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THE IMPACT OF CLIMATE CHANGE ON COMMUNAL FARMERS LIVELIHOODS

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ABSTRACT

The issues of global warming continue to affect everyone globally. These effects are observed in the changing climate patterns. Since the agricultural sector is not immune to the effects, this study is responding to the climate changes affecting this sector, focusing on Africa. The study aims to explore the effects of climate change on farmers' livelihoods. The study employed an interpretivist paradigm within the qualitative research, using semi-structured interviews to collect data from farmers in Insiza District in Zimbabwe. The findings revealed that most farmers' means of livelihood are from resource-based activities (e.g., farming, fishing, and mineral extraction), and they need to take care of the available natural resources. Additionally, financial capital is the least available asset to the farmers, making it hard for them to achieve their desired outcomes. Farmers had access to land; however, financial constraints and weather conditions affected their envisioned capacity. Nevertheless, adaptive strategies such as irrigation and conservation farming were adopted to manage their challenges. Reflecting on the evidence, farmers have learnt to farm all year round with no fixed seasons due to inconsistent climate patterns. In the past, farmers survived with one income stream, income stream, but climate change has introduced a notion of diversifying income streams to make ends meet.

KEY WORDS

Climate change, communal farmers, livelihoods, vulnerabilities, livelihood assets.

"We do not have time to sit on our hands as our planet burns. For young people, climate change is bigger than election or re-election. It is life or death" (Ocasio-Cortez, 2019). This statement emphasises the urgency of the climate change predicament and how seriously it must be taken. The realities of climate change have dawned upon us, and the outcomes are felt by everyone in the world (Akinagbe & Irohibe, 2014). The effects are severe for those that depend in agriculture, particularly rural communities because they rely on the environment for their livelihoods (Thakur & Bajagain, 2019). Statistics across different continents indicate that people in rural areas depend on agriculture and need favourable climatic conditions to make a living (Malik, 2019). The rural population is dependent on food that they grow and rearing of animals. However, if climate conditions are not favourable such agricultural activities will be affected thus leading to urban migration and a decline in rural population (Li et al., 2016).

For example, the rural population for America in 2020 was reported at 46 000 (Cromartie et al., 2020). A decline compared to 50 million people that were reported by Spielman, Sohail, Paul, and Nuzhat (2016), who indicated that a majority relied on agriculture for their livelihoods. Similarly in Asia, about 44% of the total population of Indonesia resided in rural areas, which is a substantial number considering that the country has a population of approximately 237.6 million (Hirschmann, 2020). On the same note, Shafique (2017:48) states that Pakistan is an agricultural country, and its rural areas continue to be the mainstay of the economy. These countries have a similar story; the livelihoods of rural communities depend on agriculture influenced by climate change. Africa is no exception, as people are more vulnerable to climate change than other continents because most African countries depend on agriculture for income (Sibanda, 2019; Gameda & Sima, 2015). This income directly affects people's choices and decisions.



Many African countries battle poverty, low agricultural productivity, and other environmental-related issues without climate change (Pereira, 2017). For example, over 50% of Ghana's workforce depends on subsistence farming for their livelihood (Nti, 2012). As a developing country with a greater part of the population dependent on agriculture, Ghana depicts a similar image to Zimbabwe, which the study focuses on. Between 40% to 85% of the SADC citizens live in rural areas where they depend on natural resources for providence (Economic Commission for Africa, 2012). Additionally, Sibanda (2019) states that 68% of the total population of Zimbabwean is rural and more exposed to the effects of climate change. The rural population of Zimbabwe relies on agriculture as the main source of productivity, which is highly dependent on weather and seasonal patterns (Sibanda, 2019). Communal farmers, also regarded as subsistence farmers use the land to secure livelihoods. With limited job opportunities communal farming is a livelihood strategy that helps the rural poor to feed themselves and your communities (Siphesihle & Lelethu, 2020). The excess produce can also be sold thus contributing as an economic activity.

