



ICRISAT in

# Malawi



## Country Overview

Malawi is a landlocked country with one of the highest population densities in sub-Saharan Africa. The country has an estimated population of more than **20 million** (2022), which is expected to surpass **50 million** people by **2058**. Malawi remains one of the poorest countries in the world despite making significant economic and structural reforms to sustain economic growth. The economy is heavily dependent on agriculture, employing nearly **80%** of the population, and it is vulnerable to external shocks, particularly climatic impacts. In January 2021, the Government launched the **Malawi Vision 2063** that aims to transform Malawi into a wealthy and self-reliant industrialized upper middle-income country.

(Source: World Bank)



Harvesting groundnut at an agricultural research station in Malawi.





## Partnerships

ICRISAT-Malawi was established in 1985 to focus on groundnut improvement for the Southern African Development Community (SADC) countries. ICRISAT is strategically engaged with the Department of Agricultural Research (DARS) in building the capacity of Malawi researchers and farmers' organizations in legume crop breeding, especially groundnut and pigeonpea.

### Key completed projects

- **2016-21:** Malawi Seed Industry Development Project funded by **Irish Aid** was implemented by the MSIDP II consortium comprising the Department of Agricultural Research Services (DARS) and the Department of Agricultural Extension Services (DAES), both under the Ministry of Agriculture in Malawi; International Centre for Tropical Agriculture (CIAT); the Legumes Development Trust (LDT); and ICRISAT as the project lead.  
From 2016 to 2021 the **McKnight Foundation** has funded multidisciplinary projects.
- **2014-2019:** Malawi Improved Seed Systems and Technologies (MISST) - Reseeding Malawi's Smallholder Agriculture funded by the United States Agency for International Development (**USAID**).
- **2014-2017:** Research on aflatoxin funded largely by the Peanut and Mycotoxin Innovation Lab (**PMIL**), University of Georgia Research Foundation Inc.
- **2017-21:** Improved Livelihoods through the Sustainable Intensification and Diversification of Market-oriented Crop-livestock Systems in Southern Malawi funded by the **European Union** through the **Government of Malawi**.

### Ongoing projects

- **2019-2024:** DeSIRA - Climate-smart Innovations to Improve Productivity, Profitability and Sustainability of Agriculture and Food Systems in Malawi through Multidisciplinary Research funded by the **European Union** through the **International Potato Center (CIP)**.
- **2019-2022 (Aug):** Harnessing Dryland Legume and Cereal Genetic Resource for Food and Nutrition Security and Resilient Farming Systems in Malawi and Zambia funded by the Food and Agriculture Organization of the United Nations (**FAO**).



Farmers like Elinati Mbewe from Dedza have seen their sorghum productivity increase as a result of the new varieties.



## Milestones

### Landmark varietal releases in Malawi

#### Global Research Program: Accelerated Crop Improvement

A total of **32** improved varieties and hybrids comprising of sorghum (**5**), pearl millet (**2**), finger millet (**3**), groundnut (**12**), chickpea (**3**), and pigeonpea (**7**) were released in Malawi as of 2021.

**Sorghum:** In January 2019, three improved sorghum varieties with a **yield potential of up to 4 tons per hectare** and tolerant to grey leaf spot, rust and other common diseases were released in Malawi. These new varieties replaced two varieties released in 1993, and have since been the only improved sorghum varieties available in Malawi.

**Chickpea and finger millet:** In 2021, **high-yielding chickpea and finger millet varieties** with a **yield potential of up to 3 tons per hectare** had their official release in Malawi. The release aligns well with both the Government's crop diversification agenda for food and income security and Irish Aid's goal of increasing the resilience of poor households to economic, social and environmental shocks. These varieties were bred by the ICRISAT breeding program in Kenya and were tested for adaptability in Malawi.

**Pigeonpea:** Since 2000, a **49%** increase in cropping area along with a **153%** increase in production and a **68%** increase in productivity of pigeonpea has been observed in Malawi due to **wilt-resistant medium-duration** varieties developed by ICRISAT. The new varieties provided a sustainable climate-smart solution to farmers affected by the dwindling 'Chiperoni' rains in Southern Malawi, a traditional pigeonpea growing area.



One of the machines developed by MISST being demonstrated to Dr Alexander Bulilani, Controller of Agriculture and Extension Services (3rd from right).

An impact study conducted in 2016 for the Malawi Seed Industry Development Project (MSIDP) reported a high use of ICRISAT improved varieties of different crops:

- **35%** increase in the use of improved groundnut varieties at the national level and **62%** in project impact areas.
- **46%** increase in productivity for groundnut and **43%** for pigeonpea in project impact districts.
- **45%** increase in farmer incomes associated with groundnut and **66%** for pigeonpea.

