



ICRISAT in

Zimbabwe



Country Overview

Challenging macroeconomic conditions, including soaring inflation, COVID-19-related income losses, and back-to-back poor agricultural seasons, have eroded the livelihoods of millions across Zimbabwe, leading to rising food insecurity, according to the Food and Agriculture Organization (FAO).

Drought is a major threat to the agriculture sector, which is composed mostly of rainfed farming systems, and has caused water shortages, low production, and food insecurity in recent years.

Zimbabwe's economic performance largely depends on its agricultural sector. According to the International Trade Administration, the country has 4,130,000 hectares of arable land, 25% of which is cultivated using animal and manual draught power.

According to the World Bank, although extreme poverty has declined since its peak in 2020, it remains high in the context of cyclical agricultural production and elevated food prices.





Partnerships

Key completed projects

- **1983-2003:** The Southern African Development Community (SADC) / ICRISAT Sorghum and Millet Improvement Program (SMIP) was launched in response to a recommendation by the SADC Heads of State that led to the establishment of ICRISAT Zimbabwe. The SMIP was funded by the United States Agency for International Development (USAID) with the Canadian International Development Agency (CIDA) and the German Federal Ministry for Economic Cooperation and Development (BMZ).
- **2007-2021:** The International Development Research Center (IDRC), Canada, funded an early climate change project from 2007 to 2010. In 2014, the Department for International Development (currently Foreign, Commonwealth and Development Office), UK, and the Food and Agriculture Organization of the United Nations (FAO) funded modeling studies and conservation agriculture, respectively. The BMZ/GTZ and the CGIAR research program, Climate Change Agriculture and Food Security (CCAFS), have funded other projects.

Ongoing projects

- **2017-2022 (Jun):** Enhancing Community Resilience and Inclusive Market Systems in Zvishavane and Mberengwa Districts of Zimbabwe (ECRIMS) funded by UNDP through CARE International.
- **2017-2022 (Jun):** Transforming smallholder irrigation into profitable and self-sustaining systems in Southern Africa pilot and a complementary proposal: Scaling out 'Tools + AIPs' in Zimbabwe irrigation schemes in Matabeleland North Province pilot funded by ACIAR through the Australian National University.
- **2018-2022 (Nov):** Zimbabwe Agricultural Growth Programme: Agricultural Knowledge and Innovation Systems (ZAGP-ZAKIS) funded by the European Commission through Deutsche Welthungerhilfe, Zimbabwe.
- **2020-2022 (Sep):** Stepping-up Post-Emergency Recovery and Resilience to Empower Vulnerable Communities in Zimbabwe (SUPER-EVC) funded by the European Union through Save the Children, Norway.
- **2021-2022 (Jun):** Zimbabwe Resilient Building Fund - Enhancing Community Resilience and Sustainability (ECRAS) - cost extension for additional activity funded by UNDP through CARE International.
- **2021-2023 (Dec):** Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) funded by The World Bank through CIAT.



Key outcomes

High-yielding food, feed, and fodder varieties

A total of 17 improved varieties and hybrids comprising sorghum (9), pearl millet (5), and groundnut (3) were released in Zimbabwe as of 2021.

Farmers gain from adopting new varieties: The Sorghum and Millet Improvement Program (SMIP) from 1983-2003, largely funded by USAID and with CIDA and BMZ, introduced new infrastructure for research on sorghum and pearl millet.

Significant adoption of new varieties occurred in Zimbabwe, with NARS/SMIP varieties occupying **30%** of the sorghum area and **27%** of the pearl millet area. This adoption was achieved with direct (variety development) and indirect (training and collaborative research) SMIP support.

Two varieties, sorghum SV 2 and pearl millet PMV 2, have yielded an IRR of **27%** at current adoption levels, rising to **34%** at a more realistic adoption of **50%**. The stream of net benefits from these two varieties ranges from **US\$ 7.8 million** to **US\$ 28.9 million**, depending on future adoption rates. These figures represent the value of increased productivity, which has contributed to increased food and nutritional security and reduced dislocation caused by drought to smallholder farmers in some of southern Africa's most drought-prone regions.



Biofortified dryland cereals: High iron and zinc pearl millet and sorghum varieties developed in collaboration with HarvestPlus are being tested for adaptation in the country.

Doubling groundnut production: The area under groundnut production has doubled in the past 25 years. Productivity has, however, remained low and stagnant at less than **0.5 t/ha** for many years. This is despite the availability of improved varieties with yield potentials of above **2.5 t/ha**. Reasons for this yield gap include the absence of a well-integrated seed system and a functioning groundnut value chain.