There is partial information on the impacts of climate change on the livelihoods of rural communities, specifically the farming communities of the Insiza district in Zimbabwe. In 2013 a study was done on rural livelihoods under stress which focused on the impact of climate change on livelihoods in South Western Zimbabwe. Another study was done on livelihood adaptation in rural Zimbabwe focusing on Charewa area in Mutoko. While the study of Ali and Perna (2021) focuses on the evaluation of sustainability indicators in the agricultural system, this study uses the livelihood to assess the macro indicators as a high level. The analysis focused on the available assets (macro) versus how they are being used to manage the effects for climate change. Therefore, this study aims to explore the impact of climate change on farmers' livelihoods. Thus, the research question driving this study is, what is the effect of climate change on rural livelihoods in Zimbabwe?

Following this introductory section, the paper will present the literature review. Next, section three discusses the theoretical framework upon which the research question hinges, followed by the methodology section detailing the research methods used to undertake the study. Section five presents the results, followed by a discussion of the results, and finally, conclusions are drawn from the results and areas for further research proposed.

About 70% of Africans depend on farming or cultivation for income (Mukasa, Woldemichael, Salami & Simpasa, 2017). The role of agricultural activities in securing most of Africa's livelihoods is broadly discussed in the seminal work of Tefera, Eyasu, and Koomen (2020). Thus, this sector is critical in the markets of all African countries already faced with serious socio-economic challenges and limited financial access (Biteye, 2016). Additionally, the people live in some of the continent's most biodiverse landscapes and share space with wildlife (Biteye, 2016). Consequently, wildlife and underprivileged communities both struggle to survive. Without suitable institutions and know-how to make a living, people are forced to clear forests to expand their farms or move into wildlife conservation areas in search of pasture for livestock (African wildlife foundation 2020:1). The lack of sustainable natural resource management frameworks in rural Africa and adequate know-how diminishes the opportunities available to the rural population as most of them lack basic infrastructure (African Wildlife Foundation 2020:1). Similarly, few economic and training options are available for anyone willing to increase their family income, which eventually drives them to deplete or put pressure on natural resources (African Wildlife Foundation 2020:3).

Most people in rural Africa root their revenue in a particular source, and some hold all their prosperity as a single asset (Proctor, 2014). However, it is often not easy to sustain a livelihood with one source of income or one asset. Lately, an increasing number of people in rural areas have chosen strategies characterised by multi-tasking and income diversification to complement their means of livelihood (Gautum & Andersen, 2016; Proctor, 2014). According to Proctor (2014), high levels of mobility mark both rural and urban livelihood strategies in Africa because people migrate due to developments in infrastructures and conveyance expertise. Migration has long been a feature of existence in Africa, predominantly in southern Africa. However, the growth of the universal community and the collapse of colonial rules that limited movements to urban areas meant that even greater



numbers of individuals migrated from rural areas to towns to pursue employment opportunities (Chirisa & Muchini, 2011; Procter, 2014). Logically, people escape a place with limited resources in pursuit of other sources of income regardless of the setting.

In Zimbabwe, agriculture is the major livelihood activity (Sibanda, 2019). Agricultural activities include crop production, livestock production and other activities such as trading in various commodities, like crops, and other businesses that revolve around agriculture (Sibanda, 2019). Agriculture relies on rainfall patterns, so any negative variations in the rainfall patterns are likely to influence rural livelihoods unfavourably (Sibanda, 2019). It is difficult for farmers to plan and organise themselves, given the nature of rainfall patterns. Water sources are also a critical element of the equation to ensure maintainable rural livelihoods, especially when there is diminishing rainfall (Dube & Phiri, 2013).

For those in livestock production, the condition of grazing lands has deteriorated over the years. Therefore, according to Dube and Phiri (2013), local communities have to adopt livelihood strategies such as sending away their livestock to pastures outside the region or selling some of the livestock to purchase supplementary fodder for the rest of the livestock. Furthermore, in some areas in Zimbabwe, people's livelihood centres around gathering and selling wild fruits, which act as a feeding supplement in good times and a livelihood strategy in times of need. Additionally, they mention that some rural communities in Zimbabwe rely on amacimbi (mopane worms) for their livelihoods. This worm is a nutritious delicacy used with relish across the nation. Therefore, many farmers have traditionally made a living by eating the worm and selling it for revenue.

