Adoption of Conservation Agriculture by Women in Ward 28 Chiredzi District, Zimbabwe

Sicelumusa Ncube[1], Betty Mukuwapasi[2], Tendai Mujati[1]*

[1]Department of Agricultural management, Faculty of Agriculture, Masvingo Regional campus, Zimbabwe Open University, Masvingo, Zimbabwe

[2]Department of Agricultural management, Faculty of Agriculture, Masvingo Regional campus, Zimbabwe Open University, Mashonaland East, Zimbabwe

DOI: https://doi.org/10.51584/IJRIAS.2026.110100134

Received: 03 February2026; Accepted: 09 February2026; Published: 20 February2026

ABSTRACT

For generations, agricultural communities globally have employed sustainable methods to maintain soil quality, ensure crop yields, and minimize reliance on heavy tillage. Women have played a central role in agriculture from early farming systems to the present day, and their involvement remains vital for boosting agricultural productivity and ensuring family food security. This research analysed the factors influencing the adoption of conservation agriculture (CA) among women farmers in Ward 28, Chiredzi District, Zimbabwe and the challenges they are facing in its implementation. Through stratified and random sampling, 60 women farmers were chosen for the study. Information gathered through pre-tested questionnaires was assessed using descriptive statistics. Findings showed that most women farmers view climate change as harmful to their farming, citing altered rainfall patterns, higher temperatures and frequent droughts. In response, they are adopting conservation agriculture practices such as planting basins, intercropping, rotating crops with legumes and using crop residues for mulch. Key limiting factors for women's participation included labor-intensive basin preparation, high weed pressure, insufficient finance, inadequate knowledge and training. Women farmers reported that CA improved crop yields, soil moisture retention, soil fertility and decreased use of fertilizers and chemicals. To support women and advance equitable, sustainable farming, the study suggests strengthening extension support, expanding credit access, and ensuring better provision of resources.

Keywords: adoption, conservation agriculture, equitable, food security, sustainable

INTRODUCTION

For many smallholder farmers, agriculture remains the primary means of securing household food security, generating income, and creating employment. However, most of these farmers are resource-constrained and rely on rain-fed farming systems, which are increasingly vulnerable to the challenges of climate change (Jew et al., 2020; Murindangabo et al., 2021). In response to these constraints, conservation agriculture (CA) is being promoted as a key strategy to combat climate change and achieve sustainable agriculture, thereby improving the livelihoods of smallholder farmers (FAO, 2021; Thierfelder and Mhlanga, 2024).

Conservation agriculture is defined as a farming system based on three interlinked principles: (1) continuous soil cover using crop residue or mulches, (2) minimum soil disturbance and (3) crop rotation with three or more crop types (Brown et al., 2018). This practice has been adopted globally as a sustainable method to enhance soil fertility, conserve moisture, and reduce labour and fuel costs associated with tillage. Mulching and cover crops can also reduce the need for synthetic fertilizers and herbicides. According to the FAO (2021), CA has significantly increased crop production worldwide while protecting the land base.

The significance of CA lies in its ability to improve soil health. Reduced soil disturbance helps maintain soil structure, enhance organic matter, and minimize erosion. Healthy soils support better root growth, leading to improved nutrient uptake and long-term productivity. Mulching with crop residues increases soil moisture

retention, enabling crops to mature even if rains cease early; thereby helping farmers cope with drought. Overall, CA promotes sustainable harvests and reduces production costs by lowering labour and fertilizer requirements.

Despite its advantages, women's participation in CA within Zimbabwe's communal farming sector has been limited. CA policies and frameworks have often been patriarch-driven, with men as the primary decision-makers. Women face marginalization in decision-making and land ownership, limiting their ability to adopt long-term practices such as CA. Women also balance household responsibilities with farm work, which restricts their time for participation in farmer groups, extension training, and meetings (Mitchell et al., 2019).

The involvement of women in sustainable agriculture is essential for developing strategies that support both environmental sustainability and global food security, as women constitute a large proportion of smallholder farmers (FAO, 2021; Kassam et al., 2015). This study therefore aims to analyse the factors influencing the adoption of CA by women in Ward 28, Chiredzi District, Zimbabwe, and to identify the challenges hindering their participation. The findings will inform the design of targeted interventions to promote sustainable crop production and gender-inclusive agricultural development.

