Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa

Malawi Country Report

SIMLESWA Team
Background

• Population is about 18 million
• 86.5% of Malawi’s population live in the rural areas
• 57% of total rural population is poor
• Agriculture contributes about 30% of GDP
• Farming systems- rain-fed maize-based (80% grows maize)

• Maize yield remains low at 1.8 ton/ha

• Maize is strategic crop

• Legumes provide income for women farmers
## Alignment of SIMLESA with national agendas

<table>
<thead>
<tr>
<th>NAP PRIORITY AREAS</th>
<th>SIMLESA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Irrigation Development</td>
<td></td>
</tr>
<tr>
<td>Mechanization of Agriculture</td>
<td></td>
</tr>
<tr>
<td>Agricultural Market Development, Agro-processing and Value Addition</td>
<td>✓</td>
</tr>
<tr>
<td>Food and Nutrition Security</td>
<td>✓</td>
</tr>
<tr>
<td>Agricultural Risk Management</td>
<td>✓</td>
</tr>
<tr>
<td>Empowerment of Youth, Women and Vulnerable Groups in Agriculture</td>
<td>✓</td>
</tr>
<tr>
<td>Institutional Development, Coordination and Capacity Strengthening</td>
<td>✓</td>
</tr>
</tbody>
</table>

- SIMLESA fits well in 3 pillars of ASWAP
SIMLESA project sites

- Mid-altitude agro-ecology
  - Kasungu District
  - Mchinji District
  - Lilongwe District
- Low-altitude agro-ecology
  - Ntcheu District
  - Balaka District
  - Salima District
Success Approaches

• Scaling-out approaches (Innovations platforms, FDs, farmer exchange visits, ICT etc)

• Public private partnerships

• Influence of traditional leaders

• Political will

• Feedback mechanism- Adoption monitoring

• Constant technical backstopping by CIMMYT
Outcome level achievements
Increase in yields by 30% and reduction in downside risk by 30%

- CA system increase maize yields
  - 19% - mid altitude
  - 37% low altitude agro-ecological zones
- CA led to a 16% decrease in downside risk.
Characterized farming systems and established benchmarks for adoption and impact assessment

- 11 communities characterized
- Established 36 on-farm exploratory trials
- Long term trial at Chitala research station
- Six Innovation platforms
- Baseline study (892 HH, 144 FHH)
Four typologies identified based on livelihood strategies
# Market and value chains analysis

## Key opportunities & constraints

<table>
<thead>
<tr>
<th>Actors</th>
<th>Opportunities</th>
<th>Constraints</th>
<th>Required Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importers (Fertilizer)</td>
<td>High demand for inputs</td>
<td>Monopoly in the input market</td>
<td>Strengthening of small seed agribusiness and encouraging women entrepreneur</td>
</tr>
<tr>
<td>Distributers, seed producers, chemical suppliers</td>
<td></td>
<td>Increased erratic rainfall and drought</td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td></td>
<td>Lack of credit to buy inputs</td>
<td></td>
</tr>
</tbody>
</table>

- Increased erratic rainfall and drought
- Lack of credit to buy inputs

### Actors
- Importers
- Distributers, seed producers, chemical suppliers
- Farmers
Disaster risk and mitigation measures in Malawi

Map Showing Normal Against 2015/2016 Observed Seasonal Rainfall

Legend
- Lakes
- District Boundaries
- Rainfall Distribution
  - <508.0000
  - 508.0001 - 800.0000
  - 800.0001 - 1200.0000
  - 1200.0001 - 1600.0000
  - 1600.0001 - 2000.0000
  - 2000.0001 - 2255.9000

SIMLESWA impact districts
Adaptation strategies

**Ex-ante** adaptation strategies

- Tillage system diversification
- Various forms of CA
- Crop diversification
- Drought tolerant crop varieties
- Spatial diversity

**Annual Rainfall 2015/2016, Bazale EPA, Balaka**

- Total rainfall: 534mm
Adoption monitoring of technologies/practices

- Estimated number of farmers who have adopted the SI technologies (2010-2017) is 51,097 against target 46,000
- At baseline adoption rate of SI was 4%
- Currently it is at 35%
Major Drivers of technology adoption

- Enhanced extension services (ratio, frequency, extension models & different platforms)
- Market access
- Participatory development of technologies
- IPs
Constraints to adoption in low-altitude agro-ecologies

Reasons for non-adoption in low-altitude (%)

