TRANSFORMING FARMERS LIVES THROUGH CONSERVATION AGRICULTURE-BASED SUSTAINABLE INTENSIFICATION (CASI)

Why is CASI important?

Conservation Agriculture-based Sustainable Intensification (CASI) is a farming practice involving disturbing the soil as little as possible prior to planting as opposed to the conventional practice of intensive tillage; keeping the soil covered with crop residue as much as possible and intercropping or rotating crops. These measures together with optimal use of complementary agro-inputs and proper agronomy, reverse land degradation, contribute to higher and more stable yields, and reduce production costs while enhancing the resilience of smallholder farming systems to climate change. Reversing land degradation and improving crop productivity in the face of climate change are sector priorities necessary to assure food security for our growing population and agricultural-led growth in our country.
What is the evidence from SIMLESA sites?

1. Ethiopia

Shifting from conventional tillage and cropping systems to conservation agriculture improves soils stability; helping to reduce the high runoff and soil loss responsible for soil degradation in Malawi.

- 30% More Soil organic carbon under CA based rotation compared to soils under conventional tillage
- 30% More Water retention rate recorded in soils under CA systems
- 60-90% Increase in water infiltration rates in CA systems relative to the conventional ridge and furrow system

SIMLESA leveraged Ethiopia’s extension networks and collaboration with other stakeholders to promote CASI. This led to significant increases in farmer awareness and adoption of CASI.

- 210,289 Farmers reached with information on CASI by 2015 through mass media messages
- 375,557 Farmers reached by 2017
- 23% Percentage of farmers that have at least adopted one CASI technology in the project sites

2. Kenya

Agricultural Innovation platforms (AIPs) foster networks for mutual support and collective action. AIPs led to greater participation of farmers in better paying markets and at less cost.

- 2.5 t OPV maize seed
- 4.2 t field beans

Amount of seed distributed by the Kyeni innovation platform in Eastern Kenya

Linkages to diverse stakeholders in AIPs helped farmers acquire information, procure competitively priced inputs and sell profitably.
3. Malawi

Farmers who adopt CASI maximize limited resources and get higher yields, hence improving their resilience to shocks in the face of climate change.

**Yields gained by adopting CASI practices**

<table>
<thead>
<tr>
<th>Region</th>
<th>Yield Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>In mid altitude areas</td>
<td><strong>17%</strong></td>
</tr>
<tr>
<td>In low altitude area</td>
<td><strong>37%</strong></td>
</tr>
</tbody>
</table>

**Additional months that farm families were food secure as a result of the increased yields from adopting CASI**

<table>
<thead>
<tr>
<th>Region</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>In mid altitude areas</td>
<td><strong>3 Months</strong></td>
</tr>
<tr>
<td>In low altitude area</td>
<td><strong>16%</strong> Reduction</td>
</tr>
</tbody>
</table>

**Because of AIP facilitation**

- **2%-35%** Percentage increase of Farmers using CASI technologies since 2011
- **30% More** Soil organic carbon under CA based rotation compared to soils under conventional tillage.
- **60-90%** Increase in water infiltration rates in CA systems relative to the conventional ridge and furrow system

**Agricultural Innovation Platforms**

increase technology adoption and returns on investment.

**Key drivers include;**

- Farmers training on CASI,
- Organizing farmers for collective action,
- Value chain integration.

4. Mozambique

Conservation agriculture implements including jab planters, seeders and rippers driven by machinery or draught power, enable farmers to reap the triple benefits of improved yields from timely operations, save time for other productive uses and reduce drudgery.
CASI is versatile and inclusive
SIMLESA has generated a basket of CASI options. Farmers can choose from this basket depending on their social and environmental context. Better yields and improved soil health have been recorded.