MATERIALS AND METHODS

Study area

The study was conducted in Ward 28, Chiredzi District, located in Masvingo Province in southeastern Zimbabwe (21°17′N, 31°46′E) (Makarati et al., 2021). The district lies in agroecological zone Va, with an average annual rainfall of 450–650 mm and average temperatures ranging from 34–40°C (Manatsa et al., 2020). Despite erratic rainfall, the area supports smallholder farmers engaged in commercial sugarcane production and subsistence farming of maize, sorghum, and cotton. Common livestock include cattle, goats, and poultry. The local economy is centred on sugarcane production and ecotourism. Soils are predominantly heavy clays, which are fertile and have good water and nutrient retention capacity, supporting productive cropping systems.

Sampling procedure

Ward 28 was purposively selected due to its high number of farmers practicing CA, as recorded by Agritex and stratified according to villages. Three women farmers were randomly selected from each strata, resulting in a sample size of 60. These participants represent approximately one-third of the 179 women engaged in CA in the ward.

Data collection

A pre-tested questionnaire was administered through face-to-face interviews in the local language. The questionnaire covered socio-demographic information, CA practices implemented, perceived benefits, and challenges faced.

Data analysis

Data was entered, cleaned, and analyzed using SPSS Version 22.0. Descriptive statistics (frequencies, percentages) were used to summarize the data, and results are presented in tables and figures.

RESULTS AND DISCUSSION

Demographic Characteristics of Participants

All 60 participants were women, with the largest proportion (41.67%) aged 41–50 years. More than half (53.33%) were married, and 55% had completed primary education. The majority (66.67%) were unemployed and relied on farming as their primary income source (Table 1).

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue I January 2026

Table 1. Demographic Characteristics of Participants (n=60)

Characteristic	Category	FREQUENCY (n=60)	Percentage (%)
Gender	All females	60	100
Age (years)	Below 20	0	0
	20- 30	15	25
	32- 40	10	16.67
	41- 50	25	41.67
	51- 60	6	10
	60+	4	6.67
Marital status	Single	7	11.67
	Married	32	53.33
	Widow	12	20
	Divorced	9	15
Household size	Above 10	5	8.33
	8-10	18	30
	5-7	27	45
	2-4	8	13.33
	1	2	3.33
Educational status	Primary	33	55
	O. Level	21	35
	A. Level	2	3.33
	Tertiary	0	0
	None of the above	4	6.67
Sources of income	Formally employed	8	13.33
	Self Employed	15	25
	Agriculture	55	91.67
	Business	10	1.66
	Gifts from relatives	6	0.1

Note: Participants could report multiple income sources.

Most farmers were in their productive years (20–50 years old), and households tended to be large (5–10 members), which is typical of smallholder farming communities reliant on family labour. As noted by Ogunpaimo et al. (2021) and Arbain et al. (2022), larger household size can facilitate CA adoption due to labour availability for tasks such as basin digging and weeding. Although many farmers reported diverse income streams, agriculture remains the primary and most relied-upon source of livelihood (91.67%). However, reliance on rain-fed agriculture makes households vulnerable to climate variability, a key driver of CA adoption in the area (Vuntade and Mzuza, 2022).

Farmers' perceived effects of climate change

Farmers reported that climate change is negatively affecting their agricultural activities (Figure 1). Changes in rainfall intensity (92.5%), rainfall patterns (91%), and increased temperature (90.55%) were cited as the most impactful factors. Other concerns included increased frequency of drought (87.6%), cyclones and hailstorms (67.4%), floods (65.9%) and increased pests and diseases (60.2%). Reduced pasture quality (44.6%) and damage to farmland and infrastructure (39.7%) were also reported.

