## Study #4043

### Contributing Projects:
- P1777 - TRANSFORMING MAIZE BASED PRODUCTION IN EAST AND SOUTHERN AFRICA
- P1526 - Improving yield potential, adaptation, stress tolerance and input use efficiency of highland maize varieties in Eastern and Southern Africa
- P1964 - Sustainable Intensification of Smallholder Farming Systems (SIFAZ) in Zambia
- P853 - Sustainable intensification of maize-legume cropping systems for food security in eastern and southern Africa (SIMLESA)

### Part I: Public communications

**Type:** OICR: Outcome Impact Case Report  
**Status:** Completed  
**Year:** 2020

**Title:** Smallholder farmers use conservation agriculture-based technologies and sustainable intensification practices adapted to climate change on 627,000 ha in southern Africa

**Short outcome/impact statement:**
Long-term (2004-2020) Conservation Agriculture (CA) systems research in Malawi, Zambia and Zimbabwe has generated scientific evidence on productivity, profitability, environmental, social and human impacts. This is used in all target countries to inform policies towards more climate-smart agriculture adaptation interventions. Farmer adoption reached >627,000 ha, with yield benefits of 30-50% (up to 140%) under drought. Due to greater water-use efficiency, applying the principles of CA is effective in reducing climate risks thus reducing the vulnerability of farming communities.
Outcome story for communications use:
Traditional cropping systems in Malawi, Zambia and Zimbabwe are based on soil tillage, monocropping and crop residue removal, exposing farmers to the vulnerabilities of climate variability and soil fertility decline. Cereal and legume yields remain far below their potential. Since 2004, long-term on-farm and on-station experiments advanced context-specific research on Conservation Agriculture (CA), a climate-smart cropping system; CIMMYT and partners took a systematic rather than a single commodity technology approach, generated science-based evidence and enhanced local stakeholder capacity through participatory research. The Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project focused its efforts on solidifying these results. CA systems are more adapted to low rainfall and heat stress, the likely major stress in the near future (Komarek et al. 2021).

As a direct outcome of this work, all regional climate-change and adaptation policies and investment frameworks mention CA-based practice as central adaptation strategies for smallholders. While the benefits of CA have been clearly demonstrated on farmers’ fields, its widespread adoption remains low. Thus, MAIZE research agenda has shifted towards socio-economic research and understanding farmers’ rationale and decision making (Hermans et al. 2020; Brown et al. 2019), as well as a better understanding of gender equity constraints and opportunities (e.g. mobility constraints, equal access to inputs, take on roles in value chains).

Through the regional NGO Total LandCare, more than 200,000 farmers were reached with CA in Malawi alone. Other NGOs in Zimbabwe and Zambia supported the adoption and scaling of CA systems. However, it was only in 2020 when the Government of Zimbabwe introduced a nationwide campaign to advance the CA-based Pfumvudza concept, building on previous evidence generated by CIMMYT and its partners. The targeted number of farmers for this effort in Zimbabwe is 1.8 million farmers.

Links to any communications materials relating to this outcome:
- https://simlesa.cimmyt.org/
- https://tinyurl.com/ydkctn92
- https://hdl.handle.net/10883/20129
- https://tinyurl.com/yhnj4858
- https://hdl.handle.net/10883/20128

Part II: CGIAR system level reporting

Link to Common Results Reporting Indicator of Policies: No

Stage of maturity of change reported: Stage 2

Links to the Strategic Results Framework:
Sub-IDOs:
- Enhanced capacity to deal with climatic risks and extremes (Mitigation and adaptation achieved)
- Agricultural systems diversified and intensified in ways that protect soils and water

Is this OICR linked to some SRF 2022/2030 target?: Yes
SRF 2022/2030 targets:
- # of more farm households have adopted improved varieties, breeds or trees
- Increase in water and nutrient (inorganic, biological) use efficiency in agro-ecosystems, including through recycling and reuse

Description of activity / study: <Not Defined>

**Geographic scope:**
- Multi-national

Country(ies):
- Zimbabwe
- Zambia
- Malawi

Comments: <Not Defined>

**Key Contributors:**

Contributing CRPs/Platforms:
- CCAFS - Climate Change, Agriculture and Food Security
- Maize - Maize
- Wheat - Wheat

Contributing Flagships:
- FP4: Sustainable intensification of maize-based systems for improved smallholder livelihoods

Contributing Regional programs: <Not Defined>

Contributing external partners:
- TLC - Total Land Care
- MOAIWD - Ministry of Agriculture, Irrigation and Water Development (Malawi)
- CRS - Catholic Relief Services
- ZARI - Zambia Agriculture Research Institute
- NASFAM - National Smallholder Farmers’ Association of Malawi
- University of Zimbabwe

