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Sorghum in East and Central Africa: more than food

Since 2006, IFAD and the European Union have partnered to invest over EUR 230 million in agricultural research programmes carried out through the CGIAR system. This collaboration aims to support research and scientific innovation with the active involvement of smallholder farmers themselves. Thus, the European Union-IFAD financing has produced solutions that are demand-driven and context-specific, leveraging the agricultural research capacity of the CGIAR system to advance both food security and climate change adaptation.

Context, challenges and opportunities

In the East and Central Africa region, sorghum production is typically a subsistence activity for rural households. Because of its low productivity and low-input cultivation, it does not provide a reliable source of income for smallholders; about 85 per cent of production is used for food. Although over 1 million hectares of land

QUICK FACTS

PROJECT Development of Commercially Sustainable Sorghum for Multiple Uses (SMU) Value Chains in Kenya and Tanzania

FOCUS COUNTRIES
Kenya and Tanzania

LEAD IMPLEMENTING INSTITUTION
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)-CGIAR partnership

GOAL Improving the livelihoods of poor rural smallholders by improving their access to markets and supporting the development and uptake of higher-yielding and more resilient sorghum varieties

BENEFICIARIES Resource-constrained smallholder farmers in arid and semi-arid zones

DATES 2011-2017

FINANCING EUR 2.1 million

are used to grow sorghum in Kenya and Tanzania, several biotic and abiotic stresses and drylands are keeping sorghum productivity low. Scarce availability of high-yielding sorghum varieties, poor crop management and poor access to inputs are also part of the problem.

In the arid and semi-arid areas of these countries, over 50 per cent of the population lives below the poverty line, and malnutrition affects around 30 per cent of children under age 5. Indeed, sorghum can be an important ally for reducing poverty and malnutrition in these areas due to its numerous nutritional attributes, and because it is generally well adapted to low-moisture and poor soil-fertility conditions. With the use of improved crop varieties and good crop management techniques, productivity can be significantly enhanced.

However, increasing production is not an effective and sustainable solution in itself, as smallholders in the drylands of Kenya and Tanzania face other challenges, especially limited access to markets. Sorghum farmers in the drylands are usually scattered and not organized in producer groups. As individual producers, they are unable to meet the market's demands for large deliveries, and high transaction costs discourage them from produce collection. They also usually lack market information, business skills, and the capacity to engage in contractual arrangements with other stakeholders along the value chain. Producing sorghum as a cash crop for industrial food, animal feed and non-food processing (e.g. as an alternative supply for brewing industries) is an important opportunity to move more than 25,000 smallholders from subsistence farming to a more specialized agriculture integrated in the cash economy.

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Setting objectives

The **Development of Commercially Sustainable Sorghum for Multiple Uses (SMU) Value Chains in Kenya and Tanzania** project was formulated to respond to the challenges of conventional sorghum producers, as well as those of farming systems in dry areas that are prone to frequent crop failures. In particular, the project studied the sorghum value chain and production systems, supported the development and uptake of new sorghum multi-purpose varieties that are more resistant to biotic and abiotic stresses, and improved farmers' access to inputs and markets through partnerships with agro-dealers and industry.

Solutions and results

Within three years, the project targeted directly 60,000 households in 17 districts in Kenya and Tanzania, with an estimated spillover effect extending to another 120,000 households – covering at least 26 per cent of the total population in the project areas. To develop improved multi-purpose sorghum varieties and promote their adoption, the project organized 82 on-farm selection trials, with the participation of 7,429 farmers. This allowed for over 25 improved sorghum varieties and hybrids to be evaluated and tested with farmers and end-users. In order to identify gaps and opportunities for sorghum value chain development, the project analysed and mapped the key actors, market structure, production system and existing supply chains. The project actively engaged with input suppliers, potential manufacturers, institutions and other end-users to establish pilot commercial sorghum value chains in Kenya and Tanzania.

As a result, there was a significant increase in both production and productivity, on average from 0.8 tons to 2.0 tons per hectare, with peaks of 3.2 tons per hectare. In both countries, the land cultivated with improved varieties increased by more than 40 per cent in the target areas, and in Kenya alone, the land cultivated with sorghum increased from 224,000 hectares to about 350,000 hectares during the project. In 2016, one year after the project closure, sorghum varieties still covered around 56 per cent of the land cultivated in the project areas in Kenya, compared to 33 per cent in 2011. Additionally, in participating districts in Kenya in 2016, former beneficiaries experienced yields of 405 kilograms per acre (despite the unfavourable weather events and the 2016 drought), compared to 158 kilograms per acre for non-beneficiaries.

