Africa RISING in Zambia
Creating Sustainable Systems for Agriculture

Outcomes

<table>
<thead>
<tr>
<th>Technologies validated</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers worked with to validate technologies</td>
<td>50,000</td>
</tr>
<tr>
<td>Long-term trainings</td>
<td>2 MScs</td>
</tr>
<tr>
<td>Number of development partnerships</td>
<td>12</td>
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</tbody>
</table>

Research-in-development scope

1. Cropping systems
   - Varieties
   - Agronomy
2. Natural resource management (NRM)
   - Soil & water management
3. Human condition
   - Nutrition
   - Food safety

*Appropriate technologies are integrated within and across the components above.

Technology delivery

Sustainable intensification domains
- Productivity
- Environment
- Economic
- Human condition
- Social

Collaboration
- CGIAR centers
- NARS
- Farmers
- Private sector
- Universities
- Extension services
- Government agencies

Capacity building
- Short term training
- Post-graduate training (MSc, PhD)
- Exchange visits
- Farmer field days

Africa RISING’s theory of change

Demand-driven research identifies, adapts, validates and deploys sustainable intensification innovations

Better efficiency increases production

So rural households get more from the same amount of land – without compromising the needs of future generations to enhanced livelihood outcomes

Providing a range of options increases system sustainability

And improved income flow means better household nutrition and increased human capacity, leading to enhanced livelihood outcomes

Multiple sustainable intensification domains in an enabling policy environment result in long-term equity and viability
Cropping systems

Varieties
- Drought-tolerant and nutritious maize varieties have been introduced by Africa RISING and its predecessor SIMLEZA project and have a yield benefit of more than 30% over commercial control varieties.
- The project supported the release process for four high yielding and farmer-preferred orange-fleshed sweet potato varieties - Olympia, Twatasha (Chunjila), Chiwoko (Orange Chingowa) and Kokota. These varieties have a yield range of 15 (Chiwoko) to 25t/ha (Olympia) against the national average of 5.8t/ha for sweetpotato in general.
- Over 23,000 vines of high yielding and farmer preferred orange-fleshed sweet potato varieties were produced and distributed to smallholder farmers. To ensure sustainability and continued access by farmers to clean planting materials, the project also trained 279 decentralized vine multipliers in different intervention communities.

Agronomy
- Among the different intercropping options tested and validated with farmers, the project team established that delaying cowpea planting by 7–10 days is beneficial for both maize and cowpea and provides adequate yields for both crops without a penalty. In the drought years, where maize failed, farmers were thankful for an additional crop (cowpea or pigeonpea) that could be harvested and provide additional food security and nutritional benefits. When lablab was intercropped, it provided groundcover, soil fertility improvements, and additional animal feed for the dry season. Intercropping maize with cowpea under conservation agriculture provided yield benefits of up to 51% (1114 kg/ha) compared with a conventionally ploughed system without intercrop.
- Farmers gained yield benefits of up to 82% (1788 kg/ha) and 66% (1380 kg/ha) if they planted their crops with a dibble stick or a ripper tine and rotated them with cowpea or soybean, respectively. Rotating maize with lablab under half the rate of fertilizer led to a yield benefit of 56% (1545 kg/ha).
- The doubled-up legume system involving pigeonpea and groundnut led to an increased Land Equivalent Ratio of up to 1.64.

Natural resource management (NRM)

Soil & water management
- Conservation agriculture systems tested since 2011 had an increased return on investment of 30%, a return to labor of 13.3 USD per labor day invested, and increased water infiltration rates by between 20 and 50%. Other benefits included: a reduction in soil erosion (between 111 and 140%), soil quality improvement (by up to 40%), and a reduction in labor days (25–35 labor days/ha) when compared to the conventional ridge and furrow land preparation.
- The application of glinicidia led to a yield benefit of more than 79% (1663 kg/ha) against a no-fertilizer control in on-farm trials on different soil types.

Human condition

Nutrition
- To make pigeonpea more socially acceptable and reduce farmers’ dependence on legume exports to India, the project collaborated with Catholic Relief Services and Grassroots Trust who conducted cooking classes with smallholder farmers to familiarize smallholders with the taste and recipes of pigeonpea dishes.

Food Safety
- Conservation agriculture systems tested since 2011 had an increased return on investment of 30%, a return to labor of 13.3 USD per labor day invested, and increased water infiltration rates by between 20 and 50%. Other benefits included: a reduction in soil erosion (between 111 and 140%), soil quality improvement (by up to 40%), and a reduction in labor days (25–35 labor days/ha) when compared to the conventional ridge and furrow land preparation.
- The application of glinicidia led to a yield benefit of more than 79% (1663 kg/ha) against a no-fertilizer control in on-farm trials on different soil types.

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