Maize yields (kg/ha) by cropping system in the low potential areas of Mozambique [Sussundenga and Gorongosa] (six-year averages)

- Conventional practice sole crop: 1,497 kg/ha
- CA jab planter sole crop: 1,784 kg/ha
- CA basins sole crop: 1,789 kg/ha
- CA basins maize-cowpea intercrop: 1,802 kg/ha
- CA basins maize-cowpea rotation: 2,063 kg/ha

Multi-stakeholder approaches to providing farmers with reliable and timely information accelerate technology diffusion and adoption.

How change in scaling approaches has increased number of farmers made aware of CASI

<table>
<thead>
<tr>
<th>Year</th>
<th>Farmers</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
<td>36</td>
</tr>
<tr>
<td>2014</td>
<td>38,170</td>
</tr>
<tr>
<td>2016</td>
<td>191,757</td>
</tr>
</tbody>
</table>

5. Rwanda

Functional Agricultural Innovation Platforms facilitate information flow, value chain upgrading and access to better paying markets.

**Triple Income**
Membership in successful AIPs tripled farmers' incomes within three years

**7,500 households**
The two main AIPs reached 7,500 households by 2016

**Drivers of AIP success**

Scientific Considerations

**Soil health impacts**
There was strong yield response to nutrient application in both traditional tillage (TA) and conservation agriculture (CA) trials was observed. Sites were nutrient-deficient.

**Yield Impacts**
- The yield difference between tillage agriculture and conservation tillage was insignificant in the initial season
- Yields from the second season trials were higher than those of the first season trials for both maize and beans across sites

**Bean yield (grain) in Bugesera, with:**
- T1: manure only; T2: manure + fertilizers; T3: Manure + fertilizers + bio-fertilizers.

**Maize yield (cobs and grains) in Cyuve with:**
- T1: manure only; T2: manure + fertilizers; T3: Manure + fertilizers + bio-fertilizers.

**Implications**
The environmental benefits of CASI can be achieved without statistically significant yield penalties.
Functional Agricultural Innovation Platforms (AIPs) facilitate information exchange, collective action and market participation: Driving the scaling out of CASI beyond project communities.

8/10 farmers
Use of AIPs increased the number of farmers using improved seed in maize legume intercrops from 3 in 10 to 8 in 10 farmers

3,000
Farming families received market information via SMS message system.

CASI is versatile and inclusive
SIMLESA has generated “a basket” of CASI options. Farmers can choose from this basket depending on their social and environmental context.

Better yields, improved soil health and reduced cost of labour compared to conventional practices have been recorded.

Improvement in soil organic carbon 65%
Increase in maize yields in drier areas 2.5 - 3.0 tons/ha
Increase in maize yields in higher rainfall areas 2.5 - 6.5 tons/ha

The use of smallholder appropriate machinery enables cost effective implementation of CASI practices.

Implements such as rippers, seeders and jab planters, led to timely operations, time savings and better incomes.

160 person hours
Time spent on planting one hectare of a maize field using a handhoe

3 Machine hours
Time spent on planting one hectare of a maize field using a two wheel tractor

62% 44% 50%
Percentage reduction in labour requirements when using an ox-drawn ripper
Percentage increase in bean yields due to timely operations
Percentage increase in maize grain yields due to timely operations

Conservation agriculture implements such as rippers, seeders and jab planters driven by machinery or draught power enable farmers reap the triple benefit of improved yields from timely operations; time saved for other productive uses and reduced drudgery.

6. Tanzania

7. Uganda
What policy actions are needed to make CASI uptake feasible for smallholder farmers?

- Mainstream CASI as a strategy in the formal extension system
- Invest in private sector-led business models for the supply of machinery and custom hire services
- Support local research, extension and education institutions to build capacity for all aspects of CASI
- Invest in further research and community level demonstrations of optimal CASI packages.
- Institute interventions to manage crop-residue trade-offs in CASI systems
- Invest in developing and strengthening institutions for collective action
- Foster public private partnerships with agribusinesses willing to invest in scaling CASI
- Enable the national extension system to support the establishment of agricultural innovation platforms

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