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The project also took important steps to strengthen the capacity of key stakeholders in the sorghum value chain, including through mobilization, formation and registration of 124 producer groups and training of 62,937 farmers and extension officers. About 21 field days and exhibitions were organized to share learning and disseminate information beyond farmers participating in the project. Finally, the project successfully facilitated more than 50 partnerships along the value chain among farmer groups, agro-dealers, financial institutions, national food agencies, universities and sorghum end-users.

From research results to impact

Overall, the project generated a virtuous circle by disseminating improved sorghum varieties that were better adapted to drylands and facilitating commercial linkages. Farmers who adopted these varieties were able to significantly increase their yields with minimal inputs use and sell the surplus on the market. The availability of reliable and quality sorghum in turn stimulated an increase in the demand by different end-users (including the malting industry, animal feed manufacturers and other cottage users). In Kenya alone, the project enabled an average of 8,000 farmers per year to market sorghum grain to the malting industry. The project also tangibly increased the well-being of households:

- Food security and nutrition improved in the project areas thanks to increased availability of quality sorghum, which is a source of protein, fibre, carbohydrates, iron and potassium. As of 2016, in Kenya, sorghum fulfilled 28 per cent of the household food needs, compared to only 12 per cent before the project.
- Food availability for project beneficiaries increased all year round; as a result, drastic coping strategies (such as selling productive assets) greatly reduced.
- Household choices and opportunities expanded, thanks to their increased income resulting from sorghum surplus sales. In Kenya, for example, as of 2016, sorghum contributed an average 41 per cent of income, compared to 10 per cent before the project. This increase enabled farmers to access new opportunities and improve their livelihoods. Mostly, the additional income was used to pay school fees, build permanent and semi-permanent houses, and purchase livestock to diversify households' economic base. Some youth used the additional income to invest in new small businesses, such as purchasing motorcycles to provide transport services in the rural areas.

Veronica Simeon is a farmer from the Nkungi village in the Iramba district of Tanzania. Within the project, she was able to participate in one of the on-farm Sorghum for Multiple Uses trials and she is now growing improved seeds.

The project helped her strengthen her crop management capacity and improved her access to varieties less vulnerable to biotic and abiotic stresses. She can now count on a more stable performance of her crops and an increased and more reliable production. She has, therefore, decided to invest her earnings in building a new brick house for her family.

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Innovations

The project pioneered the use of the aggregator model – a process innovation adapted from e-commerce used to collect and aggregate information on goods and services from different competing sources – in order to enhance smallholder producers' opportunities to access markets and other essential business services. By using this model, farmers gained enhanced access to tractors for land preparation, quality inputs (including seeds and crop-protection inputs), and sorghum threshing and cleaning services. This was instrumental for planting crops on time, increasing production area, reducing drudgery and enhancing the quality of the grain reaching markets, thereby improving marketability and increasing the volumes of sorghum traded. Since 2012, 47,000 tons of surplus sorghum grain (valued at US$16 million) was sold using this approach. Similarly, partnerships with industry/processors enabled grain quality end-use analysis and allowed identification of varieties suitable for multiple uses (food, feed and malting).

Another innovation validated and promoted by the project was the installation of charcoal stoves for baking sorghum products to be used by rural farmers with no access to electricity. While this initiative is still in its early stages, it is clear that these stoves provide a portable, low-cost option that can be shared among different sorghum farmers and add value to their produce. With the introduction of this innovation in some of the project areas, many farmers and farmer groups were able to start baking products for home use and for sale within the rural communities, including to schools and hospitals. This led to increased consumption of sorghum-based foods. A number of small cottage industries started emerging and smallholder farmers, especially women, significantly increased their incomes by selling finished products.

Future directions

The project created opportunities to scale up sorghum value chains by expanding market openings through alternative end-user avenues beyond household consumption and animal feed, such as in school meal programmes or as food relief. In addition to keep strengthening linkages with the livestock sector, this will also require more efforts in sensitizing households beyond the rural poor on the nutritional value of sorghum.

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