

## Challenge 3: Science-based innovation and extension

A well-developed knowledge-based extension service is crucial to effectively share scientific findings and new innovations to smallholder farmers to help improve productivity and profitability in a sustainable way. Unfortunately, extension services for small-scale farmers in Sub-Saharan Africa (SSA) and South and Southeast Asia are often inadequate, struggling with lack of funding, high farmer to extension officer ratio, low education levels among both extension workers and farmers, lack of feedback systems and weak links between research, policy and practice. In addition, reaching resource-poor households and female farmers in particular, has been especially challenging.

### Lessons learned from having project teams from multiple countries

**The positive aspects of the south-south collaborations were visible in project outcomes, especially for the individual team members.**

- Sharing experiences and co-learning, expanding the view on the topic.
- Working in an international team also led to increased professional networks for the team members.

**The disadvantages of the approach was mainly on a project administrative level.**

- Slower start when people need to get to know one another. For these type of project teams, it is therefore highly recommended to budget for an early face-to-face meeting even if the cost is higher for cross-country travels.
- Several partners meant several contracts and the project therefore became a bit more administratively demanding. We recommend supporting project teams to develop internal project management tools for managing administrative challenges.
- Several partners also meant that resources were spread a bit thinner which might have an effect on the level of local involvement. This is possible to manage by ensuring interventions are sustained through ongoing collaboration.

### Co-creating science-based extension services for smallholders

The challenge of ensuring science-based innovation and extension are available for supporting all smallholder farmers was approached by focusing on four different aspects: i) the overall extension structure in a country, ii) pathways for innovations from science to practice, iii) innovative extension methods, and iii) inclusion, and these are exemplified by our four science translation projects.

The various aspects were approached at different scales, and with a stated aim to encourage cross-country collaborations, ranging from cross-continental to national/regional scales. The structures of extension services and innovation pathways are context specific, both in terms of country/region and type of production, but the same functions need to be present. The project focusing on the extension structure aspect included three countries from two continents (Africa and Asia).

The two projects focusing on innovation pathways and innovative extension methods included three countries from Africa and Asia, respectively, whereas the project focusing on inclusion had a national/regional perspective within Tanzania. The different geographical scales and conceptual levels of the projects also meant different types and levels of stakeholder engagements, ranging from initial surveys and interviews with different stakeholders, to more in-depth collaborations and co-creation with various actors.

All projects included an exploratory first phase, such as a synthesis of the state of the scientific knowledge as in the case of projects about involvement, and innovative extension methods, or a mapping of existing structures, actors and local knowledge as in the case of projects about extension structures, pathways for innovations, and innovative extension methods. For these mappings, identifying key actors and a project impact pathway through the Theory of Change (ToC) framework was an important step. The exploratory phase served as a base or starting point for the continued activities within the projects.

### The structure of extension systems

In this project a mapping of the existing structures and actors active in dissemination of knowledge from universities and other research institutions to smallholder farmers in Kenya, Laos and Sri Lanka was done revealing both similarities and differences between the countries. One large constraint identified in all countries was the lack of sufficient resources, including staff shortage, low education level, and in some cases even low staff morale, of public extension providers. In addition, long and bureaucratic communication channels were identified as serious hurdles in sharing and coordination of extension programmes and activities, and the poor coordination between the actors, e.g. national and local governments, resulted in duplication of functions and inefficient use of resources and/or conflicts.

The project managed to raise awareness of the issues and the challenges through the project meetings, interviews and dialogues, with the extension services providers, farmers, researchers and staff at local/regional and/or national level government departments of agriculture. This co-creation process created a greater understanding of the need for more structured collaboration to develop and implement appropriate extension services frameworks that are guided by a cyclical feedback mechanism from farmers to researchers and back to farmers.

