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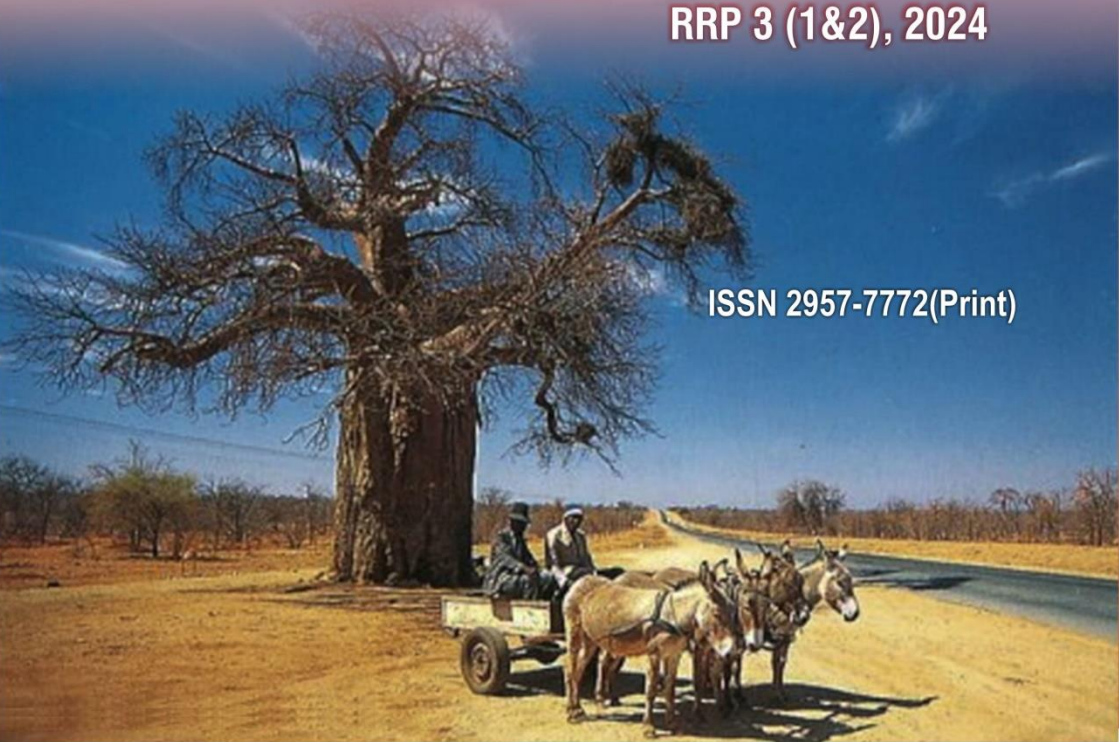

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About the Journal

JOURNAL PURPOSE

The purpose of the *Review of Rural Resilience Praxis is* to provide a forum for disaster risk mitigation, adaptation, and preparedness.

CONTRIBUTION AND READERSHIP

Sociologists, demographers, psychologists, development experts, planners, social workers, social engineers, economists, among others, whose focus is on rural resilience.

JOURNAL SPECIFICATIONS

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SCOPE AND FOCUS

In as much as the urban economic trajectory is increasing by each day, the rural economy, especially in many developing countries, still comprises a great proportion of the extractive and accommodation industries. Retaining some spaces as rural areas remains critical given the integral role rural areas play in providing ecosystem services to both wildlife and humanity. In this light, rural resilience as practice beckons for critical studies especially in the face of the ever-threatening extreme weather events and climate change that then impact on the livelihoods and lifestyles of the rural communities. Review of Rural Resilience Praxis (RRRP) comes in as a platform for critical engagement by scholars, practitioners, and leaders as they seek to debate and proffer solutions to the rural sectors' sustainable growth trajectory, which is resilient to the vagaries of climate change. This journal is also aimed at championing the philosophy of the right to be rural. The issue of conviviality between the different constituencies of the sectors, compiled with the competing challenges of improving rural spaces while also making the conservation, and preservation debates matter is the hallmark of this platform of critical thinking and reflection. The journal is published bi-annually.

Guidelines for Authors for the Review of Rural Resilience Praxis

Articles must be original contributions, not previously published and should not be under consideration for publishing elsewhere.