- Lack of skill to use technologies
- Told by fellow farmers that it is not increasing yields
- Lack of cash for herbicides
- Lack of equipment (DS, rippers)
- Labour shortage
Constraints to adoption in the mid-altitude agro-ecologies

Reasons for non-adoption in Mid-altitude (%)

- Lack of skill to use technologies
- Told by fellow farmers that it is not increasing yields
- Lack of cash for herbicides
- Lack of equipment (DS, rippers)
- Labour shortage

Kasungu Male
Lilongwe Female
Lilongwe Male
Mchinji Female
Mchinji Male
## Constraints to adoption of SI technologies promoted under SIMLES A in 2013

<table>
<thead>
<tr>
<th>Major Reasons for not adopting</th>
<th>Percent</th>
<th>Minor Reasons for not adopting</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of cash</td>
<td>28.5</td>
<td>Lack of inputs such as herbicides</td>
<td>2.7</td>
</tr>
<tr>
<td>Lack of seed</td>
<td>23.3</td>
<td>Told by other farmers that it is not effective in increasing yield</td>
<td>1.9</td>
</tr>
<tr>
<td>Just learnt about the technology</td>
<td>12.9</td>
<td>Livestock feed shortage</td>
<td>1.8</td>
</tr>
<tr>
<td>Lack of equipment</td>
<td>12.5</td>
<td>The though is that it is for fields along the road only</td>
<td>0.9</td>
</tr>
<tr>
<td>Shortage of labor</td>
<td>4.6</td>
<td>Fear of destroying soil fertility</td>
<td>0.3</td>
</tr>
<tr>
<td>Not interested</td>
<td>3.6</td>
<td>See no benefits</td>
<td>0.5</td>
</tr>
<tr>
<td>Shortage of crop residues</td>
<td>2.9</td>
<td>Increase in pest and diseases</td>
<td>0.3</td>
</tr>
<tr>
<td>Lack of technical know how</td>
<td>2.8</td>
<td>Theft</td>
<td>0.1</td>
</tr>
<tr>
<td>Lack of land</td>
<td>2.8</td>
<td>Total N</td>
<td>989</td>
</tr>
</tbody>
</table>
## Gender responsive

Decision making by men and women in married households in 2017

<table>
<thead>
<tr>
<th>Name of District</th>
<th>Female %</th>
<th>Men %</th>
<th>Both %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Balaka</em></td>
<td>38.57</td>
<td>20.62</td>
<td>51.54</td>
</tr>
<tr>
<td><em>Ntcheu</em></td>
<td>12.85</td>
<td>35.48</td>
<td>35.48</td>
</tr>
<tr>
<td><em>Lilongwe</em></td>
<td>4.28</td>
<td>25</td>
<td>69.64</td>
</tr>
<tr>
<td><em>Mchinji</em></td>
<td>2.85</td>
<td>6.34</td>
<td>90.47</td>
</tr>
<tr>
<td><em>Kasungu</em></td>
<td>14.28</td>
<td>22.23</td>
<td>59.25</td>
</tr>
<tr>
<td><em>Salima</em></td>
<td>11.42</td>
<td>22.41</td>
<td>63.79</td>
</tr>
<tr>
<td>Average</td>
<td>14</td>
<td>22</td>
<td>62</td>
</tr>
</tbody>
</table>

Adoption monitoring survey, 2017
Gender responsive transformation
AGRONOMY: To increase yield productivity and develop scalable technologies

• Exploratory trials compared locally adapted CA systems (no till, planting methods, residues, herbicides, cropping system) with conventional practices (i.e. ridges, no residues).

• Baseline yield: Maize - 1777 kg/ha, with hybrid - 1935 kg/ha, OPV- 1539 kg/ha and local variety 1434 kg/ha.
### Increases in yield productivity

Average maize yields (kg/ha) by cropping system in the low-altitude districts

<table>
<thead>
<tr>
<th>Cropping System</th>
<th>Overall 4 year mean</th>
<th>% yield increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional practice</td>
<td>2397</td>
<td></td>
</tr>
<tr>
<td>CA Basins Maize - pigeon pea intercrop</td>
<td>2824</td>
<td>18</td>
</tr>
<tr>
<td>CA Dibble stick Maize-pigeon pea intercrop</td>
<td>2628</td>
<td>9</td>
</tr>
<tr>
<td>CA Dibble Maize sole</td>
<td>2718</td>
<td>12</td>
</tr>
<tr>
<td>CA Dibble stick Maize-groundnut rotation</td>
<td>3286</td>
<td>37</td>
</tr>
</tbody>
</table>
Approaches in scaling out seed production and delivery systems