### Innovation pathways

The focus on innovation pathways was studied using the case of the adoption of agricultural biologicals (hereinafter called biologicals) in Ethiopia, Kenya and South Africa. Biologicals are nature-based products that can be used for the management of crop pests

and pathogens and are thought to be potential alternatives to conventional agrochemicals. They can also act as biostimulants and boost crop yields. Producing and using biologicals in SSA could reduce reliance on synthetic chemicals, boost smallholder productivity, support sustainable food systems, create jobs and contribute to the economy. The project created awareness among decision-makers, private sector actors and farmers on the need for functional regulatory frameworks and enabling environment for production and usage of biologicals. By bringing these actors together, the project helped in knowledge co-creation and identifying knowledge gaps for the expanded use of biologicals in the countries.

The use of biologicals is steadily increasing in developed countries. However, there is limited information on the status of biologicals in SSA where agricultural production is to a large degree led by smallholder farmers. The project showed that lack of knowledge and skills are the most prohibiting factors to farmers' adoption of biologicals. It was also evident that the limited knowledge among smallholder farmers and other stakeholders could be linked to the bias researchers have in gearing their work towards academic publications rather than communicating with farmers. The main focus of the project was on the initial mapping of the status of biologicals and understanding the flow of information and knowledge. However, the stakeholder engagements led to increased awareness among decision-makers about the need for updated regulatory directives (Ethiopia), a realization of the critical knowledge gaps and weak links between research and policymakers (Kenya), and increased awareness and demand for biologicals by smallholder farmers (South Africa).



A smallholder farmer in the Philippines show the AgriFoSe2030 team new agricultural practices acquired through Digital Extension. Photo: Flordeliz B. Dacuyan



## Innovative extension methods

The use of information and communication technologies (ICTs)/digital extension, especially in connection with the recent rapid rise of high-speed internet connections and smartphones, has the potential to create new pathways for smallholder farmers in the Global South to access science-based technologies and innovation. However, digital extension has so far been mostly provided by private actors while the public/traditional extension systems, which are usually the ones targeting smallholders, are lagging behind in their awareness and use of digital-based extension services. In this project, science-based innovation and digital extension services for smallholders in Vietnam, Cambodia, and the Philippines, were studied.

Through an initial ToC process, a mapping of the scientific and local knowledge and digital extension utilisation within the three countries was conducted. The findings informed strategic engagements and promotion of interactions among multiple stakeholders. This multi-stakeholder engagement (e.g. meetings and trainings) played a crucial role in creating awareness, building capacity and co-creating pathways for the use and further development of digital extension services that benefit smallholders. In Vietnam for example, a network of extension actors was established comprising provincial extension departments of the five central provinces, farmers' cooperatives, local non-governmental organisations and private sector service providers.

These actors collaborate through online knowledge sharing, organising conferences and developing joint proposals to raise funds for the development of digital extension services. However, it was noted that government funding tends to prioritize equipment and digital infrastructure, while critical issues such as well trained staff in extension departments, the quality of public extension services, and inadequate oversight of private extension providers (such as agricultural input suppliers) remain significant barriers.

## Inclusion

The inclusion aspect of Challenge 3 to support science-based extension and innovation services was approached through a project with a focus on how to support access and implementation of agricultural

extension services for female smallholder farmers in Tanzania. An initial extensive review of the scientific literature on the topic provided several insights, and identified a lack of focus on extension workers in much of the previous research. To translate the findings from the review into real policy and practice change on-the-ground in Tanzania, a second phase of the project was developed with one of the national agricultural extension training colleges in Tanzania. The aim was to investigate how gender was incorporated into the training curriculum of future extension workers, and to further support gender-sensitive extension by working with the tutors and students. Critical is that these students tend to remain local after graduation and thus provide crucial in-village agricultural advice and support.