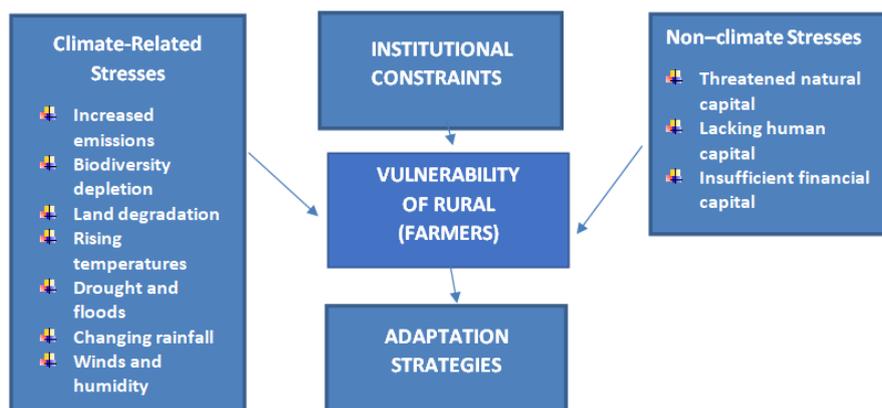


Figure 1 – Climate change and livelihoods framework, adapted from Morton (2007) and Mjata (2015)

There is a link between climate change and livelihoods, especially as they relate to the livelihoods of African farmers and people dependent on natural resources for survival. Those who reside in rural areas are more vulnerable to climate change due to geographical location, land characteristics, high dependency on natural resources and high exposure to frequent climate-induced natural disasters (Qaisrani et al., 2018). The ongoing trend may trigger a vicious cycle of poverty, resource degradation, environmental deterioration, and social unrest (Bahry, 2010). This study's framework is derived from the livelihoods framework and assumes that people's livelihoods revolve around the five livelihood assets/capitals, as shown in figure 1. A compromise of these assets or variables and climate change affects the entire livelihood structure and consequent outcomes.

METHODS OF RESEARCH

Matabeleland's south province is in the southern part of Zimbabwe, sharing boundaries with Botswana and South Africa. The province is divided into seven districts, as shown in Figure 2, with a population of approximately 683 893 (Dube, 2008, p. 24). The seven districts do not necessarily have the same climatic pattern. Beitbridge's climate resembles the hot desert climate receiving an annual rainfall of 453mm with average temperatures of 40°C in



summer and 13°C in winter. It is characterised by periodic drought and vulnerability to other meteorological hazards (Muzerengi & Tirivangasi, 2019). The other districts are either ecological region four or region five, with little and unreliable rainfall below 600mm and vast lands of sandy soils (Muzerengi & Tirivangasi, 2019). The weather variances make the districts highly vulnerable to climate change, negatively affecting the livelihoods of those in the districts (Dube, 2008, p. 22).

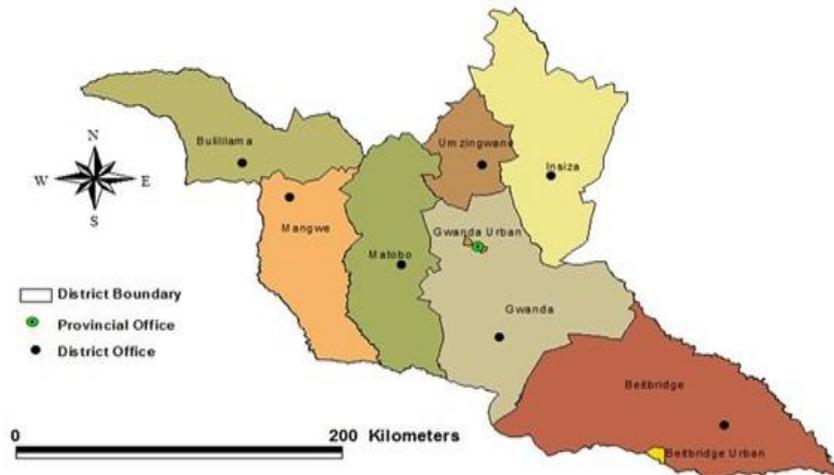


Figure 2 – Matabeleland South Map (Zimbabwe Electoral Commission 2020)