Manuscript Submission: Articles submitted to the *Review of Rural Resilience Praxis* are reviewed using the double-blind peer review system. The author's name(s) must not be included in the main text or running heads and footers.

A total number of words: 5000-7000 words and set in 12-point font size width with 1.5 line spacing.
Language: British/UK English
Title: must capture the gist and scope of the article
Names of authors: beginning with the first name and ending with the surname
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Abstract: must be 200 words
Keywords: must be five or six containing words that are not in the title
Body: Where the authors are more than three use *et al.*
Italicise *et al.*, *ibid.*, words that are not English, not names of people or organisations, etc. When you use several authors confirming the same point, state the point and bracket them in one bracket and in ascending order of dates and alphabetically separated by semi-colon e.g. (Falkenmark, 1989, 1990; Reddy, 2002; Dagdeviren and Robertson, 2011; Jacobsen *et al.*, 2012).

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Agricultural Productivity Enhancement on Land: Challenges, Options and Strategies in Zimbabwe

FREDDY CHIMBARI[1]

Abstract

Land productivity enhancement remains a pipeline dream in the African agrarian landscape as climate change continues to ravage the continent with most of the countries in dire need of productivity improvement as populations are food insecure and disproportionately vulnerable to the adverse effects of climate change. The post-colonial African state has addressed the land issue through land reform, but the regained land remains unproductive or less productive than it was before causing the quest for land productivity enhancement strategies clearer than before. The article critically examines the strategies and options of the farmers in Zimbabwe on land productivity enhancement amid the vagaries of climate change that are transforming land into barren land. The study was guided by the climate-smart agriculture concept as the conceptual framework that attempts to reduce the impacts of climate change while, improving productivity in the agricultural sector. The study adopted a qualitative methodology with a bias towards the case study research design. The study used secondary data as the source of data gathering. The study found that lack of institutional support is the main challenge encountered in enhancing land productivity. The study revealed that climate-smart agriculture has become one of the strategies to improve productivity and reduce crop failure through the growing of small grains that are drought resistant. The study concluded that climate-smart agriculture can be the only way towards land productivity enhancement. The study recommends the inclusion of technology-based agricultural productivity enhancement strategies.

Keywords: *food insecure, climate change, climate-smart agriculture, post-colonial, institutional support, small grains*

INTRODUCTION

Most of the African economies are based on agriculture as economic mainstay and the food security of this country of late is erratic and questionable because of climate change and other drastic policies that are pushed in Africa by post-

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colonial states (Mangena, 2014). Starvation, food shortages, and lack of safe foods remain significant global problems as hunger tops the list of SDGs (FAO, 2018). Grappling with hunger, starvation and food insecurity is the major challenge that global communities, and Zimbabwe in particular, are experiencing since the 1990s (Muzerengi and Tirivangasi, 2019). In 2016, Zimbabwe declared a state of emergency as drought caused crop failures across the country, rendering many communities vulnerable and food insecure (Tirivangasi, 2018). This resulted in approximately 2.5 million people or more than a quarter of the population requiring aid (Buchanan, 2016).

Mandisvika, Chirisa, and Bandauko (2015) concurred with the findings of Chirimuuta and Mapolisa (2011) that 80% of Zimbabwe's total land is made up of fertile agricultural land, yet the country struggles to be food secure. Food insecurity is attributed to many factors, political and socio-economic factors, however the most gruesome are the effects of climate change (Muzerengi and Tirivangasi, 2019).

Most households in the country struggled to meet their food needs while both rural and urban households were subjected to this turbulent environment (Tawodzera, 2012). The rural areas of Zimbabwe are usually seen as the epicentre of poverty, hunger and malnutrition however, unlike most other countries in SADC where food insecurity is viewed almost exclusively as a rural problem (Tawodzera, 2012). Harare has a substantial history of food insecurity as well showing that there is low productivity in the farms and smallholder farms (Tawodzera, 2012). Thierfelder *et al*. (2015) observes that the real cause of crop failure and lack of productivity in Zimbabwean farms. This is attributed to be the result of unplanned land reform as the process that was implemented without due assessment of the beneficiaries' capabilities in the farming sector as the programme was hijacked and politicized to placate the ruling party supporters for the party to stay relevant (Thierfelder *et al*., 2015).

