Smallholder wheat production in Kenya's drylands

Drought-resistant crop varieties can diversify livelihoods and improve food security, provided seed supply is adequate and farming practices are appropriate. ESAPP worked to promote the farming of two new wheat varieties in arid and semi-arid areas in eastern Kenya, training farmers as well as technical and extension staff and supporting community-based seed bulking.

Main messages

- There is untapped potential to successfully diversify crop-based rural livelihoods. This requires identifying and implementing appropriate approaches to promote inclusive community mobilization, participation, and extension support.
- Adequate provisioning for seed bulking and multiplication is decisive for successful introduction and rapid uptake of new seed varieties, especially in dry environments where most farmers live below the poverty line.
- Poverty limits farmers' ability to afford commercially produced seed, which is usually very expensive. Interventions should include measures to protect the seed from being used as food if the communities involved face successive seasons of crop failure.

Sustainable development challenge

Introducing new drought-resistant crop varieties can be a strategy to diversify livelihoods and improve food security in marginalized rural areas. However, efforts to do so in arid and semi-arid regions of Eastern Africa have largely failed to achieve the desired impact. One of the main reasons is that these efforts lack the necessary support to produce enough seed for widespread use in areas where new varieties have been accepted. Other reasons include inappropriate farming practices, over-reliance on non-performing crops, and ineffective government-supported extension service systems that are near collapse.

Over the years, agro-pastoral communities in the semi-arid areas of Makueni and Machakos in eastern Kenya abandoned agro-climatically suitable crops in favour of crops that fulfil both subsistence and commercial functions. This practice continued despite poor performance of such crops and persistent crop failure. To address the problem, the Kenya Agricultural Research Institute (KARI) – now the Kenya Agricultural and Livestock Research Organization (KALRO) – developed two new wheat varieties, Duma and Njoro1. While smallholder farmers were willing to shift to the new varieties, uptake was severely hampered by the lack of affordable seed to satisfy the huge demand.

ESAPP's response

ESAPP developed, tested, and implemented integrated approaches for promoting sustainable livelihood strategies in different socioecological environments of Eastern Africa. The approaches are based on inclusive community mobilization and institutional capacity development, and are adapted and implemented in different ESAPP regions.

To promote wheat farming in the semi-arid areas of Makueni and Machakos, ESAPP supported KARI's Seed Research Centre, the non-governmental organization Benevolent Institute of Development Initiatives (BIDII), and existing self-help groups. A community-based seed bulking and distribution initiative was designed to address the problem of seed availability and promote widespread distribution and use. Appropriate training materials were prepared, and farmers from selected project areas, together with staff from BIDII and line ministries at the county level, were trained in the basics of wheat farming in drylands environments. This included harvesting, primary processing, packaging, and use of wheat and wheat products.

The new wheat varieties Duma and Njoro1 are specially developed for early maturing and drought resistance. They offer an interesting alternative to the commonly planted maize, which requires more moisture and takes longer to mature, often resulting in crop failure. (Photo: Samuel Makali)

The project story

A study conducted within ESAPP-associated projects (Ifejika Speranza et al. 2007) revealed that despite persistent crop failure resulting from unfavourable weather conditions, communities in Makueni and Machakos continued to depend almost exclusively on maize as their main crop. In this region, maize doubles as a subsistence as well as commercial crop. This practice was found to limit crop diversification, reducing the options for broadening livelihood systems and causing communities in the affected areas to face perpetual food insecurity. Other studies (Hager 2012) showed that despite availability of alternative crops, uptake was hindered by a lack of seed to supply farmers. This was even the case with new wheat varieties such as Duma and Njoro1, which were recommended for smallholder production in dry environments. Based on these findings, ESAPP supported the "Smallholder Wheat Production in Arid and Semi-arid Lands" project, which promotes wheat farming in semi-arid areas of Kenya. The project's main approach is to facilitate community-based seed bulking and distribution in selected areas of Makueni and Machakos counties.

Prior to seed bulking activities, selected farmers and BIDII staff were trained in the basics of wheat farming, harvesting, primary processing, and packaging, as well as the use of wheat and wheat products. To ensure sustainability of uptake, training was organized at two levels: for technical and extension staff at county level, and for farmers at village level. Over 160 farmers from 13 villages were trained, and participating community-based organizations were supplied with seed and basic farm inputs for initial multiplication. After the first season, the seed generated by the community-based organizations was distributed to 100 farmers for further multiplication. In the two subsequent seasons, supply reached over 600 farmers, increasing the initial area under production from about 2.6 hectares to over 243 hectares in 13 villages. This rapid increase in wheat-growing farmers ensured availability of affordable wheat seeds, which, in turn, boosted the process of scaling activities up beyond the initial test areas (Kiteme et al. 2010).