Enhancing crop improvement: Zimbabwe functioned as the regional hub for the enhanced crop improvement work under the Bill and Melinda Gates Foundation-funded AVISA Project. Modernization of crop improvement, strong market orientation, gender responsiveness, and development of nutrition traits, besides public-private partnerships, are some of the Project's components. Seed multiplication programs have sought to contribute to nutritional and food security amongst smallholder farmers growing sorghum, pearl millet, cowpea, and groundnut.

Well-equipped genebank: The regional genebank at Bulawayo conserves over 20,900 accessions of regional importance that are critical to research.

Climate-smart agriculture

Impact of Conservation Agriculture (CA): Over the past 15 years, the CA approach has been promoted throughout Zimbabwe. It has consistently increased average cereal yields by 50 to 200% in more than 150,000 farm households, with the yield increase varying by rainfall regime, soil types and fertility, and market access. Rather than simply handing farmers free seed and fertilizer inputs, teaching farmers CA principles has enabled them to apply inputs like water, fertilizer, and seed more efficiently.

Building resilience: ICRISAT has implemented climate change projects funded by the BMZ/GTZ and CCAFS. The former used the 'temperature analog site' approach to assess the impact of predicted temperature increase over the next 30-40 years on crop productivity, and the latter introduced climate forecasts to reduce risks at the farm level.

Through the Protracted Relief Program (PRP), Livelihood and Food Security Program (LFSP), and the Zimbabwe Resilience Building Fund (ZRBF), ICRISAT has worked in partnership with several NGOs across 20 districts of Zimbabwe. Since 2004, ICRISAT has trained more than 10,000 lead farmers, 341 government extension officers, and 119 extension officers from 24 local and international NGOs.

Modeling studies: Commencing in 2014, the Agricultural Model Intercomparison and Improvement Project (AgMIP) was set to estimate the impacts of climate change on food production into the future. Computer-simulated scenarios were created to guide policymakers, academicians, and farmers.



Soil and water management

ICRISAT promotes and upscales natural resource management technologies such as integrated soil fertility management (fertilizer microdosing, legume rotations/intercropping, organic soil fertility amendments) and infield water management in the semi-arid areas of Zimbabwe.



Microdosing impact: Scaling of microdosing was initiated in 2003/2004 with the support of DFID and the European Commission Humanitarian Aid Office (ECHO) under national drought relief programs. An impact assessment study showed that for every US\$ 1 invested using the microdosing technique, farmers reaped a return of US\$ 5. In Zimbabwe, more than 300,000 households are practicing the technology and have increased their food security and household income.

Use of soil moisture sensors: The use of Agriculture Innovation Platforms (AIPs) and Smart Water Management (SWM) tools (the Chameleon and the FullStop Wetting Front Detector) in 13 small-scale communal irrigation schemes in Zimbabwe reached 1,698 farmers covering 757 ha. This resulted in reduced frequency of irrigation. These reductions in over-irrigation and increased nutrient retention in the root zone improved water productivity from 0.2kg of maize per m³ of water at the start of the project to 1.2 and 0.9kg/m³ for those with and without tools, respectively. Close to 86% farmers reported increases in yields of more than 25%, and about half reported income increases.



Integrated crop-livestock systems

Investing in small ruminants: A baseline survey in semi-arid Zimbabwe showed that smallholder farmers sell livestock to sustain food security during dry periods when crop harvest fails. Dry

season feed technologies and livestock markets were identified as leverage areas for sustainably improving food security and income. Work on cereal-legume supplementary dry season feeds, conservation and storage was demonstrated and promoted with farmers in more than six districts in Zimbabwe. Goat mortality rates were reduced from as high as 40% to less than 15%. Testing these feed ratios illustrated that farmers can achieve the same product quality as commercial stock feed.

ICRISAT has worked on strengthening linkages between farmers and markets, and facilitated the restoration of efficient, market-oriented farming systems, especially related to the goat value chain. This has included agribusiness training to build the capacity of both women and men. ICRISAT is currently one of the partners in the Zimbabwe Agriculture Growth Program, Knowledge and Innovation Services (ZAGP KIS).

Looking to the Future

ICRISAT has strong ties with the Government of Zimbabwe and is part of a consortium that works on a national strategy for increasing the productivity of sorghum and millets. ICRISAT is also working with the private sector to develop a robust seed system for hybrids. There is significant potential for ICRISAT's improved varieties to be utilized as food, feed, and fodder.

Interactions with the UNDP-Zimbabwe Resilience Building Fund (ZRBF) inform a second phase strategy, which will run up to 2031, to implement activities that contribute to the SDGs.