Marongwe et al. (2011) argue that productivity on farmland in Zimbabwe started after the Land Reform Programme as the government grouped people in areas that lacked infrastructure or the technology to start production and this reduced the yields from the national agricultural sector. Tirivangasi and Nyahunda (2021) observe that climate change has also caused a sharp decline in the productivity of land in Zimbabwe as extreme weather events are occurring more frequently affecting the national yields and causing crop failure. It is against the backdrop of the challenges in the Zimbabwean agricultural sector emanating from political, economic and climate change that

this article seeks to explore the challenges, options and strategies for land enhancement in the Zimbabwean agricultural sector. With the vagaries of climate change and other various global crisis that are underway around the world productivity has dwindled in developing countries where climate change is affecting the most (Nyahunda and Tirivangasi, 2021, Chazovachii, 2020, Nyasimi *et al*., 2023). The agricultural productivity enhancement challenges and strategies are important to understand for Zimbabwe if the country is to attain Vision 2030 status of an Empowered and Prosperous Middle Income Country status while leaving no one behind. Hunger and starvation have terrorised developing countries Zimbabwe included (World Vision, 2020) hence productivity enhancement challenges and strategies become important to understand at this juncture. The article seeks to critically explore and understand the agricultural productivity enhancement strategies in Zimbabwe. The study seeks to understand the challenges faced in the agricultural productivity enhancement in Zimbabwe. It is at the backdrop of the view that lack of agricultural productivity in an agrarian economy results in low economic performance of the country that this study becomes important beyond academic corridors. The study is important for policy makers and development agencies as it provides an understanding of how productivity can is enhanced in Zimbabwe inclusive of the challenges therein. The article is lined in this way, introduction, theoretical framework, literature review, methodology, presentation of findings, discussion of the findings, conclusion and the reference.

CLIMATE-SMART AGRICULTURE CONCEPTUAL FRAMEWORK

The conceptual framework underpinning this study is climate-smart agriculture as agricultural productivity is widely affected by climate change in Zimbabwe with some agro-ecological regions moving further downwards in terms of productivity. This framework has three pillars that are to enhance food productivity, adapt to climate change and reduce greenhouse gas emissions (Khatri-Chhetri *et al*., 2017). The vagaries of climate change and variability need drastic action by farmers and community to combat potential detrimental impacts on productivity, the environment, resilience sustainability and livelihoods capturing the pillars of climate-smart agriculture can help the farmers enhance productivity and reduce the challenges experienced (Chitakira and Ngcobo, 2021).

Phiri *et al*. (2021) observe that productivity is dwindling because of a lack of enhanced productivity. Climate-smart agriculture has emerged as the solution to enhance productivity in agriculture and Zimbabwe has adopted it. The concept of climate-smart agriculture emerged as a solution motivated by

the need to develop solutions for the integrated goals for increasing agricultural productivity and yields, reducing greenhouse gas emissions from the agricultural sector enhancing resilience and adaptation for farmers and agricultural systems (Andrieu *et al*., 2017). The potential and sustainable action include an adaptation of strategies that enable farmers to cope with socio-economic environmental and agricultural production challenges such as implementing climate-smart agriculture (Chitakira and Ngcobo, 2021). Climate change has adverse impacts on local farming communities and the effects are heterogeneous and tightly coupled with persistent poverty and inequalities (Chandra *et al*., 2017).

Inequalities have become a plausible theoretical an entry point in the study of vulnerability studies to analyse the uneven social distribution of impacts on rural and natural-dependent communities (Tschakert *et al*., 2013). Climate-smart agriculture has enhanced production amidst the vagaries of climate change terrorizing agriculture in Zimbabwe and its adoption in Zimbabwe can create enhanced productivity in the agricultural sector while saving livelihoods.

LITERATURE REVIEW

This section provides a review of the literature that guided this study and the review for this study focused on the strategies that are used to enhance agricultural productivity globally, regionally and locally.