This study adopted an interpretivist paradigm to understand the topic at hand and the themes emerging from the data (Du Plooy-Cilliers, Davis & Bezuidenhout, 2014; Rahi, 2017). Considering that little is known concerning effects of climate change on communal farmers' livelihoods in Zimbabwe. In addition, a case study design was followed by interviewing communal farmer of the Insiza district in Zimbabwe. Qualitative data was collected because it gives an in-depth understanding of the research problem and how communal farmers in Zimbabwe are currently coping considering the climate change predicament. A single case study was used to gain an in-depth understanding and evaluation of the nature of climate change in a developing country context (Astalin, 2013). However, it is noted that a single case study may fail to bring out common behaviour to develop a theory, as suggested by (Sammut-Bonnici & McGee, 2015). However, the study had to narrow the scope, which enabled the researcher to focus on the livelihoods of communal farmers with a specific focus on the Insiza rural district in the context of climate change. After interviewing the farmers, interpreted their experiences and opinions on climate change and rural livelihoods were interpreted and analyses against the specific livelihood assets.

This study purposefully sampled 12 farmers for the Insiza district case study. Research suggest that 12 interviews are a reasonable minimum to access adequate qualitative data and data saturation can be achieved between a sample of 9 and 19 depending on the heterogeneity and homogeneity of a sample (Hennink & Kaizer, 2022; Malterud, et al., 2016:1756; Sim et al., 2018:622). The sample for this study was capped at 12 because the participants were already repeating the same information that the others had said which meant that study had reached data saturation (Aguboshi, 2021). The inclusion criteria used targeted farmers residing in Insiza between 12 and 55 years, as they will have a better understanding of weather patterns in that area. Seven of these participants were male, five were female and were residents for over 20 years. Their experience in farming varied between five to 38 years (with the majority having over ten years of experience). The age of the participants ranged from 25 to 63 years. Most participants stated that they are into livestock and crop farming, while the remaining participants only specialised in crop farming. The farmers who participated in the study own between 4 and 9 hectares of land for subsistence farming.



Data were collected using semi-structured formal interviews to allow response clarification and probing. Additionally, the interviewer had the freedom to alter, rephrase and add questions according to the nature of responses from interviewees (Roulston, 2014, p. 297). The data collection process was for five weeks in 2021. The COVID-19 pandemic made travelling to rural areas impossible because of the existing safety regulations; thus, interviews were telephonic. Telephonic interviews were 40 minutes on average. Collected data were analysed thematically. An inductive approach was also used to determine themes contrary to the deductive approach, which predetermined the emerging themes (Saldana, 2015, p. 19). Ethical considerations were provisioned by ensuring that participants rights to participant and withdraw from the study were discussed with them. Identifiable information was also not recorded to ensure privacy and confidentiality. Additionally, the ethics approval was requested from the university and was granted with reference number: H20BESDEV144.

RESULTS AND DISCUSSION

The participants in the study exhibited varied farming experiences; most had been in the Insiza district for a long time. However, considering that most of the participants grew up in the Insiza district and inherited farming skills from their predecessors, they demonstrated excessive knowledge of the weather patterns that have been occurring in the district over time. This knowledge is evident from the way they defined climate change.

Farmers described climate change:

As the inconsistency in rainfall and changing weather patterns. They also added that climate change is not new but is getting worse. In addition, some mentioned that, "As a community, we have discovered many things about climate change over time. For example, back in the day, the rainy seasons would start in October till December. However, lately, we see different rainfall patterns as the rainy season starts around December, forcing us to change our farming schedules to take advantage of the rain" (Participant 2).

"The only difference is that climate change is worse off now than it was about 20 years ago. The series of droughts we have had in the past years has made me aware that times have changed. I grew up in this area, but the condition of the trees and livestock tells a story, and it is evident enough that weather patterns are no longer the same as before. The natural resources have been compromised; everything is dry in the veld (Participant 7).

"My understanding of climate change is that things are no longer the same; growing up rainy season would start around September and stretch till April the following year. However, lately, rain is sporadic, leaving us without much harvest" (Participant 4).

"When I hear of climate change, what comes to mind is that in the 80s, there used to be plenty of rain which is no longer the case. Now there is a change in the weather patterns and much inconsistency. Weather patterns constantly change, making it difficult to plan as farmers" (Participant 11).

The data displays that some of the participants took up farming because it was a traditional means of livelihood for their parents, and they adopted it. However, farmers have noticed a change in the province as far as weather patterns are concerned, which has brought about many challenges concerning farming. These changes mean that farmers must adopt a practical stance if they continue farming as their main source of livelihood. Similarly, Owusu and Asumadu-Sarkodie (2016:1) suggested that global decision-makers are working to find appropriate ways of saving the world from any uncertainties brought about by climate change by making informed decisions about which actions to take going forward.