• **Formal**
  – Seed grower contracts by seed companies
  – Production Basic/pre-basic seed) at DARS (govt) stations
  – Seed Revolving (ICRISAT and IITA projects)
  – Farmer Associations (NASFAM, ASSMAG, GALA)

• **Informal**
  – Pass-on programs by NGOs
  – Community based seed banks
  – Farmer Research Groups – early generation seed
Maize and legume released varieties

- 10 hybrid maize
- 7 groundnut
- 1 Soybean
- 3 pigeon pea
## Scalable technologies

<table>
<thead>
<tr>
<th>Agroecology</th>
<th>Technology Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low altitude</td>
<td>✓ Use of planting basins&lt;br&gt;✓ Use of stress tolerant crop varieties&lt;br&gt;✓ Maize-groundnuts Rotation&lt;br&gt;✓ Maize-pigeon pea intercrop</td>
</tr>
<tr>
<td>Mid altitude</td>
<td>✓ Maize-Soybean Rotation including inoculation&lt;br&gt;✓ Improved maize and legume varieties that withstand multiple stresses&lt;br&gt;✓ Flat planting</td>
</tr>
</tbody>
</table>
# Maize and legumes for scaling

<table>
<thead>
<tr>
<th>Crop</th>
<th>Technology (varieties)</th>
<th>Ecology</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundnuts</td>
<td>Chitala, Kakoma Nsinjiro, CG 7, ICGV-SM 01514, 99551, 99556, 01724, 01731, 08503, 08501</td>
<td>Low-Mid Altitude areas</td>
<td>Peacock Seeds, Museco, Funwe, Ex-Agris, NASFARM</td>
</tr>
<tr>
<td>Pigeon pea</td>
<td>Mwaiwathualimi, Chitedze pp1,2</td>
<td>Low-High Altitude areas</td>
<td>MUSECO, NASFARM, WASA</td>
</tr>
<tr>
<td>Soy bean</td>
<td>Makwacha, Tikolare, Nasoko</td>
<td>Low-High Altitude areas</td>
<td>MUSECO, NASFARM</td>
</tr>
</tbody>
</table>
### Farmer Preferred traits

<table>
<thead>
<tr>
<th>Crop</th>
<th>Variety</th>
<th>Rank</th>
<th>Reasons of preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>MH26</td>
<td>1</td>
<td>- High yielding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Flint</td>
</tr>
<tr>
<td></td>
<td>MH31</td>
<td>2</td>
<td>- Flint</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Comparatively high yielding</td>
</tr>
<tr>
<td></td>
<td>DKC8053</td>
<td>3</td>
<td>- Low yielding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Flint</td>
</tr>
<tr>
<td>G/nuts</td>
<td>Kakoma</td>
<td>1</td>
<td>- Early maturity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Comparatively high yielding</td>
</tr>
<tr>
<td></td>
<td>Chitala</td>
<td>2</td>
<td>- Disease resistant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Early maturing</td>
</tr>
</tbody>
</table>
## Innovation platforms established in Malawi

<table>
<thead>
<tr>
<th>Name of platform</th>
<th>Number of farmers</th>
<th>Year established</th>
<th>Activities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitundu AIP</td>
<td>146</td>
<td>2010</td>
<td>Marketing, Input acquisition and Out scaling activities (demos, trophies, field days)</td>
<td>Most Successful</td>
</tr>
<tr>
<td>Chamama AIP</td>
<td>83</td>
<td>2012</td>
<td>Out scaling activities (demos, field days) Input acquisition</td>
<td>Successful (requires support on marketing)</td>
</tr>
<tr>
<td>Nsipe AIP</td>
<td>52</td>
<td>2013</td>
<td>Out scaling activities (demos, field days)</td>
<td>Requires more support</td>
</tr>
<tr>
<td>Tembwe AIP</td>
<td>152</td>
<td>2012</td>
<td>Out scaling activities (demos, field days) Input acquisition</td>
<td>Successful (well organized but requires support on marketing)</td>
</tr>
<tr>
<td>Kapiri AIP</td>
<td>60</td>
<td>2012</td>
<td>Out scaling activities (demos, field days)</td>
<td>Requires more support since it has not reached the sustainable stage</td>
</tr>
<tr>
<td>Rivirivi AIP</td>
<td>45</td>
<td>2013</td>
<td>Out scaling activities (demos, field days)</td>
<td>Requires more support since it has not reached the sustainable stage</td>
</tr>
</tbody>
</table>

