

Improving innovation adoption among African smallholder farmers

The INTERFACES project backs four regional ventures run by the German Federal Ministry of Education and Research and aimed at promoting sustainable land management in sub-Saharan Africa. Its mission focuses on developing change strategies to boost innovation and implementation processes.

By Theodore Asimeng

The development and adoption of innovations have been the main driver of economic growth and other benefits for humans and the sustainability of the environment, without denying that some innovations have contributed to some adverse effects. Globally, improvements in agricultural development have been achieved in many world regions by adopting innovations targeting productivity, resilience, quality and other objectives of farmers and other food system actors such as processors and consumers. However, smallholder farmers in Africa tend to adopt innovations much less intensively than those in other world regions – to the detriment of their situation, their societies and the environment.

Reasons for low innovation adoption

The reasons for the lower adoption rate are manifold and often overlap. They can be grouped into three clusters. An innovation may require resources which are large compared to the farmers' current means. It is difficult for smallholder farmers to adopt innovations that need more land and water, capital and other investments, institutional support, labour and inputs such as fertiliser and pesticides than they have, can afford or can absorb. Moreover, farmers often face difficulties when implementing an innovation requires reorganising their existing farming practices, inputs and longer productivity times than they are used to. And then there are limitations from both the natural environment, such as weather, and the structured environment, like skilled labour in the backward and forward sectors, as well as access to markets. These three reasons for lower adoption rates are further underlined by socio-cultural factors relevant to the community but not considered in the innovation which may affect adoption.

Despite these challenges and many failed efforts, the need to drive innovation among African smallholder farmers has never been higher than now. Africa has a growing population but is saddled with lower food production, re-



Solar panels for solar-powered irrigation pump. Farmers often face difficulties when implementing an innovation requires reorganising their existing farming practices or investments are large compared to their current means.

Photo: Jörg Böhling

sulting in food security concerns exacerbated by climate change and extreme events already affecting agricultural productivity. In contrast, nature-based solutions for climate change mitigation and natural resource management are in high demand. Therefore, fostering innovation development and adoption among smallholder farmers in a delicate balance that ensures economic, environmental and socio-cultural development is crucial.

Factors that foster innovation adoption

Given the challenges above, the Interfaces project – an accompanying project supporting four other regional research and implementation projects funded by the German Federal Ministry of Education and Research (BMBF) to drive change for sustainable land

management in six sub-Saharan African countries – conducts several research measures and workshops. At the 8th Africa Agribusiness and Science Week in Durban, South Africa in 2023, it organised a side event to solicit ideas on factors that improve innovation adoption among smallholder farmers. The discussion among the participating scientists and farmers and representatives from agriculture extension organisations, civil society organisations, financial institutions and other local, national and regional institutions yielded some key considerations that are reflected in the following.

Considerations for the physical environment

Since most smallholder farmers depend on elements of nature, such as rainfall and sunshine, for their farming activities, innovations that demand requirements outside the physical environmental conditions, such as irri-

gation, usually become a problem to adopt. Moreover, smallholder farmers assume a high cost-benefit ratio when changing their current practices because they have minimal support when things go wrong. This naturally makes them hesitant of change beyond the practices they already know. Alternatively, accompanying risk-reducing measures, such as pesticides, improved seeds, crop loss insurance and irrigation, can reduce these vulnerabilities. However, these risk-reducing measures often constitute innovations of their own, and adopting such complex bundles of innovation often requires new organisational arrangements, and may result in new challenges for farmers.

Participatory research and implementation

The linear transfer of technology models where scientists develop the innovation and extension agencies transfer the information to farmers has not been successful in Africa, particularly among smallholder farmers, for the reasons indicated above. This has been compounded by the fact that agriculture is highly diversified and does not have standard crops and cropping systems found elsewhere. Therefore, participatory approaches where farmers are involved in the innovation development often lead to adoption. These can take four forms: contractual, consultative, collaborative and collegiate. The collaborative format, where farmers and other stakeholders are equal partners throughout development of the innovation, has been highlighted as most promising.