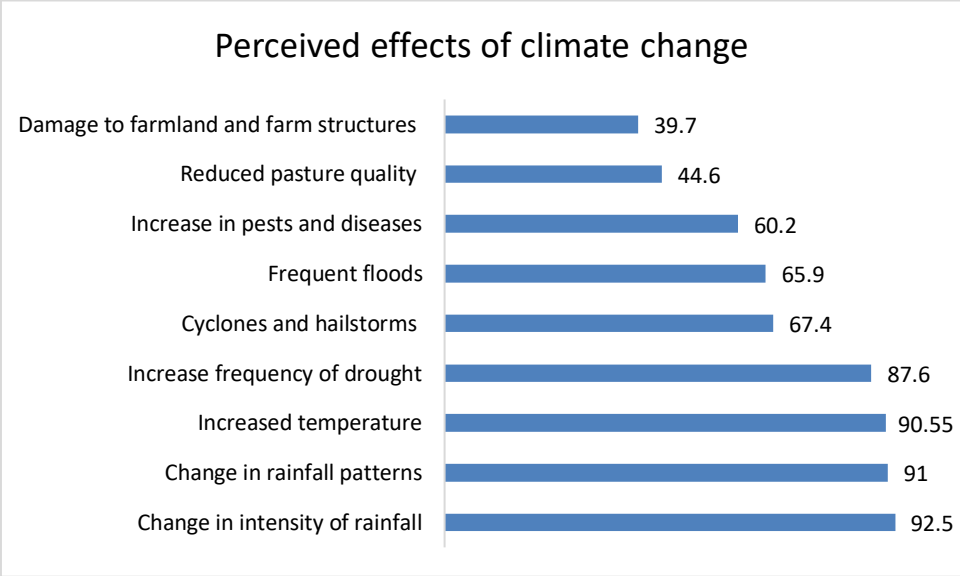

Figure 1: Perceived Climate Change Impacts on Agricultural Activities

These observations align with studies noting shifts in rainfall patterns and rising temperatures in the region (Belay et al., 2022; Chatsiwa, 2025; Teshome et al., 2021; Zakari et al., 2022). Similarly, research by Roco et al. (2015) and Nzuza (2022) underscores changes in average temperature as a significant climate indicator. Higher temperatures and unpredictable rainfall have reduced crop yields due to dry spells, moisture deficits, and heat stress (Manatsa et al., 2020; Nzuza, 2022).

The study further revealed that climate change adversely affects agriculture through decreased crop production, poorer pasture quality, increased pests and diseases, and flood damage to land and infrastructure. These findings correspond with those of Araro et al. (2020), Belay et al. (2022), Concha (2018), and Megersa et al. (2014). Farmers recognize that climate change is undermining agricultural productivity. Given their dependence on rainfed farming, smallholders are becoming increasingly vulnerable to food insecurity, a trend also noted by Mavhura et al. (2021) and Mashizha (2019) in the context of Zimbabwean livelihood systems. Consequently, farmers need to adopt adaptation measures to mitigate the harmful effects of climate variability on their livelihoods.

Conservation agriculture practices by women farmers

The most common CA practices in Ward 28 were digging planting basins (98%), intercropping and crop rotation with legumes (87.5%), timely planting (80%), mulching with crop residues (72%), and dry-season land preparation (12%) Figure 2.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue I January 2026