AGRICULTURAL PRODUCTIVITY ENHANCEMENT

There are a few agricultural productivity enhancement strategies around the world and in Africa that are used to make the countries food secure. Mutiro and Lautze (2015) observed that there is schemes to improve agriculture and enhancing productivity through smallholder irrigation. This has worked as a strategy for poverty alleviation and improving livelihoods in rural communities as the majority is dependent on agriculture (Mutiro and Lautze, 2015). Woltersdorf *et al*. (2015) observed that in Israel and Spain there is the extensive planned reuse of treated water for irrigation while Egypt and Chile use untreated wastewater as a process to enhance agricultural productivity in arid areas. The use of irrigation schemes is dominant in both developed and developing countries to enhance agricultural productivity. Chitongo *et al*. (2019) indicate that there is the construction of dams and the desiltation of existing dams to enhance agricultural productivity through irrigation schemes. Hut (2008) posits that in Kenya to enhance agricultural productivity sub-surface groundwater dams are constructed to store water for irrigation and

livestock. The enhancement of agricultural productivity through irrigation schemes is dominant across the world improving climate-smart agriculture.

Naorem *et al.* (2023) observed that there is the use of plastic mulching to prevent the soil moisture from being lost through evaporation. Akutse *et al*. (2020) observed that in Uganda and Ghana there is the use of salt to dehydrate insects in a less expensive way while enhancing productivity. Ndebele and Mubaya (2019) argued that in Masvingo Province there is the introduction of the growing of small grains to avoid the crop failure and enhance agricultural productivity in the province amid the vagaries of climate change. Nciizah *et al*. (2021) observed that small grains adoption is done in semi-arid areas like Zvishavane, and farmers have curtailed food insecurity and enhanced agricultural productivity. These various strategies of agricultural productivity enhancement have improved productivity and reduced crop failure while proofing the impacts of climate change.

There is the development of the agroforestry practices pushed to assist the farmers enhance agricultural productivity and adapt to the impacts of climate change (Beyene *et al*., 2019). Agroforestry has advantages that is carbon sequestration, water and air purification all that enhance agricultural productivity (Jahan *et al*., 2022). Agroforestry improve soil fertility, protect crops from wind, repair damaged land promote water conservation limits pests while minimising soil erosion all that move towards productivity enhancement (Jahan *et al*., 2022). Flores *et al*. (2016) has observed that agroforestry has for centuries enhanced productivity and food security and with the advent of agro-entrepreneurship it is providing income security in Mexico. The revealed literature has revealed that agricultural productivity enhancement is done in the world and in Africa through various strategies.

RESEARCH METHODOLOGY

The study adopted a qualitative research methodology with a bias towards a case study research design. The study used a literature review approach to sample case studies that are relevant to the study. A literature review-based study uses a collection of accessible both published and unpublished theme documents that contain facts, concepts, data and evidence published from a particular viewpoint to obtain or express those viewpoints on the subjects' nature and how it should be examined (Templier and Pare, 2015). The literature review will be used in this study to understand how productivity is enhanced on land in Zimbabwe post-land reform.

FINDINGS

CHALLENGES TO AGRICULTURAL PRODUCTIVITY ENHANCEMENT

In Zimbabwe after independence agriculture emerged as the dominant method that can alleviate households' poverty however, agriculture in Zimbabwe has not been fully mechanised and modern technology is still heavily complemented by a greater reliance on rain and with climate change, rain-fed agriculture has not been productive. Mutasa (2015) revealed that productivity enhancement in Zimbabwe is facing the challenge of the technological advancement in the agricultural sector, lack of infrastructure to enhance productivity and a lack of financial resources to develop irrigation systems. NewsDay (2020) indicated that traditional leaders have presented challenges for farmers in the enhancement of productivity through the growing of small season grains that are tolerant of the arid areas as the traditional leaders ban the growing of certain grains arguing against these grains using tradition and taboos as the reason for the decrees.

Relioefweb (2020) observes that in Mashonaland West under Chief Chundu, the traditional leadership is overlapping its power going against the government directive for the growing of small grains as a way to mitigate against climate change and enhance land productivity through the rich nutrients in small grains as the traditional leaders banish people from growing pearl millet because the founding chief died from poisoned beer grown from Peal Millet. Phiri *et al*. (2021) showed that the hindrance to the adoption of small grain and enhancement of land productivity is the farmers who hold on to the past unable to accept new interventions that are science-backed. Mukate *et al*. (2018) indicated that there is a lack of institutional support for the enhancement of land productivity as there is a lack of knowledge among the new farmers that got land after the land reform. Phiri *et al*. (2019) observed that there is a challenge in the uptake of the growing of the small grains they are labour intense and the birds can attack the whole field making the farmers lose all their yields.