A group photo from the GenSens project in Tanzania. Photo: GenSens project

Through the co-creation and co-designing facilitated by the ToC framework, and the flexibility to adapt and refocus the activities to address the identified needs, the project contributed to deep and transformative enhancement of a local understanding around how gender gaps can arise, what contributes to gendered differences in skills, abilities and power within agriculture, as well as providing some strategies for reducing such gaps and better supporting female smallholders. Although the number of tutors, students and farmers directly reached were relatively small, the impact on the individual level was strong with many stakeholders making pledges to include gender transformative frameworks in their work and rethink everyday practices and decisions that increase gender gaps. The approach and ways of visualising the gender gaps and how to sensitively respond to gendered differences was noticed also at the Ministry level, opening for potential future refinement and national level scale-up.



Meeting with stakeholders in Laos. Photo: Daovy Kongmanila

## Conclusion

A well-developed science-based extension system, where innovations reach all groups of smallholder farmers is complex, involves many actors and is often limited by insufficient resources. Nevertheless, as was shown in the science translation to policies and practices projects, things can be done at several levels to improve different aspects of the extension system and its relevance for smallholders. Creating meeting arenas to raise awareness amongst the different actors is a good start. However, taking the time to identify the context-specific needs and hurdles, beyond the initial assumptions, is crucial to make true impact. As shown by the projects herein, science based knowledge co-created in dialogue with scientists and relevant actors can make an impact and contribute to extension systems that can more effectively serve smallholders in the Global South.

## Challenge 3 project team leaders

### Functions in extension service pathways – Kenya, Sri Lanka and Laos

Project leaders and national coordinators Kenya: Cecilia Onyango, University of Nairobi and Justine Nyaga, University of Embu; National coordinator Laos: Daovy Kongmanila, National University of Laos; National coordinator Sri Lanka: Anuradha Jayaweera, University of Peradeniya.

### Agricultural biologicals: Identifying hurdles of use by a Knowledge, Attitude and Practice (KAP) analysis of stakeholders in sub-Saharan Africa

Project leader Erik Alexandersson, SLU, Sweden; National coordinator Ethiopia: Tewodros Mulugeta, Kotebe University of Education; national coordinator South Africa: Lerato Matsaunyane, Agricultural Research Council; national coordinator Kenya: Cecilia Onyango, University of Nairobi.

### Digitalization of Extension Services in the South East Asian (SEA) Region

Project leader and national coordinator Vietnam: Le Thi Hoa Sen, HUE University of Agriculture and Forestry; National coordinator Cambodia: Phanith Chou, Royal University of Phnom Penh; National coordinator Philippines: Flordeliz B. Dacuyan, University of the Philippines Visayas Tacloban College.

### Training and Empowering Village-based Agricultural Agents to be more Gender Sensitive

Project leaders Merezia Wilson and Mohamed Samkunde, University of Dar es Salaam Business School, Tanzania, and Ahmad Kyaruzi Athman of Sokoine University of Agriculture, Tanzania

# AgriFoSe2030

## Agriculture for Food Security 2030

Translating Science Into Policy & Practice

### Agriculture for Food Security 2030 (AgriFoSe2030)

The AgriFoSe2030 programme is dedicated to overcome the hurdles to achieve the sustainable development goals (SDGs), with a primary focus on promoting sustainable agriculture and ensuring food security via research translation. Its framework comprises four cross-disciplinary 'challenges', each aimed at addressing different aspects of SDGs 1 (no poverty) and 2 (no hunger) and related goals. The challenges are:

*Challenge 1 - Improving access to safe and nutritious food*

*Challenge 2 - Agricultural productivity and ecosystem functions*

*Challenge 3 - Science-based innovation and extension*

*Challenge 4 - Smallholder agriculture within transforming food systems*

Poverty alleviation, gender equality, climate resilience, and biodiversity conservation are integrated as overarching priorities.

### About Challenge 3

This challenge focus on different aspects of how to ensure science based innovations and extension supporting all groups of small-holder farmers. From specific new technologies, to inclusion and the overall structures of the extension systems.

### Credits

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***This brief highlights lessons on promoting research impact for funders, commissioners and managers of science translation and research for development initiatives.***