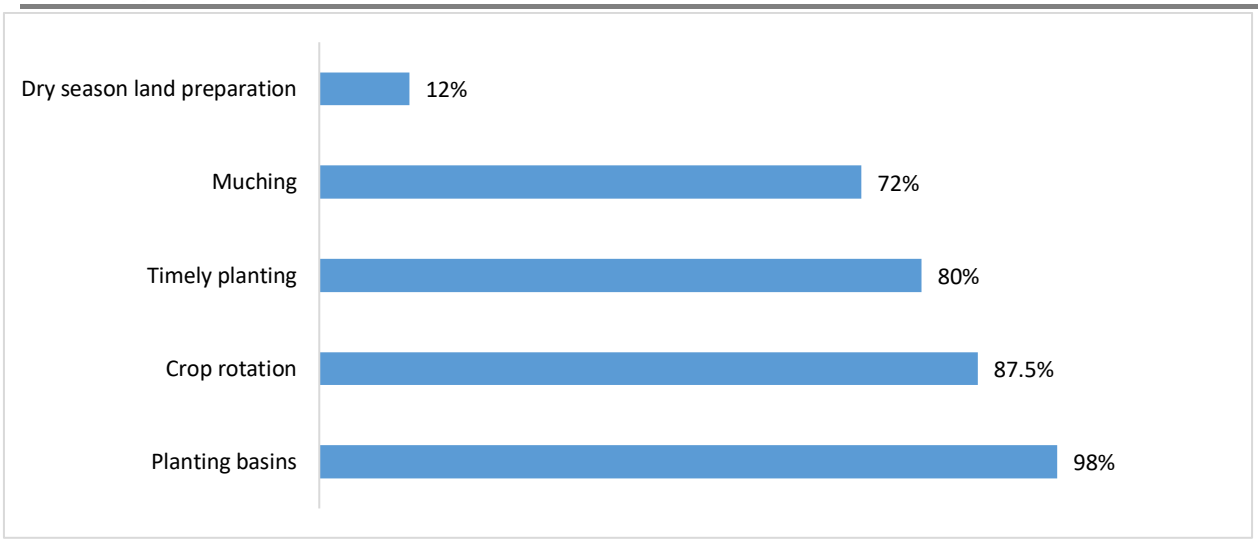

Figure 2: Conservation Agriculture practices by women in Ward 28, Chiredzi

The high adoption of planting basins (98%) differs from studies where minimum tillage is more common (Brouder and Gomez-Macpherson, 2014), possibly due to local soil conditions in ward 28, heavy clays benefit from improved water infiltration through planting basins. Crop rotation and intercropping were popular, likely due to benefits such as dietary diversity and pest and disease control (Pellegrini and Tasciotti, 2014). Low adoption of winter weeding (12%) might be a result of other off-season household commitments

Challenges women farmers face in the practice of CA

All respondents reported significant challenges in implementing CA (Figure 3). The most cited constraints were labor-intensive basin preparation (97%), high weed pressure (76.5%), and difficulty obtaining mulch (65.5%). Other challenges included insufficient finance (60%), limited access to manure (57.3%), termite and pest infestations (45.7%), inadequate knowledge and training (33%), and waterlogging of basins (22.5%).

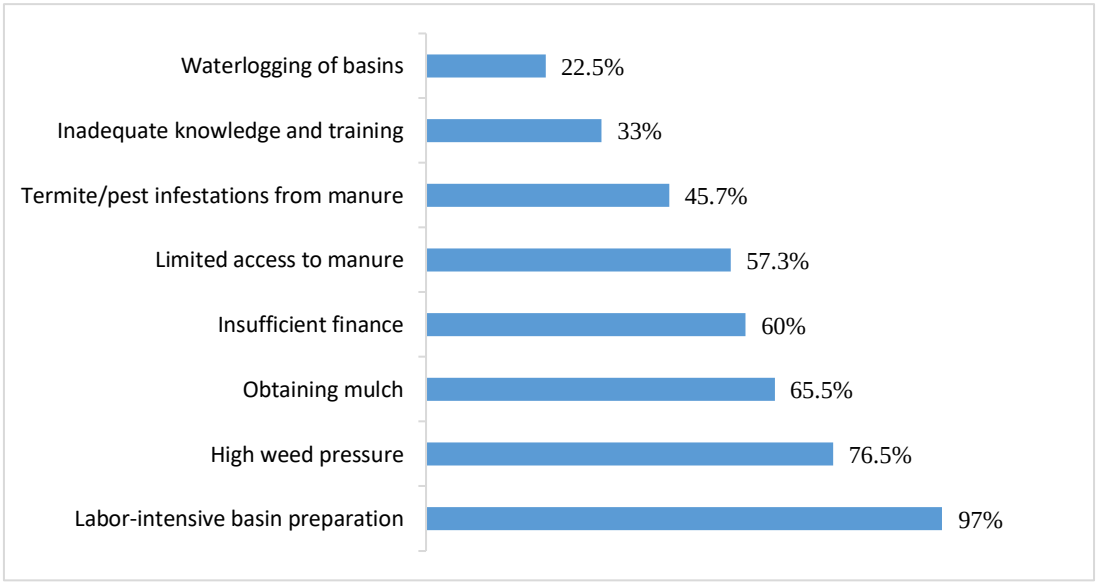

Figure 3: Women farmers perceived challenges of conservation Agriculture

The labor demands of basin preparation and weed management are particularly challenging for women (Thierfelder et al., 2019), who must balance farm work with domestic responsibilities—a gendered constraint noted in other studies (Giller et al., 2009; Baudron et al., 2012; Mitchell et al., 2019). Securing mulch and manure also proved to be difficult, especially in arid areas where crop residues are often used as livestock feed (Marongwe et al., 2012). Limited knowledge and training further hinder effective CA implementation,

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue I January 2026

highlighting the need for targeted support and policy interventions to facilitate successful CA adoption, especially among women farmers.