There are about 538 farmers affiliated to the platforms, 2016 assessment
Innovation platforms

**Lilongwe**
1. Farmers World
2. Kulima Gold
3. Export Trading Company
4. TLC
5. Agri -Trading Company
6. Pannar seed company

**Kasungu**
1. CADECOM
2. TLC
3. K2 TASO
4. NASFAM

**Mchinji**
1. Clinton (CDI)
2. TLC
3. NASFAM
4. CADECOM
5. Farmers Hum
6. Action Aid
7. Chisaka Alimi

**Achievement of IPs:**
- Facilitated identification of out scaling farmers

**Balaka**
1. Concern Universal
2. FAO
3. NASFAM
4. MINELELA
5. FIDP

**Ntcheu**
1. TLC
2. NASFAM
3. Africa Rise Project
4. Concern universal

**Salima**
1. Malawi Lake Basin
2. TLC
3. Environmental Africa
4. Agro-dealers
5. PANA-seed company

**Achievement of IPs:**
- Facilitated acquisition of inputs e.g. Mitundu =1 million Malawi Kwacha or 2439 USD
Drivers to farmer adoption of the IPs

- Market access
- Storage opportunities

Needs good facilitating institution to drive the platform
## SIMLESA competitive grantees in Malawi

<table>
<thead>
<tr>
<th>Name of institution</th>
<th>Farm Radio Trust</th>
<th>NASFAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main scaling approach</td>
<td>Participatory radio</td>
<td>Club model</td>
</tr>
<tr>
<td>Scaling pathways</td>
<td>Via radio, field and mobile (ICT)</td>
<td>National network of farmer groups</td>
</tr>
<tr>
<td>Number of farmers reached out</td>
<td>200,000</td>
<td>40,245</td>
</tr>
</tbody>
</table>
Individual capacity building initiatives by SIMLESA Programme since 2010

<table>
<thead>
<tr>
<th>Type of training</th>
<th>Key skills/knowledge advanced</th>
<th>Number of personnel</th>
<th>Proportion of women</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhDs</td>
<td></td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>MScs</td>
<td>Agronomy &amp; economics</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td>Short course</td>
<td>Gender mainstreaming (TOTs)</td>
<td>5</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Gender mainstreaming (project implementers)</td>
<td>18</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Agronomy</td>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Conservation agriculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APSIM modelling</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>CA, Soil health and Innovation Platform skills</td>
<td>4</td>
<td>0%</td>
</tr>
<tr>
<td>Workshops</td>
<td>Scientific writing</td>
<td>3</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>APSIM modelling and use of ODK</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Coordination</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Field exchange visits</td>
<td>CA-based sustainable intensification</td>
<td>93</td>
<td>45%</td>
</tr>
</tbody>
</table>
What worked well in SIMLESA

- Strong government commitment to support the programme
- Integration of the project to ASWAp
- Good Public Private Partnerships
- Enhanced adoption of SI by farmers
- Rigorous socio-econs studies were conducted which could inform policies
- Purchasing of scientific equipment
- Capacity building of scientists, extension workers as well as farmers
- A suite of technological innovations
- Institutional innovations, especially AIPs, that improve the enabling environment for adoption of SI practices
Soft benefits

• SIMLES A yielded inception of other brother projects
  – SAPP and APPSA all focus on SI
GAPS in SIMLESA

- Knowledge management and dissemination Publications
- The IPs needs to be out-scaled
- Reliance on ADMARC as an output market
- GAP remain in marketing of commodities- maybe a model like that of ICRISAT is also needed
- Integration of farmers into the value chains was minimal
Key lessons

1. Need for systemic research, going beyond disciplinary approach
2. The technologies made available are not silver bullets but a shopping basket for farmers depending on their environment
3. Rigorous research to develop marketing model with farmers integrated into the value chains is vital
4. “If a tree fell in the forest and no one is there to hear it, did it make a sound?” Knowledge management is key
5. There need for innovative institutional arrangement and policy alignment to transform agriculture in Malawi
6. Enhanced PPP has facilitated adoption of SI technologies
Acknowledgement

- ACIAR
- CIMMYT
- QAAFI
- CG partners
- Farmers and farmer organizations
- DARS
Thank you for your interest!

ZIKOMO!!