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

END OF PROJECT REVIEW
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Uganda SIMLESA Project

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Background

- Average maize yields on smallholder farms in Uganda, which on average are between 0.5–1.0ha, range from 0.8 to 1.6t/ha; this is less than 20% of the potential (RATES, 2003; Otunge et al., 2010).
- Average yields of legumes such as beans are less than 0.6t/ha; which is 30% of the potential (Sebuwufu et al. 2010).
- Potential maize yield in Uganda is estimated to range from 3.8 to 8.0t/ha (Semaana, 2010) while that of beans is 2.0t/ha.
- About 30% of what is produced by smallholders is lost due to poor post harvest handling (FAO, 2010).
- Adoption of new technologies and practices is still very low.
Interventions: Uganda SIMLESA Project

Overall objective
➢ To improve livelihoods of maize and legume producers by addressing pre-production, production and post-harvest challenges of the commodity value chains.

Specific Objectives
• Assess the technical and socio-economic potential of conservation farming
• Develop, test, adapt, and demonstrate various conservation farming practices
• Develop strategies to improve post-harvest handling
• Establish market information
• Support skills development / improvement
Since 2012, the project has supported 16 farmer groups with total membership of about 320 farmers, each farmer representing a household of five members, on average.

Project Sites

The Uganda SIMLESA Project is being implemented in two rural districts:
• Nakasongola & Lira
• With a total rural population of 623,100 (UBOS, 2015)
Interventions along commodity value chains – informed by a socioeconomic and biophysical study

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<thead>
<tr>
<th>Phase</th>
<th>Constraints/challenges</th>
<th>Interventions</th>
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<tbody>
<tr>
<td>Pre-production</td>
<td>Poor quality seed</td>
<td><strong>Improved seed:</strong> Maize [10H, PH5052] drought tolerant &amp; high yielding</td>
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<td></td>
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<td>Bean [NABE 14 &amp; 15] drought tolerant &amp; high yielding</td>
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<td>Failure to open land on time</td>
<td><strong>Implements:</strong> spray pumps, pedestal sprayers, rippers and ox-yokes, and direct seeders</td>
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<td><strong>Inputs:</strong> herbicides</td>
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<tr>
<td>Production</td>
<td>Low productivity</td>
<td><strong>Inputs:</strong> fertilizers</td>
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<td></td>
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<td><strong>Technologies:</strong> PPBs, rip-lines, intercropping, agronomic practices e.g. proper spacing, mulching, pest and disease mgmt.</td>
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<td>Post-harvest</td>
<td>Spoilage due to lack of storage facilities</td>
<td><strong>Capacity bldg.:</strong> Training in post harvest handling</td>
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<td><strong>Facilities:</strong> Maize storage cribs</td>
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Studies conducted

• A socio economic and biophysical study was done in Nakasongola and Lira districts to understand the producers’ challenges, constraints and prevailing circumstances in order to set the stage for technology exposure and skills improvement.
• Quantification of bare ground coverage in Nakasongola District due to extreme cases of soil degradation
• Tillage methods – convention vs. conservation farming [Permanent Planting Basins & Rip lines]
• Maize-bean intercropping patterns
• Maize and bean seeding rates/ plant populations under PPBs & rip lines
• Business model analysis
• Elite pigeon pea profiling, seed multiplication and dissemination

✓ Operational Field Guide for Establishing and Managing Conservation Agriculture Demonstrations . Drake N. Mubiru et al. (eds.). NARO/ New Vision
✓ Permanent Planting Basins (PPB): Bridging the yield gap – a brochure
✓ Rip lines: Egging you on to food security – a brochure
Farmers using technologies such as rip lines and permanent planting basins (PPB), introduced by the SIMLESA project, in combination with improved seeds and fertilizers and/or manure have seen their bean grain yields increase from as low as 300 kg ha\(^{-1}\) to 1,000 kg ha\(^{-1}\), although the yield potential of beans in Uganda is 2,000 kg ha\(^{-1}\).

Mubiru et al., 2017
Maize grain yield has increased from an average of 3,000 kg ha\(^{-1}\) to 5,000 kg ha\(^{-1}\); yield potential for hybrid maize ranges from 5,000 to 8,000 ha\(^{-1}\).

Evidence of impact in terms of 30% increases in yield and 30% reduction in production risks
Evidence of increased environmental sustainability

In Uganda, land degradation has led to significant impacts upon the smallholder agro-ecosystems including direct damage and loss of critical ecosystem services such as agricultural land/soil and biodiversity.

Bare ground coverage in Nakasongola District due to extreme cases of soil compaction was 187 km² (11%) of 1,741 km² of arable land – Mubiru et al., 2017
In tillage trials/ demonstrations on degraded farmer plots, conservation farming tillage methods [PPBs] proved beneficial relative to conventional methods on degraded soils, with a short term benefit of increasing land productivity leading to better harvests and food security.
In tillage trials/demonstrations on degraded farmer plots, conservation farming tillage methods [Rip lines] proved beneficial relative to conventional methods on degraded soils, with a short term benefit of increasing land productivity leading to better harvests and food security.
### Key messages to farmers, agribusiness, extension and policy

<table>
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<tr>
<th>Category</th>
<th>Message</th>
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<tbody>
<tr>
<td>Farmers</td>
<td>With project support, farmer groups have been strengthened and are now more coherent. Achieved through constant engagement, hands-on training, and exposure to technologies, and tools and implements along the commodity value chains.</td>
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<td>Extension</td>
<td>The project has introduced technical service units, AIPs, communication materials [brochures &amp; CA demo implementation guide].</td>
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<td>Agribusiness</td>
<td>Business model analysis revealed that private entrepreneurship has the potential to contribute significantly to the adoption and scaling of research technologies.</td>
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<td>Policy</td>
<td>Policy recommendations have been made on promoting sustainable intensification through enhanced input access.</td>
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**Key impacts and in invisible benefits**

| Reduced production risks and improved food security | - PPBs and Rip lines spreading quite fast  
- Maize storage cribs have helped to reduce post-harvest losses and farmers can now afford to hold onto their produce for better prices |
| Business outlook along the commodity value chains | - Agricultural Innovation Platforms (AIP)  
- Mechanization service providers [spraying, ripping, and shelling]  
- Bulking and collective marketing |
| Capacity development | - Farmer level – targeting men, women and youths  
- Field ext. worker level - targeting both men and women  
- Scientist staff level - targeting mainly young scientists |
| Mechanization | - Youths have been targeted to coordinate Technical Service Units [trained and equipped with conservation farming tools and implements] |
Prospects and challenges to scaling

• SIMLES to capture best bet practices for the AIPs
• For sustainability of the AIPs, skills development for the facilitators and some AIP members in savings and financial management is required
• Organize exchange visits for the AIPs to other successful platforms
• Link farmers to financial institutions
• Embed the technical service units model in AIPs
• Highlight exit plan of project to stakeholders
Prospects and challenges to scaling

- Put more emphasis on post-harvest handling and marketing
- SIMLESA to draw expertise from local artisans who make ox drawn ploughs for ripper making.
- Boost acquisition of supplementary feeds for oxen most especially in drought conditions by involving animal husbandry experts from national institutes and local government officials
- Promote the introduced elite pigeon pea varieties to SIMLESA project areas (Nakasongola and Lira)
- Engage ASARECA in policy formulation dissemination and advocacy for conservation farming equipment and implements
ACKNOWLEDGEMENTS

• The farming communities in Lira and Nakasongola districts
• The district local governments
• The National Agricultural Research Organization (NARO)
• SIMLESA
• CIMMYT
• ACIAR
Thank you for listening!