Benefits women farmers derive from CA in Ward 28, Chiredzi district

Farmers reported multiple benefits from adopting CA (Figure 4), including higher crop yields (99%), improved soil moisture retention (85%), reduced tillage costs (76%), improved soil fertility (68.5%), and timely planting (70.9%). Additional benefits included reduced soil erosion (32%) and decreased use of fertilizers and chemicals (30.5%).

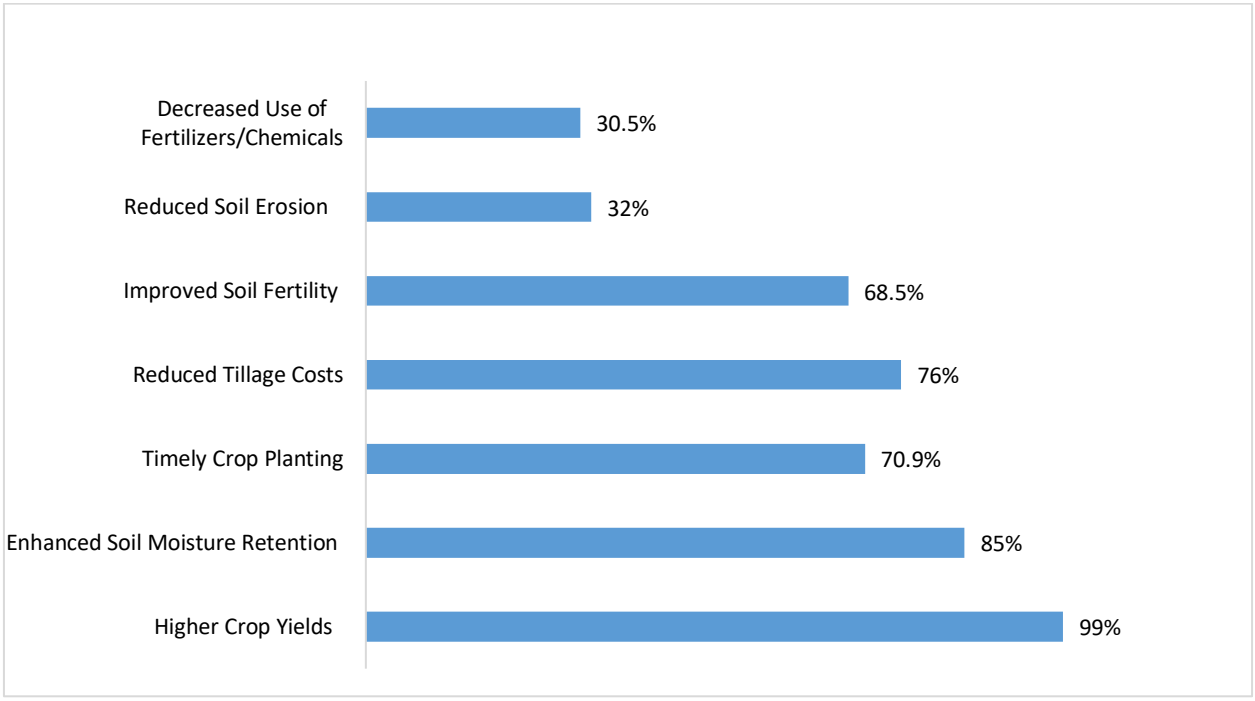

Figure 4: Women farmers perceived benefits of conservation Agriculture

Increased yields align with previous research indicating that CA can enhance productivity compared to conventional methods (Mazvimavi and Twomlow, 2009). These gains are attributed to improved physical, biological, and chemical quality of the soil. However, yield benefits may take 3–5 years to materialize (Thierfelder et al., 2019; Ngwira et al., 2013), indicating that CA systems require several years to demonstrate clear advantages. CA also helps control erosion and rehabilitate degraded land through soil cover and crop rotation (Lal, 2015; Nezomba et al., 2015). Furthermore, CA reduces input costs by concentrating water and nutrients in planting basins and reducing reliance on synthetic inputs (Mazvimavi & Twomlow, 2009), offering important economic benefits for smallholder farmers.

