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

Paswel Marenya and Objective 1 SIMLESA TEAM
SIMLESA End of Project Review
Addis Ababa March 5-9, 2018
SIMLESA OBJ 1: To enhance the understanding of CA-based intensification options for maize-legume production systems, value chains and impact pathways

Phase 1
- Maize-legume farming system characterization
  - Constraints and opportunities, C-L interactions, resource use, tech preference, mkt access
- Input and output markets and value chains
  - Effective adoption and impact pathways
- Farm Typologies for resource allocation and risk management

Phase 2
- Refined understanding of CA Prod. Systems, VCs and Impact Pathways
  - Analysis of Risk-Productivity Tradeoffs and Management
- Maize-Legume-Fodder Value Chains
- Farm Typologies Relevant to CA
  - Recommendation Domains
<table>
<thead>
<tr>
<th>Paper Title</th>
<th>Summary message</th>
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<tbody>
<tr>
<td>Author(s)</td>
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<td>Reference</td>
<td>Summary</td>
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<tr>
<td>Mulwa, C., Marenya, P., &amp; Kassie, M. (2017). Response to climate risks</td>
<td>The paper focuses on how to encourage farmers to take adaptive actions by assessing the relative importance of information compared to other factors. In relative terms the paper finds that even when financial limitations are binding, making climate-related information available can still motivate farmers to adapt.</td>
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<td>among smallholder farmers in Malawi: A multivariate probit assessment of</td>
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<td>the role of information, household demographics, and farm characteristics.</td>
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<td>Climate Risk Management, 16, 208-221.</td>
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<tr>
<td>Jaleta, M., Kassie, M., and Shiferaw, B. (2013) Trade-offs in crop</td>
<td>The competition for feed constrains the use of crop stover for mulch. This tradeoff has to be resolved by promoting property rights over crop stover through local bylaws that limit livestock indiscriminate livestock grazing.</td>
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<td>residue utilization in mixed crop-livestock systems and implications for</td>
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<td>Kassie, M., Marenya, P., Tessema, Y., Jaleta, M., Zeng, D., Erenstein, O.,</td>
<td>This paper focuses on economy wide impacts of SI options</td>
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<tr>
<td>&amp; Rahut, D. (2017). Measuring Farm and Market Level Economic Impacts of</td>
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<tr>
<td>Improved Maize Production Technologies in Ethiopia: Evidence from Panel</td>
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<tr>
<td>Data. Journal of Agricultural Economics. DOI 10.1111/1477-9552.12221</td>
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<td>Rodriguez D, De Voil P, Rufino MC, Odendo M, van Wijk MT (2017) To</td>
<td>Even though the trade-off between mulch and feed can be resolved, the magnitude of the benefits in terms of food security and household income are likely to be small. More transformational changes, e.g. market developments, new value chains, and strategies to diversify sources of livelihoods are required, in addition to incremental adaptations from conservation agriculture practices.</td>
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<td>mulch or to munch? Big modelling of big data. Agricultural Systems</td>
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<td>153, 32-42</td>
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Micro and Macro Perspectives

1. At farm level SAI requires: adoption of suites of practices and technologies

2. At Macro level it requires a major policy rethink
Adoption of CA related SAI practices require same (similar) preconditions as other technologies
- Constrained by the same/similar barriers
Adoption of CA related SAI practices require same (similar) preconditions as other technologies

- Constrained by the same barriers


Social Capital is Key to facilitate information sharing learning and resource mobilization (Farmer groups, Relatives in important positions)

Positive outcomes from CA-based practices are possible but for them to spread widely among farmers require strong information systems


Linkages to markets are critical for adoption. Markets mediate profitable opportunities to underwrite technology adoption.

Working in multi-stakeholder process across the value chain to facilitate division of labor. In recognition that technology transfer happens in a pipeline.
Policy Action 1: **Increase frequency and access to extension information**

Extension workers/ 10,000 Farmers in a few countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Extension Workers/10,000 Farmers</th>
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<tr>
<td>India</td>
<td>2</td>
</tr>
<tr>
<td>Nigeria</td>
<td>3</td>
</tr>
<tr>
<td>Tanzania</td>
<td>4</td>
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<tr>
<td>Indonesia</td>
<td>6</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>16</td>
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<td>China</td>
<td>16</td>
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Policy Action 1: Increase frequency and access to extension information

Some experts have suggested 33 extension workers per 10,000 farmers as near adequate (Pye-Smith, 2012)

Extension workers/ 10,000 Farmers in a few countries

- India: 2
- Nigeria: 3
- Tanzania: 4
- Indonesia: 6
- Ethiopia: 16
- China: 16
Policy Action 1: Increase frequency and access to extension information

Increasing Extension Farmer Ratio to Ethiopia Levels

Effect of extension on adoption of 50% minimum till practices

- **Kenya**: 4% and 7%
- **Malawi**: 34%
- **Tanzania**: 10% and 21%

Policy Action 1:

*Increase frequency and access to extension information*

- **Base case**
- **No credit, extension staff farmer ratio at 16:10,000**

**Effect of extension on adoption of minimum till practices, with no credit**

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<th>Country</th>
<th>Base Case</th>
<th>No Credit, Extension Staff Farmer Ratio</th>
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<tr>
<td>Kenya</td>
<td>4%</td>
<td>6%</td>
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<tr>
<td>Malawi</td>
<td>34%</td>
<td>47%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>10%</td>
<td>18%</td>
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Policy Action 2:
*Improve market access, lower input costs, widen access to finance*

Effect of subsidy expenditures on adoption of minimum till practices

- **Ethiopia**
  - Base: 25.8%
  - Subsidy expenditure at 58% (Malawi level): 57.2%

- **Kenya**
  - Base: 3.9%
  - Subsidy expenditure at 58% (Malawi level): 14.0%

- **Tanzania**
  - Base: 9.9%
  - Subsidy expenditure at 58% (Malawi level): 14.3%

Policy Action 3:
Support integrated approaches to technology development and dissemination

Adoption of sustainable practices in Ethiopia: impacts on income ($/ha)

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Support integrated approaches to technology development and dissemination

Adoption of sustainable practices in Ethiopia: impacts on income ($/ha)

In Tanzania, the probability of adopting fertilizer increased from 4% to 8% when the technology combination involved minimum tillage, soil and water conservation (SWC) and improved varieties.

In Ethiopia, adoption of crop diversification and SWC was slightly less than 20% but doubled in the presence of all the other SAIPs.

Policy Action 4

Invest in value staples chains

ET: Ethiopia
KE: Kenya

Post harvest handling
KE=16%
ET=15%

Advisory Services
KE=2%  ET=2%

None
KE=58%  ET=48

Trade Finance
KE=4%  ET=33%

Insurance
KE=15  ET=0

Transportation
KE=5%  ET=2%

Linking SIMLESA to Policy

Data linkage: Protocols for data assembly and dissemination

Data linkage: Feedback mechanisms, from grassroots to top echelons of the policy community

Data linkage: A system for documentation, communication and dissemination
A Proposal: Demonstrate and Pilot

- **Demonstrate** agricultural technologies
  - At farm scale, in real world circumstances
  - For extended periods

- **Pilot** policy ideas: at reasonably small but realistic scale (district or Woreda, selected villages)

- **Invite** those who need to use the evidence to observe for themselves

- **Document**, disseminate and communicate
Demonstrate and Pilot to Whom?

- To Agriculture ministry decision makers – cascading from bottom up
- To extension leadership and frontline staff
- To development organizations – including official agencies
- To business community
- To farmers
What does all this mean?

It means researchers should walk an extra mile

- It means we need their boots on the ground to test their findings in real life (before or after publication)
- It means proving that the evidence CAN work

It means getting out of their comfort zone

- It means applying for research funds, but also…
- It means applying for “piloting and demonstration funds”
Those with responsibility for decision-making will certainly take note of [...] and seriously consider [...] demonstrated evidence!
SIMLESA OBJ 1 OUTPUTS

Phase 1
- Maize-legume farming system characterization
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We plan to use various outlets to scale SIMLESA results out and up to reach various points in the “ecosystem”

1. Farmer Extension Materials
2. Manuals for Extension Staff
3. Business Briefs for Private Sector
4. Policy Briefs for Public Sector
5. Development Briefs for NGOs
Some Questions to Tackle in next 12-14 months

1. How to avoid the valley of death? *Institutionalization, Ownership and Domestication of SIMLESA in-country and across Africa*

2. The key *social, economic and policy failures* and how to correct them. Does SAI scaling require: social, economic or policy changes? Where?

3. Thinking carefully why the *private sector has “failed”* – to solve some of the intractable issues around agricultural development.

4. What is *missing for Private Sector*?
   - Are we sure the private sector is really leaving money on the table?

5. How can farmers be assisted to *take the risks of experimentation, adaptation and sustainable adoption*?

6. What are the specific *policy failures* and how to correct them?

7. Will require meta-analyses of all multi-disciplinary results using *panel socio-economic and agronomic data and bio economic, systems and transdisciplinary modeling*
Some Questions to Consider

1. How to move from plot to field to community level analysis

2. How to move from incremental to transformational changes

3. How to move from commodity focus to livelihood emphasis
Thank you for your interest!

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Sustaining long term panel data generation and analysis.
Seeking answers to outstanding questions on the dynamics of technology adoption and impact analysis.
Prioritizing women empowerment as a critical pillar in sustainable agricultural intensification.
Capacity development

Sustainable intensification = f(markets, incentives, policies, gender equity)
Scaling up project research outputs and policy dialogue
We have produced a series of take away information briefs to inform the SIMLESA research community.

We hope to continue the consolidation process to focus on the following steps:

- **Extension materials to be used directly by farmers to offer recommendations on how to try out most promising elements of CA-based production.**
- **Extension guides for extension workers on the most promising CA options that they can recommend to farmers (e.g. wall charts, posters, leaflets).**

**Business briefs to show the potential of agribusinesses to engage farmers in structured value chains.**

**Policy briefs for key decision makers in government to guide extension messaging and agricultural programmers.**

**Development briefs to inform programming for development NGOs.**