AGRICULTURAL PRODUCTIVITY ENHANCEMENT STRATEGIES

The study revealed that Zimbabwe has implemented adoption of strategies to enhance agricultural productivity and alleviate poverty. Phiri *et al*. (2021) revealed that to improve productivity and survive the vagaries of climate change farmers in Umguza and Ntabazinduna started growing small grains, conservation and the rearing of small livestock to respond to crop failure induced by rainfall variability and enhance productivity on their land. Corbeels, *et al.* (2015) revealed that conservation is a combination of soil

management practices that includes crop rotation, soil cover through mulching and reduced soil disturbances that are incorporated into climate-smart agriculture. Phiri, *et al.* (2021) has indicated that the growing of small crops in Umguza improved food security and enhanced productivity in Matebeleland as most of the farmers in the area are producing excess small crops and selling them to beer breweries. The findings of Dube *et al*. (2018) have indicated that the ecological Regions 4 and 5 have become more arid and to enhance productivity in these areas farmers have adopted the growing of small grains as small grains are ecologically compatible with semi-arid and arid areas compared to maize and small grains are drought tolerant while they have long storage life with seldom attacks from pests unlike maize that is easily attacked.

Tirivangasi and Muzerengi (2019) have revealed that farmers in the Mangwe district have used the strategy of growing small grains to enhance productivity on their lands after enduring years of crop failure in maize farming with small grains they have realized food accessibility eradicating food insecurity experienced in the past. the government of Zimbabwe (2020) indicated that The Ministry of Agriculture and Climate Change adopted the Intwasa or Pfumvudza farming concept that involves the utilisation of small pieces of land applying the correct agronomic practices for higher returns also it is based on the conservation of agricultural principles that seek to climate proof agricultural production and low profitability of farming among smallholder farmers that continue to be negatively by climate change. Mutoko, *et al*. (2014) indicated that farmers in the resettlement areas have adopted using mulching as a conservative method to enhance productivity in the soil. Phiri *et al*. (2021) observed that in Matobo Khulasiswe an NGO is helping farmers adapt to climate change through adoption of small livestock to increase agricultural productivity. Dube *et al*. (2021) posits that there is the provision of irrigation schemes in Tsholotsho that has enhanced agricultural productivity. These findings indicate that people are triggered to action through the availability of water enhancing agricultural productivity.

Mashizha (2019) indicated that farmers in Zvimba District have adopted solar-powered irrigation systems to enhance land productivity amid climate change and rainfall variability. Mashapa *et al*. (2013) observed that in Chimanimani there is the local adoption of sustainable agro-ecology practices of direct seeding and mulch based cropping system to enhance agricultural productivity. Mapanje *et al*. (2023) showed that farmers in Manicaland have adopted agroforestry to enhance land productivity and mitigate the impacts of climate change on maize farming and other crops that are failing. Parwada *et*

al. (2022) indicated that agroforestry is used in Zimbabwean farmlands to create environmental economic and social benefits through combining high agricultural and biodiversity goals. Parwada *et al*. (2022) indicated that agroforestry is used in land productivity as trees are sequesters of carbon from the atmosphere and secure rural livelihoods as leguminous trees such as Acacia torticollis and Adenanthera povonina build the soil-healthy and fertility as this could be useful in the smallholder farming areas in Zimbabwe. The findings of Phiri, *et al.* (2021) indicated that the option of farmers in Zimbabwe are climate smart agriculture if the farmers are to enhance productivity as the traditional crops continue to fail because of climate change. The adoption of climate-smart agriculture remains the possible way to navigate and enhance land productivity in Zimbabwe if the country is to realize the benefits of land reform.

DISCUSSION

The study revealed that land productivity enhancement in Zimbabwe has faced challenges in the technological advancement in the agricultural sector, lack of infrastructure to enhance productivity and lack of financial resources to develop irrigation systems. Zimbabwe is facing challenges in technological development as other countries continue to develop the country is still grappling with socio-economic hardships making it hard to develop intelligent farming systems such as smart irrigation systems, and smart remote sensors on farms. Consistent with the study is Zhou (2023) who revealed that a lack of technology and infrastructure is the major drawback in the enhancement of productivity.