**CGIAR innovation(s) or findings that have resulted in this outcome or impact:**
Conservation Agriculture practices; climate-smart Agriculture practices, based on evidence from large number of participatory validation trials on conservation agriculture cereal-legume systems, integrating complimentary practices (drought-tolerant seed, machinery, agro-forestry, improved weed control strategies amongst others) innovation in participatory research and community-based approaches (cba)

**Innovations:** <Not Defined>
Elaboration of Outcome/Impact Statement:
CIMMYT has incrementally conducted regional on-farm and on-station trials since 2004 in more than 50 trial locations (on-farm communities and research stations) with approximately 300 replicated and un-replicated researcher/extension-managed trials. In addition, 4,000 farmer-managed scaling plots were established to test technologies across different agro-ecologies (soil types, rainfall regimes and farm types). The agronomic research was supported by detailed socio-economic research in target communities to understand the economic benefits of Conservation Agriculture (CA) and to advance social and human research as well. One new research area includes detailed research on farmers’ decision making to overcome the barriers to CA adoption. Recent foci of agronomic research have been weeds and weed control; appropriate-scale mechanization; crop diversification using doubled-up legume and strip cropping systems; research on the nutritional value of CA technologies; research on carbon sequestration; effects of CA on the soil microbiome; and research of CA on biotic stress (e.g., fall armyworm, white grubs, and nematodes). Research and extension of CA and capacity building has mostly been done with national extension partners using “Mother and Baby” trial approaches, innovation systems, service provider models and traditional extension services using the national extension services of the respective governments. Research results have been incrementally put together covering all domains of sustainable intensification. To date, farmers have taken up CA systems in the three countries on >627,000 ha (Kassam et al. 2019). For context: Arable area in the three countries cover about 12 million ha (FAO, World Bank), whilst total maize-based cropping systems area is ca 4.3 million ha.

Research on CA systems enriched the discussion about climate-smart agriculture and associated policies in all target countries. This relatively unknown system is now mainstreamed in national policies and dialogues. Zimbabwe’s National Agriculture Policy Framework (NAPF) 2018-2030 and Climate Policy and the Climate Change Response Strategy aim at sustainable agricultural intensification, reducing vulnerability, promoting technology transfer, capacity building and information sharing. Zambia’s National Agriculture Policy (NAP) 2012-2030 and its National Disaster Management Policy and the Policy on Climate Change promote the adoption of appropriate climate-friendly agricultural (CFA) technologies (including CA) for different agro-ecological zones. Malawi’s National Climate Change Management Policy highlights the negative impact of climate change on rural farming households. These policies therefore promote CA and other CFA interventions.
References cited:

Quantification:

<table>
<thead>
<tr>
<th>Type of quantification</th>
<th>Number</th>
<th>Unit</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>a) Actual counts or estimates from a particular study (please provide reference)</td>
<td>670000.00</td>
<td>hectares in 3 countries Malawi, Zambia and Zimbabwe</td>
<td><a href="https://doi.org/10.1080/00207233.2018.1494927">https://doi.org/10.1080/00207233.2018.1494927</a> 1 million+ farmers adopted CA systems on &gt;627,000 ha, with yield benefits of 30-50% (up to 140%) under drought.</td>
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<tr>
<td>b) Extrapolated estimates</td>
<td>1000000.00</td>
<td>farmer households adopted CA systems in Malawi, Zambia and Zimbabwe</td>
<td><a href="https://doi.org/10.1080/00207233.2018.1494927">https://doi.org/10.1080/00207233.2018.1494927</a></td>
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Gender, Youth, Capacity Development and Climate Change:

**Gender relevance:** 1 - Significant
Main achievements with specific Gender relevance: https://simlesa.cimmyt.org/gender-tag/
women's bargaining power/empowerment - https://doi.org/10.1016/j.ecolecon.2019.05.013
gender & value chains, southern Africa
https://journals.sagepub.com/doi/10.1177/0030727019888661

**Youth relevance:** 0 - Not Targeted

**CapDev relevance:** 1 - Significant
Main achievements with specific CapDev relevance: NARS capacity building & community-based approaches

**Climate Change relevance:** 1 - Significant
Describe main achievements with specific Climate Change relevance:
https://ccafs.cgiar.org/news/conservation-agriculture-malawi-we-always-have-problems-rain-here

Conservation agriculture aims to boost agricultural production by optimising the use of farm resources and helping to reduce widespread land degradation through the integrated management of available soil, water and biological resources combined with external inputs. Several benefits arise from the application of CA, some of which (improved yields, biodiversity, etc.) become obvious once the system reaches stability.

**Other cross-cutting dimensions:** NA

**Other cross-cutting dimensions description:** <Not Defined>

**Outcome Impact Case Report link:** Study #4043

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