Target the pathways to scale out climate-smart agricultural technologies to farming communities

Summary

» The process of getting climate-smart agricultural (CSA) interventions and practices to farmers is just as important as the interventions and practices.

» Given the complex systems in which CSA is implemented and the various CSA practices and technologies, there is no one-size-fits-all scaling pathway – so far.

» Best-fit climate-smart agricultural scaling approaches are guided by the biophysical, socioeconomic and institutional context and attributes of the CSA technology.
There is debate about the most effective approaches for enabling smallholder farmers to take up innovations or practices on a wider scale. They can be done through government or private sector-led extension services, through innovative certification schemes, through farmer-to-farmer learning, via new financing initiatives or through a combination of models.

Both supply- and demand-driven extension approaches exist and have their merits and demerits. Often, supply-driven extension influences what farmers are growing, the market, and even the farming practices used. Technical advice on planting of improved seeds is increasingly being provided by the private sector on the seed packaging material. Farmers are now active stakeholders who are seeking new and relevant information to improve their farming.

The success of any extension model is based on how well it realigns to the realities and constraints under which implementation is conducted and addresses the CSA needs.
Evidence shows that agricultural extension is a smart investment with positive outcomes, for example increased productivity, reduced poverty and better nutrition.

National agricultural extension systems have often yielded unsatisfactory performance and in many parts of sub-Saharan Africa, extension-to-farmer ratio is less than 1:5,000, far below the World Bank’s recommendation of 1:500.

There are challenges such as inadequate finance, mismatch between enterprises that farmers prioritize and those promoted through the government-led extension service, limited human resources, numerous farmers, and climate change and variability.

Scaling out CSA is complex because it involves more than scaling up of technological innovations in agriculture. Several extension pathways exist but each model has potential and constraints. Extension models also need to be scalable.

Envisioning, implementing, and monitoring CSA requires that farmers adapt to biophysical, socioeconomic and institutional dimensions at different scales. This means that an extension services model that works in one place may not be the best fit in a different context, which may not be in any way limited to locality.

Why?

Table 1 shows that different approaches and methods to stimulate innovation adoption have different attributes that can help meet the objectives of different actors, from farmers to policy makers.
<table>
<thead>
<tr>
<th></th>
<th>Demonstration plots</th>
<th>Peer to peer</th>
<th>Mother baby</th>
<th>Host farmer</th>
<th>Farmer field school</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potential to focus on complex practices</strong></td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Cost effectiveness</strong></td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Time availability</strong></td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Geographical coverage</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Coverage in remote areas</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Demonstrate benefits of the technologies clearly</strong></td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Requires literacy of the farmers</strong></td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Promotes inclusive decision making</strong></td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Women’s inclusion</strong></td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Improve extension-to-research interaction</strong></td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Capacity of farmers to demand training</strong></td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Diversify provision beyond production</strong></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Capacity to provide rewards &amp; recognition of the best extension service agents</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Capacity for oversight of extension service</strong></td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Participatory approach</strong></td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Allows indigenous knowledge and innovation</strong></td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Supply-driven approach</strong></td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Target the pathways to scale out climate-smart agricultural technologies to farming communities
### Table 2. Identification of best-fit extension pathways to promote prioritized CSA technologies in Nwoya, Uganda and Lushoto, Tanzania

<table>
<thead>
<tr>
<th>CSA Technology</th>
<th>Attributes of the technology</th>
<th>Criteria considered in selection of the extension model</th>
<th>Best-fit pathway selected with target communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved crop varieties</td>
<td>- Simple practice oriented to a single technology</td>
<td>- Farmers are helped to acquire the new seed</td>
<td>- Farmer-to-farmer learning</td>
</tr>
<tr>
<td></td>
<td>- Learning process can be theoretical or practical</td>
<td>- Interest of farmers and local leaders in the practice</td>
<td>- Farmer field schools</td>
</tr>
<tr>
<td></td>
<td>- Full benefits of the technology can be observed in the short term from the first season</td>
<td>- Presence of farmers regarded as role models</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Farmers with passion to share information with their peers without expecting rewards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Farmers have in-depth knowledge and experience of local varieties and therefore can disseminate innovation more efficiently</td>
<td></td>
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<tbody>
<tr>
<td>Empowering farmers to manage advisory services</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Accessibility by poor farmers</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Opportunities for experience sharing</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Level of motivation required to participate</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Diffusion to non-participating farmers</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
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</table>
| Conservation agriculture | Complex system involving a technology package, practices implemented in unison  
Farmers learn through hands-on experiential learning approach; it is difficult to convey through verbal communication  
A more participatory approach is required where farmers are supported with provision of equipment and training to experiment with the technology and fine-tune it to their context  
Requires continuous technical support; it may be more appropriate to have technical experts, not farmers, conducting the training  
Takes a longer period of time for all benefits of the technology to be observed  
Implies a radical change from conventional farming systems, which requires institutional and policy support to adapt and validate the technology to the local environment | Interest of farmers and local leaders in the practice  
Government extension limited by a low number of extension agents  
Availability of trained human resources at the site on the technology is limited. Some of the villages are remote and it is difficult to reach farmers  
Community/farmers willing to set aside land for demonstrations, and reachable by other farmers  
Opportunities for contracting services with linkage to the private sector where it may be difficult to access equipment | Demonstration plots  
Farmer field schools |
| Manure composting       | Short-term practice which yields tangible results within a short period of time (in one production season)  
Practice is easy to test, experiment with, and adapt using materials available at the site  
Farmers can follow the composting process on their own | Farmers and local leaders are interested in the practice  
Composting materials easily accessible at the sites  
Farmers are organized in groups, and those not in groups are interested in joining one | Host farmer approach  
Demonstration plots |
The ultimate goal of scaling out is to reach more farmers and its success greatly depends on the effectiveness of the scaling pathway. These pathways are the basic models that can add value to, and be integrated into other government, nongovernmental organization (NGO) or private sector extension services. Sustainability can be enhanced by combining and leveraging the strengths of different approaches, promoting local ownership, and providing continued technical, logistical, and policy support.

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<td>Manure composting</td>
<td>Learning can be experiential or verbal</td>
<td>Community/farmers are willing to set aside land for demonstrations, and are reachable by other farmers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is labor consuming and therefore easier to locate the technology near where most materials are sourced e.g. the homestead</td>
<td>Farmers are willing to set aside land for a demonstration plot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complements existing farming practices such as livestock production and application of inorganic fertilizers</td>
<td>Demonstration farms are easy to access</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
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Mwongera C; Shikuku KM; Twyman J; Läderach P; Ampaire E; van Asten P; ... Winowiecki LA. 2017. Climate smart agriculture rapid appraisal (CSA-RA): A tool for prioritizing context-specific climate smart agriculture technologies. Agricultural Systems 151:192–203


Westermann O; Thornton P; Förch W. 2015. Reaching more farmers: Innovative approaches to scaling up climate smart agriculture. CCAFS Working Paper No. 135. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen, Denmark.

Supporting Materials

- **CSA Lesson Brief 4:** Support farmer-to-farmer and community-widesocial learning
- **CSA Lesson Brief 8:** Invest in climate-smart soil and land health
- **CSA Lesson Brief 9:** Monitor climate-smart agricultural interventions with a real-time participatory tool

Target the pathways to scale out climate-smart agricultural technologies to farming communities. International Center for Tropical Agriculture (CIAT). Cali.