The study show that traditional leaders present a challenge in the enhancement of land productivity as they use their authority to banish the growing of small grains going against the government directive of promoting small grains production. The study revealed that in certain areas that are under threat from climate change traditional leaders are overlapping their power and authority confusing. Concurrent with the findings is Mutasa (2015) who revealed that there is confusion in rural areas and resettlement areas as to the authority in in-charge with traditional leaders continue to give decrees against certain practices. The study revealed that the enhancement of productivity in Zimbabwe is suffering from a lack of institutional support and farmers' tendency to hold on to the past rejecting new interventions. In support of the study Mazwi *et al*. (2019) revealed that most agricultural practices in Zimbabwe suffer because of a lack of institutional support.

The study revealed that to improve productivity and survive the vagaries of climate change farmers started growing small grains, conservation and the rearing of small livestock to respond to crop failure induced by rainfall variability and enhance productivity on their land. The study showed that the ecological Regions 4 and 5 have become more arid and to enhance productivity in these areas farmers have adopted the growing of small grains as small grains are ecologically compatible with semi-arid and arid areas compared to maize and small grains are drought tolerant while they have long storage life with seldom attacks from pests unlike maize that is easily attacked. Similar to the study Moyo-Nyoni (2022) revealed that to improve land productivity in smallholder farms in Zimbabwe small grains have reduced crop failure and increased food accessibility. Concurrent with the study is Mutami (2015) who revealed that small grains have increased productivity in smallholder areas reducing poverty and starvation as the strategy has enhanced food accessibility. In support of the study is the conceptual framework that argues that climate-smart agriculture reduces crop failures and enhances productivity as observed by Beyene *et al*. (2019) who argues that climate-smart agriculture reduces crop failure and enhances productivity. Climate-smart agriculture has grown to become one of the farming strategies that has enhanced productivity improved livelihoods and improved food security.

The study revealed that the farmers in Zimbabwe through the government have adopted the Intwasa or Pfumvudza farming concept that involves the utilisation of small pieces of land applying the correct agronomic practices for higher returns also It is based on the conservation agricultural principles that seek to climate proof agricultural production and low profitability of farming among smallholder farmers that continue to be negatively by climate change. Similar to the study is Mavesere and Dzawanda (2023) that revealed Pfumvudza improved yields and reduced donor aid in the smallholder farms. In support of the study is Tanyanyiwa (2021) who observes that the Pfumvudza programme is a success because it promotes high profile conservation agriculture technique that requires little financial input. The study revealed that farmers have adopted agroforestry to enhance land productivity in Zimbabwe. Similar to these findings, Nazu *et al*. (2021) argue that in Bangladesh farmers are enhancing the productivity of the land through agroforestry while improving the livelihoods of smallholder farmers. The study revealed that climate-smart agriculture is the option that farmers have in Zimbabwe as climate change continues to reduce productivity. In support of these findings is the conceptual framework the climate-smart agriculture as

observed by Lipper *et al*. (2014) that climate-smart agriculture aims to enhance productivity while reducing greenhouse gas emissions from agriculture.

CONCLUSION AND RECOMMENDATIONS

The post-colonial Zimbabwe is confronted with a series of developmental problems and most of the problems in the country emanate from the Fast-Track Land Reform that reclaimed land from the white settlers and gave the land to the native Zimbabweans triggering a decrease in the productivity of the land under farming. The study showed that productivity in Zimbabwe had decreased but efforts are made to enhance productivity through climate-smart agriculture. It can be concluded that the lack of technological advancement remains the stumbling block against the enhancement of productivity as the world has moved towards climate-proofing and embraced technology introducing remote sensors. The adoption of climate smart agriculture is a step in the right direction in Zimbabwe as the introduction of small grains has resulted in enhanced productivity and access to food in most rural areas making the land reform a success as people in the rural areas are food secure. It can be concluded that climate-smart agriculture remains the option for farmers to enhance land productivity as climate change continues to affect developing countries with no technology that depends on agriculture.

- There is a need to mainstream climate smart agriculture across all the provinces of Zimbabwe.
- There is a need to teach farmers about climate smart agriculture as most farmers are still holding on the traditional grains that are failing.
- There is a need to develop agroforestry in Zimbabwe, as it is a way that can reduce the carbon sequestering.

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