td>
<td>173,533</td>
<td>121.00%</td>
</tr>
</tbody>
</table>

On track to achieve 650,00 households by 2023
Expected to create awareness of 5 million farm households
**Some Empirical Lessons 1: Adoption**

<table>
<thead>
<tr>
<th>Group Membership including Innovation platforms</th>
<th>Proximity to Markets</th>
<th>Household Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those farmers belonging to groups had higher chance to adopt:</td>
<td>When close to markets farmers had a higher chance to adopt:</td>
<td>With more assets in the household farmers had a higher chance to adopt:</td>
</tr>
<tr>
<td>- In Ethiopia: Crop diversification and minimum tillage</td>
<td>- In Ethiopia: Crop diversification and manure use</td>
<td>- In Ethiopia: Soil and Water Conservation</td>
</tr>
<tr>
<td>- In Kenya: Improved varieties and fertilizer</td>
<td>- In Malawi: Improved varieties</td>
<td>- In Kenya and Tanzania: Manure</td>
</tr>
<tr>
<td>- In Malawi: Soil and Water Conservation</td>
<td>- In Tanzania: Crop diversification and minimum tillage</td>
<td></td>
</tr>
</tbody>
</table>
Some Empirical Lessons 2: *Returns and impact*

1. Adopting individual practice benefit farmers but suites of technologies:
   - Led to highest income
   - Reduced fertilizer use, without yield penalty
   - Lowered cost of risk (downside risk)

2. Adoption of improved varieties of maize and legumes
   - Improves food and nutrition security

3. For conservation agriculture to succeed (crop livestock production systems)
   - Alternative feed sources are needed—new forage crops being promoted

   Crop residue is a valuable multi-use resource
The SIMLESA Outputs

Technical

• Farmers realized increased from 2.5 to 4 tons/ha maize (1.5t/ha) and increase of 0.8 tons/ha legumes yields through drought tolerant crops from practicing CA based SI practices compared to conventional farming practices.

• Selected hybrids yielded 30-40% more under drought and 20-25% under optimum conditions compared to commercial varieties across the 5 countries.

• Farmers saved labour by 50% for other use in other economic activities through adopting zero tillage in Tanzania and Malawi.

• Strong Science outputs (122 publications 52 posters 15 policy briefs and various communication products including national level media coverages, national, regional and international conference, participation by partners, SIMLESA Website)
LOOKING FORWARD

- FINALIZE ONGOING RESEARCH ACTIVITIES
- Document and publish lessons and insights
- Fast track recently launched scaling out under the Competitive Grant Scheme (20 scaling partners – Seed companies, Media, NGOs and University)
- 2017- Organize Africa Sustainable Intensification conference in collaboration with other development partners (USAID, BMGF, AfDB...)
- 2018 SIMLESA- ACIAR BOOK
Acknowledgment;
SIMLESA Partners
SIMLES HOST FARMERS AND COMMUNITIES rs
ACIAR AND CIMMYT