Over **245,000 households** were reached and **14,500 metric tons (MT)** of seed were produced through the Malawi Improved Seed Systems and Technologies (FtF MISST) Project. Groundnut yield increased **205%** from **0.37 MT/ha** in 2015 to **1.12MT/ha**. The income per hectare for groundnut increased **9.3%** from **US\$ 330.3** to **US\$ 352**.

#### Sustainable intensification of crop production:

With decreased landholding, there is a need to maximize productivity through adopting soil fertility and productivity enhancing technologies such as double-up legume and cereal-legume intercropping. Studies show that when legumes are intercropped with maize, the cost of fertilizers reduced by up to **50%**.



Malawi farmers reduce poultry feed cost by 80%, increase egg production by 200% through improved feed.

## Adopting a value chain approach

### Global Research Program: Enabling Systems Transformation

**Seed production and delivery systems:** The Malawi Seed Industry Development Programme, established in 2008 and managed by ICRISAT, aimed to improve the quality of seed available to smallholder farmers. ICRISAT engaged directly with members of the National Smallholder Farmers Association of Malawi (NASFAM) and the seed produced under this program were certified and sold commercially under an umbrella brand, the Malawi Seed Alliance (MASA).

**Seed value chains:** An estimated **US\$ 40 million per annum**, up from **US\$ 17 million in 2009**, was infused into Malawi's economy from legume exports. Through the MSIDP, **€ 843,000 (US\$ 1,006,945)** has been transferred to farmers mostly through seed related initiatives. Beneficiary farmers generated **€ 72,000 (US\$ 86,000)** from grain sales in the 2017- 2018 cropping season. The **Seed Revolving Fund model** developed by ICRISAT for improving groundnut and pigeonpea seed systems in Malawi was recognized for making a significant impact in the livelihoods of smallholder farmers, especially women.

**Machines to reduce drudgery:** Machines like the groundnut sheller, stripper, lifter, peanut butter maker and groundnut oil expeller all alleviate the labor intensive burden faced by many smallholder farmers, especially women in Malawi.

**Crop livestock integration:** ICRISAT's work illustrates the importance of feed technologies that farmers can integrate into their cropping activities, such as crop residues from dual-purpose crops and intercropping maize with groundnut, pigeonpea and sorghum. Farmers may use part of their income gains from livestock sales to buy quality seed and fertilizer. Such income gains for resource-poor households provide an option to acquire less costly nutrient-dense foods, like eggs or pulses, and reduce trade-offs with food production, given the limited land in Malawi.

**Nutrition and food safety:** The Government of Malawi in partnership with ICRISAT, CIAT and the **Malawi Seed Industry Development Project (MSIDP II)** increased the utilization of legumes and cereals as a means of reducing malnutrition and stunting in women, children and other vulnerable groups in the country. Over **7,500** farmers were trained in the processing of these foods since the start of MSIDP II in 2016.

About **7%** of households in the project's target areas are already practicing aflatoxin mitigation strategies promoted by the project. A total of **7,557** smallholder farmers have benefited from these interventions with more poised to learn and teach others, leading to greater awareness on health and nutrition.





A crop modeling training session in progress.

## Climate-smart approaches

### Global Research Program: Resilient Farm and Food Systems

Young Malawian researchers are being trained in crop modeling to tackle land, water and climate related challenges facing agriculture and smallholder farmers. Researchers from Malawi's national research organizations learned to model agricultural systems using the Agricultural Production Simulator Model (APSIM) with the support of the Australian Center for International Agricultural Research.



## Looking to the Future

**Modernizing breeding:** ICRISAT is modernizing its crop improvement operations to be able to realize quick genetic gains to speed up variety releases and to replace old varieties.

**Soil health:** Crop protection and soil health are key to improving crop productivity, which is suboptimal in Malawi. ICRISAT aims to improve this through diagnostic research that will determine the status of the soil microbiome and how to improve it. ICRISAT is also developing and testing holistic crop protection packages to reduce loss to diseases and pests.

**Aflatoxin mitigation:** Our research shows that biocontrol has the potential to reduce aflatoxin to safe levels for consumption, but its efficacy is enhanced when applied together with GAPs. This research has the potential to restore international markets for Malawi's groundnuts leading to improved livelihoods.

**Capacity development programs tailored to women and youth:** ICRISAT supports seed development and value adding business ventures that create jobs and income. ICRISAT can provide training organizations with knowledge on seed development and multiplication while helping register seed producing groups with the Malawi Seed Alliance for seed marketing linkages. ICRISAT can also offer contracts to grower groups to multiply pre-basic seed to the stage of basic seed, guaranteeing a market for these seeds and thus an income to these groups. Through its linkages to the agro-industry, ICRISAT can broker internships with established seed and grain processing companies.



Cookery class in Malawi teaches participants how to incorporate millets and legumes in their diets.