CONCLUSION

This study demonstrates that women farmers in Ward 28, Chiredzi District, are actively engaging with conservation agriculture as a strategy to address climate change and improve livelihoods. While they perceive substantial benefits; including higher yields, improved soil health, and reduced costs, they face significant challenges related to labor, resource access, and knowledge gaps. For CA to contribute meaningfully to climate resilience and gender equity in Zimbabwe, interventions must address the structural barriers limiting women's participation. This requires integrated approaches that combine technical support with attention to land rights, financial access, and labor constraints. Agricultural extension services and policy makers should develop targeted programs addressing women's specific needs, including research into labor-saving technologies for basin preparation and weed management. Empowering women farmers as agents of sustainable change can advance both environmental sustainability and gender equality in rural communities.

REFERENCES

1. Araro, K., Legesse, S. A., & Meshesha, D. T. (2020). Climate change and variability impacts on rural livelihoods and adaptation strategies in Southern Ethiopia. Earth Systems and Environment, 4(1), 15-26.
2. Arbain, M., Kurniasih, N., Agang, W., Sulistyo, A., & Samaria, S. (2022, September). The Role Of Agricultural Extension In The Empowerment Of The Tampilon Putra Farmer Group In Belayan Village, North Malinau. In International Conference On Indigenous Knowledge For Sustainable Agriculture.
3. Baudron, F., Tittonell, P., Corbeels, M., Letourmy, P., & Giller, K. E. (2012). Comparative performance of conservation agriculture and current smallholder farming practices in semi-arid Zimbabwe. Field crops research, 132, 117-128.
4. Belay, A., Oludhe, C., Mirzabaev, A., Recha, J. W., Berhane, Z., Osano, P. M., ... & Solomon, D. (2022). Knowledge of climate change and adaptation by smallholder farmers: evidence from southern Ethiopia. Heliyon, 8(12).
5. Brouder, S. M., and Gomez-Macpherson, H. (2014). The impact of conservation agriculture on smallholder agricultural yields: A scoping review of the evidence. Agriculture, ecosystems & environment, 187, 11-32.
6. Brown, B., Llewellyn, R., and Nuberg, I. (2018). Global learnings to inform the local adaptation of conservation agriculture in Eastern and Southern Africa. Global Food Security, 17, 213-220.
7. Callo-Concha, D. (2018). Farmer perceptions and climate change adaptation in the West Africa Sudan savannah: Reality check in Dassari, Benin, and Dano, Burkina Faso. Climate, 6(2), 44.
8. Chatsiwa, J. (2025). Vulnerability to Climate Variability of Smallholder Farmers in Gutu District, Zimbabwe: A Pro-Poor Asset Adaptation Approach. Journal of Asian and African Studies, 60(8), 5289-5309.
9. Giller, K. E., Witter, E., Corbeels, M., & Tittonell, P. (2009). Conservation agriculture and smallholder farming in Africa: the heretics' view. Field crops research, 114(1), 23-34.
10. Jew, E. K., Whitfield, S., Dougill, A. J., Mkwambisi, D. D., & Steward, P. (2020). Farming systems and conservation agriculture: technology, structures and agency in Malawi. Land Use Policy, 95, 104612.
11. Kassam, A., Friedrich, T., Derpsch, R., & Kienzle, J. (2015). Overview of the worldwide spread of conservation agriculture. Field Actions Science Reports. The Journal of Field Actions, 8.
12. Lal, R. (2015). Restoring soil quality to mitigate soil degradation. Sustainability, 7(5), 5875-5895.
13. Makarati, F., Ruhiiga, T. M., & Palamuleni, L. G. (2021). Analysis of the influence of precipitation patterns on wetland sizes in South-Eastern Zimbabwe. African Journal of Environmental Science and Technology, 15(10), 439-450.
14. Manatsa, D., Mushore, T. D., Gwitira, I., Sakala, L. C., Ali, L. H., Chemura, A., ... & Muzira, N. M. (2020). Revision of Zimbabwe's Agro-Ecological Zones.
15. Marongwe, L. S., Kwazira, K., Jenrich, M., Thierfelder, C., Kassam, A., & Friedrich, T. (2012). An African success: the case of conservation agriculture in Zimbabwe. In Sustainable intensification (pp. 153-161). Routledge.
16. Mashizha, T. M. (2019). Adapting to climate change: Reflections of peasant farmers in Mashonaland West Province of Zimbabwe. Jàmbá: Journal of Disaster Risk Studies, 11(1), 1-8.
17. Mavhura, E., Manyangadze, T., & Aryal, K. R. (2021). A composite inherent resilience index for Zimbabwe: An adaptation of the disaster resilience of place model. International journal of disaster risk reduction, 57, 102152.
18. Mazvimavi, K., & Twomlow, S. (2009). Socioeconomic and institutional factors influencing adoption of conservation farming by vulnerable households in Zimbabwe. Agricultural systems, 101(1-2), 20-29.
19. Megersa, B., Markemann, A., Angassa, A., Ogutu, J. O., Piepho, H. P., & Zaráte, A. V. (2014). Impacts of climate change and variability on cattle production in southern Ethiopia: Perceptions and empirical evidence. Agricultural systems, 130, 23-34.
20. Mitchell, J. P., Reicosky, D. C., Kueneman, E. A., Fisher, J., & Beck, D. (2019). Conservation agriculture systems. CABI Reviews, (2019), 1-25.
21. Murindangabo, Y. T., Kopecký, M., & Konvalina, P. (2021). Adoption of conservation agriculture in Rwanda: a case study of Gicumbi District Region. Agronomy, 11(9), 1732.