According to Levine (2014:3), climate change brings about different forms of distress, especially for those who rely on agriculture for their livelihoods. Therefore, the emergence of climate change has brought about some vulnerabilities among farmers. Insiza district is no exception; climate change has brought about vulnerability among farmers. The degree of vulnerability varies with each case; some are worse off than others. All the farmers face



various vulnerabilities, but some are more common than others. Below are the responses given by the participants on the vulnerabilities they have faced because of climate change:

"Climate change has affected our daily routine; we now spend much time looking for food and water for our animals and crops. Additionally, we now have to choose which crops to farm and the type of seeds we use; for example, for our corn, we now use low-breed seeds" (Participant 1).

"The shifting weather patterns have affected the livestock. I have had to let go of some cattle to buy food for the others. The same applies to crop farming. I have had to let go of farming corn, which brings in more income and settle for cereal crops because they thrive even in a harsh climate" (Participant 11).

"In my household, we have lost a lot of cattle and our day-to-day activities now centre around finding solutions and better ways of coping result of the change in weather patterns which was never the case in the past. We always work around the clock to save crops and ensure livestock access to food, water, and medicine" (Participant 7).

"Climate change has hit us hard in the pocket, especially those like me who grew up under parents who used farming as a livelihood. We saw them making it without living for greener pastures, and I also had the same vision, but it was hard, so I had to find something else to do to complement my income" (Participant 6).

Based on the findings, farmers have learnt to adapt to new routines and ways of doing things as they spend most of their time trying to find solutions to the problems brought about by climate change. Moreover, climate change makes it difficult for farmers to plan well for the farming season as they do not know how things will pan out. In some instances, farmers have had to reduce the number of animals they keep and the farming area as they are afraid to plant crops in large areas when they are not certain of a good harvest. As a result of climate change, the farmers' livelihoods have been compromised, and they must find other means of income to subsidise their income. Livelihood opportunities in rural areas are limited compared to urban setups. Climate change has made farming much harder and more complicated than in the past. As a result, farmers must put in the extra work to get proceeds out of farming to survive and depend on it as a livelihood.

Human capital is the experience, work skills, knowledge, ability to find labour and good health, which, when combined, enable people to pursue different livelihood strategies and achieve their livelihood objectives (UNDP, 2017). Considering the vulnerabilities faced by farmers in the Insiza district, the farmers exhibited various skills and abilities to achieve their livelihood objectives. The findings show that all participants possess diverse skills, knowledge, and abilities, and most agree that there is room for improvement. One of the participants stated that:

"I am a baker and happy that climate change does not affect this skill. I can still make a living out of it. However, existing structures do not necessarily promote my skill. It is more of my determination as I have to meet my family's needs. I wish the government could offer professional training courses in rural areas whereby we get certificates for the skills we have in order to reach bigger markets. I also wish to be a renowned baker for all local boarding schools in the district, but I cannot achieve that without a certificate" (Participant 9).

One common finding from the interviews was that most of the skills that farmers have are self-taught; therefore, if relevant structures are set up, it can help them perfect their skills to achieve better livelihood outcomes. Below are some comments from the participants:

"There are no structures that promote my skill; all I have is the knowledge I acquired at high school, and over time I have perfected my skill. One day I would love to enhance my skills by attending college to at least get a certificate" (Participant 1).

"Existing structures do not necessarily promote my skill. It is more of my determination as I have to meet my family's needs" (Participant 4).

Farmers in the Insiza district desired to improve or better themselves by extending an invitation to the government and well-wishers to assist in any way possible to be better equipped. However, the prevailing climate change challenges have encouraged them to hone their skills and consider other forms of income streams.



Across the world, people have many businesses ideas worth pursuing, but without adequate financial backing, it is almost impossible to see them become a reality. Glopp (2008) states that financial capital enables people to adapt to different livelihood strategies of the five capitals. Therefore, access to financial capital allows people to access diverse livelihood opportunities. Moreover, financial capital sets the precondition for creating or improving other capitals (Masanga & Jera, 2017). For example, Hidayat, Offermans and Glasbergen (2021) observed that farmers with excess profit tend to reinvest in livestock which may later be sold to supplement their livelihoods when crises ensue. Thus, to get a head start or any form of enhancement in most projects, there is a need for financial backing. Moreover, considering the global predicament of climate change, coping and adaptation strategies are not cheap, and some require financial backing (Hidayat, Offermans & Glasbergen, 2021). For the theoretical section.