This intervention provided a feasible approach to crop diversification using suitable alternative crop varieties that meet farmers' subsistence and commercial expectations and are adapted to ecological conditions in the test areas. It broadened smallholder farmers' means of making a living, and reduced their vulnerability to weather-based crop failures.

Top: Farmers in Makueni visiting a test plot. Changing their farming systems strategy is coupled with substantial risks, which is why seeing the potential and advantages of a crop in their own context was a very important element in gaining farmers' participation in the project. (Photo: Samuel Makali)

Bottom: Farmers in Makueni have long depended on maize as a subsistence as well as commercial crop. Switching to wheat required substantial persuasion and training, as farming techniques for this crop are quite different and its cultivation is challenging. The project included regular field-based courses, mainly involving seed research scientists of the Kenya Agricultural Research Institute and local farmers. (Photo: Samuel Makali)

Innovation and relevance

This knowledge-based intervention was designed from research results that helped to understand the agronomic and socio-economic factors contributing to food insecurity in the semi-arid areas of Makueni and Machakos (Ifejika Speranza 2006; Ifejika Speranza et al. 2007). The research component ensured integration of socio-economic and agroecological dimensions to promote farming of crop varieties that meet farmers' expectations.

Furthermore, this is the first time in Kenya that socioecologically marginalized farmers were involved in seed bulking, multiplication, and distribution through the self-regulated systems of local community-based organizations. Use of institutions that are rooted in local communities' social structures guaranteed instant ownership of the process and provided a solid foundation for successful implementation and sustenance of uptake. The approach to precede seed bulking with relevant training for both farmers and county extension service providers was very important for guaranteeing sustainability beyond the project's duration. The ESAPP project transformed farmers' livelihoods for the better, strengthened their social capital through an expanded social network, and provided a new foundation for improved social interaction and cooperation – all crucial features for broad-based and secure rural livelihoods. Compared with maize, the two wheat varieties Duma and Njoro1 have higher yields, fetch better prices, require less moisture, and mature earlier.

The project provided some important lessons worth noting for similar interventions. First, even the most suitable crop variety for drylands cannot succeed without the minimum moisture required for growth to term; Duma and Njoro1 failed in one of the seasons that experienced total crop failure. Second, sustainable community-based seed bulking can fail if no arrangements are put into place to prevent farmers from using the seed for food in cases of serious food shortage and the total collapse of other alternative food sources. This happened in the seasons following the total crop failure, when some of the affected farmers were forced to consume their wheat seed and had to abandon wheat farming.

Top: Farmer field day in Kaiti, Makueni County. A county-level agricultural extension service provider displays different wheat seed varieties at the event, during which farmers learn about and discuss important aspects of wheat production and use. Consistent and reliable extension service support is crucial for successful transfer and adoption of new agricultural innovations. (Photo: CETRAD photo gallery)

Bottom: A healthy and fast-growing wheat crop in one of the successful seasons in Kathiani, Machakos County. Even the crop varieties most suited to the drylands cannot succeed without the minimum amount of moisture required for growth to term. (Photo: CETRAD photo gallery)

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Highlight profile

This highlight is based on the achievements of 2 ESAPP priority action projects.

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Implemented by:
Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

In collaboration with:
Kenya Agricultural Research Institute (KARI), Nairobi, Kenya; Benevolent Institute of Development Initiatives (BIDII), Nairobi, Kenya

Main beneficiaries:
Farmers in Makueni and Machakos counties, Kenya

References and further reading

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What is ESAPP?

The Eastern and Southern Africa Partnership Programme (ESAPP) is a research implementation programme funded by the Swiss Agency for Development and Cooperation (SDC), coordinated by the Centre for Development and Environment (CDE) of the University of Bern, Switzerland, and implemented jointly by CDE and a network of partner institutions in Eastern and Southern Africa. Launched in 1999 and completed in 2015, ESAPP implemented over 300 priority action projects in the programme region, which included Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar.

What are ESAPP Highlights?

ESAPP Highlights are a series of 24 project descriptions providing insights into ESAPP's research and implementation partnerships. Each Highlight describes a succession of demand-driven priority action projects addressing local and regional sustainability issues. The 24 Highlights are collected in a publication that includes additional background information on ESAPP (see citation above). The individual Highlights and the entire publication are also available for download on CDE's website: www.cde.unibe.ch (keyword search: "ESAPP").

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