22. Nezomba, H., Mtambanengwe, F., Tittonell, P., & Mapfumo, P. (2015). Point of no return? Rehabilitating degraded soils for increased crop productivity on smallholder farms in eastern Zimbabwe. Geoderma, 239, 143-155.
23. Ngwira, A. R., Thierfelder, C., & Lambert, D. M. (2013). Conservation agriculture systems for Malawian smallholder farmers: long-term effects on crop productivity, profitability and soil quality. Renewable Agriculture and Food Systems, 28(4), 350-363.
24. Nzuza, P., Ramoelo, A., Odindi, J., Mwenge Kahinda, J. M., & Lindeque, L. (2022). A triangulation approach for assessing and mapping land degradation in the Lepellane catchment of the greater Sekhukhune District, South Africa. South African Geographical Journal, 104(4), 514-538.
25. Ogunpaimo, O. R., Oyetunde-Usman, Z., & Surajudeen, J. (2021). Impact of climate change adaptation on household food security in Nigeria—a difference-in-difference approach. Sustainability, 13(3), 1444.
26. Pellegrini, L., & Tasciotti, L. (2014). Crop diversification, dietary diversity and agricultural income: empirical evidence from eight developing countries. Canadian Journal of Development Studies/Revue canadienne d'études du développement, 35(2), 211-227.
27. Roco, L., Engler, A., Bravo-Ureta, B. E., & Jara-Rojas, R. (2015). Farmers' perception of climate change in mediterranean Chile. Regional environmental change, 15(5), 867-879.
28. Teshome, H., Tesfaye, K., Dechassa, N., Tana, T., & Huber, M. (2021). Smallholder farmers' perceptions of climate change and adaptation practices for maize production in Eastern Ethiopia. Sustainability, 13(17), 9622.
29. Thierfelder, C., Chivenge, P., Mupangwa, W., Rosenstock, T. S., Lamanna, C., & Eyre, J. X. (2017). How climate-smart is conservation agriculture (CA)?–its potential to deliver on adaptation, mitigation and productivity on smallholder farms in southern Africa. Food security, 9(3), 537-560.
30. Thierfelder, C., Mhlanga, B., Ngoma, H., Marenya, P., Matin, A., Tufa, A., ... & Chikoye, D. (2024). Unanswered questions and unquestioned answers: the challenges of crop residue retention and weed control in Conservation Agriculture systems of southern Africa. Renewable Agriculture and Food Systems, 39, e7.
31. Thierfelder, C., Mwila, M., & Rusinamhodzi, L. (2013). Conservation agriculture in eastern and southern provinces of Zambia: long-term effects on soil quality and maize productivity. Soil and tillage research, 126, 246-258.
32. Vuntade, D., & Mzuza, M. K. (2022). Factors affecting adoption of conservation agriculture practices in mpatsa extension planning area, nsanje, southern Malawi. Journal of Geoscience and Environment Protection, 10(3), 96-110.
33. Zakari, S., Ibro, G., Moussa, B., & Abdoulaye, T. (2022). Adaptation strategies to climate change and impacts on household income and food security: evidence from Sahelian region of Niger. Sustainability, 14(5), 2847.