The collaborative process allows the uncovering of blind spots which otherwise would have been overlooked. Through the incorporation of farmers from the beginning, their actual needs are directly brought to the forefront, not what researchers, their funders, or other stakeholders consider essential for farmers. Another advantage is that the skills of farmers, labour, inputs and other requirements necessary to implement the innovation become noticeable. Collaborative processes expose socio-cultural issues and norms that can hinder innovation adoption if neglected, as well as indigenous knowledge that helps modify solutions fostering adoption.

Access to land, credit, market, information and labour

Ownership and easy access to specific resources influence people's willingness to invest in innovations and are therefore essential for innovation adoption. Distinguishing target groups for different types of innovations depending on resource access and ownership or developing and propagating accompanying innovative rules of access to land, inputs and

Since October 2022, the project **INTERFACES** has been supporting four BMBF-funded regional projects in their endeavour to drive change for sustainable land management in sub-Saharan Africa: **COINS** (Co-developing innovations for sustainable land management in West African smallholder farming systems), **DecLaRe** (Decision support for strengthening land resilience in the face of global challenges), **InfoRange** (Increasing efficiency in rangeland-based livestock value chains through machine learning approaches and digital technologies) and **Minodu** – Fostering local sustainable development through research and technology.

other resources helps in the adoption of innovations. Farmers who do not own land, for instance, are unlikely to invest in long-term innovations such as tree planting or soil quality improvements, which provide benefits after a longer runtime. The availability of credit facilities enables farmers to take risks to purchase inputs if there is an option for a repayment system adapted to farmers' seasonal cash flow. Again, the availability and access to markets for the produce and, therefore, certainty of income to repay credits is essential. Protections like contract farming or joint marketing would improve reliability and reduce variability in access to land, credit and market.

Access to reliable information through trusted sources is also crucial to increasing innovation adoption. Smallholder farmers often look for evidence on paths to improve their farming practices. Here, farmer organisations frequently become the enabling tool. The same applies to the facilitation of access to credit and new markets. Strengthened farmer organisations are therefore essential for improving innovation acceptance. Where skilled labour and farming inputs are not readily available to farmers, it is important to consider access to and affordable costs of these resources as vital enablers for adoption.

Scaling-out and scaling-up of successful innovations

It is erroneous to assume that an innovation which has worked for an individual or a community will automatically work for others. Differences in social, economic, ecological, organisational and geographic scales may affect the adoption of successful innovations when transferred without proper screening through adaptive research. It is therefore important to propose out-scaling for these "recommenda-

tion domains" to avoid offering solutions that will not work in other jurisdictions, making those farmers sceptical to future innovation adoption.

Some innovations can only yield their full benefits when scaled up, so it is crucial to consider the means of up-scaling innovations. Up-scaling the quality or adding certain aspects to the innovation to improve its benefits should be done after proper screening. These may require institutional restructuring of the extension services and further research, which may come with their own innovations.

Conclusion

As argued, improving innovation adoption among smallholder farmers in sub-Saharan Africa depends on addressing various issues. These issues include considering the physical environment in which farming is done, ensuring the inclusion of farmers in the innovation development process from the onset and making sure that the innovation does not widely depart from the current practices and considerations for access to land, credit, market, information, labour, and inputs. Furthermore, adaptive research done before scaling successful innovations in new communities can be crucial. The Interfaces project intends to continue to work on these priorities with the regional projects to improve sustainable land development in sub-Saharan Africa.

Another critical issue that is central to the project is the role of gender and social equity. Women, youth, ethnic minority groups and disabled people are often less considered when it comes to research and development activities and implementation efforts. The project will further strive to understand and promote the consideration of gender issues and the needs of marginalised groups in innovation adoption and implementation among smallholder farmers while identifying ways to make the research findings and information available to all stakeholders in a customised and context specific manner.

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