Farmers do not only possess skills but use them to subsidise their income. The participants exhibited different and diverse means of earning a living they are engaged besides farming. The findings show that all farmers have other means of earning a living besides farming. Their skills are diverse, including building/construction, small-scale mining, buying, and selling clothing items, running grocery stores, baking, owning backyard vegetable gardens, welding, fishing, selling firewood and growing chickens for sale. Below are some comments from the participants:

"I am a builder, which gives me money for survival, but in the region, many people engage in small-scale mining for livelihood. These income streams have kept us at a breakeven level. However, we have enough to survive, unlike back in the day when we would have more than enough farming produce and were able to sell. Moreover, some coping mechanisms do not come cheap. As farmers, we need financial resources to see them through" (Participant 1).

"I am a welder, but people barely have money to pay me for my welding services due to recurrent droughts. COVID-19 made things worse as all of us were trapped indoors and could not offer community services to make an income. Moreover, farming has changed; it is no longer a cheap exercise as it was in the past. Most of the resources we have to buy on our own, even the seeds we use" (Participant 6).

Small-scale mining was the most common way of making a living in the district, especially for the non-disabled, as mentioned by all the participants during their interviews. Farmers in the Insiza district are not wallowing in misery but facing the challenges of climate change head-on. Their resilience is shown by their determination to keep working without backing down, a spirit noted by Hidayat, Offermans, and Glasbergen (2021). However, there was no joy regarding the issue of savings as most participants concurred that it is an afterthought as they can barely meet their current needs. Some mentioned that the most common way of saving in rural areas is through acquiring assets in the form of cattle as monetary value destabilises over time (Hidayat, Offermans, & Glasbergen, 2021). Finally, the findings show that the financial status of most farmers in the Insiza district is currently unstable as people survive on a hand-to-mouth basis. Therefore, there is a need for financial aid in the district. Below are some comments from the participants:

"When it is dry, the farm's pockets automatically dry up. We did not get enough rain in the past year, which translated to dry pockets. I do not have savings; the country's economic performance has made it impossible to save, especially for us who reside in rural areas (Participant 3).

"The lack of financial aid, however, has seen many people selling off their animals to buy food and sometimes, out of desperation, people end up selling their animals at close to nothing in order to get the little income to get supplies that will last for a few days (Participant 7).

Rural development primarily centres on increasing natural capital (UNDP, 2017). Therefore, it is important to understand how natural capital is employed both on its own and when it is in conjunction with other capitals to enhance the establishment and sustainability of livelihoods (Serrat, 2017, p. 24). The findings show that Matabeleland has an abundance of wild fruit such as *xakuxaku* (snot apple), *mtshwankela* (black chocolate) and *mviyo* (wild



medlar), to mention a few; moreover, Insiza district is specifically known for *amacimbi* (mopani worms), this is line with Dube and Phiri's (2013) study. Below is a comment from one of the participants:

"We are a blessed area; we have a lot of wild fruits such as mtshwankela, mbhunzu and xakuxaku as well as fish in our nearby dams. Therefore, many people make a good income when they sell wild fruits. In addition, this province is famous for having mopane worms. In a good year, people make much income from selling them, although they are not always available because weather patterns also affect them" (Participant 8).

Many families have traditionally made a livelihood by consuming the worm and selling it for income (Dube & Phiri, 2013). Additionally, the findings show that in the district, there are a series of workshops for the farmers and the community at large to conscientise them on the importance of taking good care of the available natural resources so that they can be useful to them now and for future generations. Some participants even shared the importance of taking care of trees which are useful in blocking the wind that affects crops. The participants speak to this in the quotes below:

"Our leaders teach and remind us all the time to take care of our natural resources, especially the trees that attract clouds to build up and cover wind; if they are not there, the wind can destroy crops and even homes. However, hunger pushes people to the edge, and they do anything to get food, so they start cutting the same trees we need" (Participant 7).

