Extreme weather events such as floods and droughts are putting at risk the livelihoods and resilience of millions of smallholder farmers. Finding, testing and encouraging uptake of practices that can mitigate climate risks is essential to securing sustainable agricultural production in the future.

Key messages

- Floods and droughts cause food insecurity
- New climate-resilient crop varieties give improved yields
- Successful trials incentivize farmers to take up new practices
Extreme weather threatens food security

In 2015, more than 1.1 million people in southern Malawi were affected by El Niño-induced flooding, which submerged or washed away more than 64,000 hectares of cropland.

That growing season was a nightmare for Malawian farmers, as the country faced floods at the beginning of the season and then terminal drought. Flooding caused loss of property, crops and valuable topsoil, while surviving crop fields were burnt dry prematurely due to drought. A failed growing season has serious implications for farmers’ incomes and food security.

While 2015 was a particularly bad year, unpredictable and extreme weather events are becoming increasingly more common. New crop varieties that can withstand adverse climatic conditions can help farmers sustain their production and resilience, even under difficult conditions.

Cross-CGIAR cooperation ensured fast response to food crisis

With the risk of serious food insecurity looming during 2015, scientists acted quickly and collaborated with farmers to find possible mitigation strategies. Farmers identified orange-fleshed sweet potatoes as the best option: They grow faster than maize and could, if planted quickly, be ready for harvesting before the end of the season.

By collaborating across CGIAR centers, scientists were able to provide and distribute sweet potato vines to more than 1,200 farmers. The Malawian government estimated that the flood and drought caused a 30 percent yield reduction, and therefore the additional yield provided by the distributed sweet potato vines can be assumed to have made a big difference for farmers’ food security.

However, while the sourcing and distribution of sweet potato vines proved a great short-term solution, there is still a need for long-term solutions to risks brought on by floods and droughts.

Magic beans may provide long-term solution to climate risks

Common beans (Phaseolus vulgaris L) play an important role in food and nutrition security as well as income for Malawian farmers. However, its yields have remained low (around 400 kg per hectare), mainly due to pest and diseases, declining soil fertility, poor quality of genotypes, slow adoption rate of new technologies and adverse climatic conditions, such as those experienced in 2015.

Therefore, scientists began testing improved, high-yielding, drought-resilient genotypes, which were introduced along with appropriate integrated soil fertility management practices.
The new genotypes were piloted using a ‘mother-baby’ participatory approach, where the first (mother) trial was managed by farmers and located in a highly visible and trafficked area. Next, farmers were encouraged to implement their preferred technology on their own fields. In total, 209 farmers participated in the trials.

Farmers were also trained on crop, pest and disease management as well as on different treatments, such as using manure fertilizer for bean crops.

When evaluating the trials, farmers and researchers found that of the four types of beans tested, especially the two kinds of bush beans showed outstanding performance on all the plots when compared to other crops, including the local bean varieties and maize. Trials showed that the bush bean yielded 1,050 kg per hectares, which is 262.5% higher than the current mean yield for beans. When comparing to the poor performance of maize, farmers nicknamed the bean “the magic bean.”

Climate-resilient crop varieties could boost food production

The successful farming of sweet potato increased farmers’ interest in new crop varieties and farming practices. Extension workers and non-government organizations also benefitted, as they are now able to provide communities with more evidence on the importance of interventions that help improve climate resilience.

Some farmers kept sweet potato vines in a nursery beside their main houses, a space that is usually used for vegetables and communal tree nurseries, to plant them again during the upcoming season.

Farmers who participated in the bean trails were impressed with the results:

“This is a magic bean. How I wished I had an opportunity to plant it in a big area,” said Pokoma Lobita, a farmer hosting the Mother trial at Ungwe village in Linthipe, Dedza district. Even farmers that did not participate in the trials learned of the success and are interested in taking up the practice. The trialed bean genotypes have since been earmarked for wide release by the Department of Agricultural Research Services in Malawi.
Outcome Story Coordinates

Country: Malawi
Region: South Asia
Agricultural livelihood system: Rainfed
Cross-cutting theme: Climate change
CGIAR SLO: Improved food and nutrition security and health
SDG: SDG 2: Zero hunger (~2.2 Food safety improved)

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