Country overview

Challenging macroeconomic conditions, including soaring inflation, COVID-19-related income loss, and back-to-back poor agricultural seasons have eroded the livelihoods of millions across Zimbabwe which has led to rising food insecurity (FAO). Drought is a key threat to the agriculture sector which is composed of mostly 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. The country has 4,130,000 hectares of arable land, 25% of which is cultivated using animal and manual draught power, according to the International Trade Administration.

According to the World Bank, a significant proportion of households experienced reduced or no income since the onset of the Covid-19 pandemic and the coverage of social assistance programs remains low. The number of people living below the international poverty line was expected to be 6.1 million in 2021 and to marginally decline in 2022, supported by expected economic growth and relatively lower inflation.
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 made by the SADC Heads of State, which led to the establishment of ICRISAT Zimbabwe. 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 the earliest climate change project from 2007 to 2010. In 2014, the Department for International Development, UK (DFID) and the Food and Agriculture Organization of the United Nations (FAO) funded modelling 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

- **2021-2023 (Dec)**: Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) funded by World Bank through CIAT.
- **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.
- **2017-2022 (Jun)**: Enhancing Community Resilience and Inclusive Market Systems in Zvishavane and Mberengwa Districts of Zimbabwe (ECRIMS) funded by UNDP through CARE International.
- **2021-2022 (Jun)**: Zimbabwe Resilient Building Fund - Enhancing Community Resilience and Sustainability (ECRAS) - cost extension for additional activity 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 is funded by ACIAR through Australian National University.

Outcomes of ICRISAT’s work

1. High-yielding food, feed and fodder varieties

Global Research Program: Accelerated Crop Improvement

A total of 17 improved varieties and hybrids comprising sorghum (9), pearl millet (5) and groundnut (3) were released in Zimbabwe as of 2021. Breeding, crop protection, and crop management research focused on drought tolerance, early maturity, grain and fodder productivity, and resistance to diseases. Grain for food, malting, and feed qualities of both sorghum and millet were evaluated.

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, brought in 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 range from USD 7.8 million to USD 28.9 million depending on future adoption rates. These figures represent the value of increased productivity. There are also additional benefits (food security, nutrition, reduction in 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.

Constraints in 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 nutrition traits, besides public-private partnership focus 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 20,000 accessions of regional importance that are critical to research that targets market requirements and farmer preferences.

2. Climate-smart agriculture

Global Research Program: Resilient Farm and Food Systems

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 free seed and fertilizer inputs to farmers, 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 analogue 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 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 a number of 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.

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

3. Soil and water management

ICRISAT promotes and upcales 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 European Commission Humanitarian Aid Office (ECHO) under the context of national drought relief programs. An impact assessment study done in Zimbabwe showed that for every US$1 dollar invested using the microdosing technique, farmers reaped a return of US$5 dollars. 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 (WFD) in 13 small-scale communal irrigation schemes in Zimbabwe reached 1698 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. Of all the farmers, 86% reported increases in yields of more than 25% and about half of those reported increases in income.

4. Integrated crop-livestock systems

Global Research Program: Enabling Systems Transformation

Investing in small ruminants: A baseline survey in semi-arid Zimbabwe, illustrated that smallholder farmers sell livestock to sustain food security during dry periods, when their crop harvest fail. Dry season feed technologies coupled with livestock markets were identified as leverage areas for improving food security and income in a sustainable way. 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 compared to commercial stock feed.

ICRISAT has worked on strengthening linkages between farmers and markets, facilitating 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, the Zimbabwe Agricultural Knowledge and Innovation Services (ZAKIS).

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 productivity of sorghum and millets. The strategy targets 200-300 K tons as part of its 1.5 M tons grain reserves. ICRISAT is working closely with the Government’s Crop Breeding Institute (CBI) to speed up final trials and release hybrids by the end of 2022. ICRISAT is also working with the private sector to develop a robust seed system for hybrids. There is large potential for ICRISAT’s improved varieties to be utilized as food, feed and fodder, hence reviving collaboration with USAID, the Foreign, Commonwealth and Development Office (FCDO- previously DFID) and the European Union.

Interactions with the UNDP-Zimbabwe Resilience Building Fund (ZRBF) inform a second phase strategy, which will run up to 2031 to implement activities contributing towards the SDGs. In September 2021, the United Nations (UN) convened the global Food Systems Summit (UNFSS) to explore pathways to transform our current fragile and inequitable food systems towards achieving the 17 SDGs “Vision 2030”. This could be an opportunity for ICRISAT to be involved in Transforming Agriculture Production and Food Systems in Zimbabwe. ICRISAT has the potential to leverage on its capacity to lead Action Track 1 on Food safety, especially the control of mycotoxins and work closely with Action Track 3 on the promotion and upscaling of proven CSA technologies. The upcoming International Year of Millets-2023 also provides an opportunity for working closer with the Indian High Commission.

Improved feed and fodder reduces goat mortality rates from 40% to 15%.

(L-R) Minister Dr Anxious Jongwe Masuka and Dr Dumisani Kutywayo (fourth and fifth from left, respectively) flanked by ICRISAT staff (L-R) Drs Eric Manyasa, Martin Moyo, Rebbie Harawa and Hapson Mushoriwa.