"Since the time EMA (Environmental Management Agency) put regulations, many people in the community are now conscious of the need to take good care of natural resources" (Participant 5).

Farmers have different strategies for coping with vulnerabilities created by climate change. In some countries, farmers usually pray to God (Allah) for rainfall; this has been a long-practised religion of Islam (Dariush, Masoud & Fereshteh, 2010). Most farmers believe this is the only thing they can do if droughts persist. However, unlike the Muslims in some parts of the world who pray to cope with climate change, the farmers in the Insiza district have to do much more than that. According to the study's findings, the participants stated the different coping strategies they employ to cope with climate change. The most common method farmers use in the Insiza district is conservation farming, which involves digging pits to store water. However, other participants felt this is much work, especially for the elderly. The findings also show that NGOs have greatly assisted in working with the Insiza Farmers Association to equip farmers in this time. Below are some comments from the participants:

"The non-governmental organisations (NGOs) do workshops repeatedly to train and equip people on the different ways of coping with climate change, such as conservation agriculture. We are also taught ways of preserving clouds by planting trees, resulting in increased rainfall. I want to share with others in Zimbabwe and worldwide that this animal called climate change is real; it is not a myth. Therefore, we must not get stuck in the old way of doing things but try to adapt to make the most out of the situation" (Participant 1).

"We get teachings from NGOs, but most of the time, we equip each other as farmers, but these organisations are not always present; therefore, we must find ways of sharing knowledge amongst ourselves and not entirely wait on them" (Participant 2).

Another method that came up a lot during the interviews is planting cereal crops that thrive even when there is no rain. On the same note, some participants mentioned the irrigation method. However, it is beyond the reach of many, as most farmers in the area have unstable financial resources due to climate change. As the saying goes, "there is power in numbers", which is the general trend amongst the farmers in Insiza. The participants confirmed that there is a lot of information sharing among farmers in the area to assist each other in making the most out of an unfavourable situation. Lastly, the findings show that farmers in the Insiza district heed the information and advice from the meteorological department as it helps them plan for the upcoming farming seasons. Below are some



comments from the participants; not all responses were recorded in this section as some were similar:

"We plant crops that do not need much rain, crops that can withstand heat, such as cereal crops. Many organisations come and run workshops where we get equipped about farming and a lot more such as baking and dishwasher development workshops, which has offered many people an alternative to their means of livelihood. Sometimes NGOs avail funds for people to start up small income-making projects. I want to extend our gratitude to the NGOs who have greatly assisted us in these trying times" (Participant 11).

"I noticed that in as much as there is not much rain, some families were doing better and getting more harvests than my parents were. I asked them how they do it, and they taught me about conservation farming. Since then, our harvest has improved. I would love to encourage fellow farmers that climate change is all over; we must help each other cope. If you are falling short, do not hesitate to seek counsel from others (Participant 6).

Coping strategies are relevant not only in crop farming but also in livestock farming. Based on the study's findings, the participants agree that one viable method of coping with the challenges presented by climate change is to sell some of the livestock (Hidayat, Offerman, & Glasgerben, 2021) to buy food for the remaining ones. Thus, they have to reduce the number of livestock they keep. On the same note, some participants mentioned that they go to neighbouring villages to try and find pastures for their animals. Another method during the interviews was that farmers sometimes go the extra mile when they get plenty of rain. They cut grass and store it so that they have enough feed for the animals during dry spells. Participants speak to that below:

"Over time, we have learnt to listen to the advice from the meteorology department as they have the know-how to estimate when likely it is to rain. The information they give us is vital as it guides us when exactly to plant. We now plant crops that can withstand the sunlight, and those that get ripe early are known as small grain crops and cereal crops. Concerning livestock farming, the most common and feasible way so far has been to reduce the number of animals we keep. We sell some to buy food for the other ones. We also cut fresh grass and store it so that when it is dry, animals have enough food. Finally, we need to unite; conservation farming is not easy and requires great effort. If we are to pull this off, we need each other as a community" (Participant 12).

"We have been taught new farming methods for digging pits that store water (conservation farming). Additionally, we have been taught to mulch, and that way, we have been able to make some harvest" (Participant 3).

CONCLUSION

The core of the study was to determine the effect of climate change on communal farmers' livelihoods. The findings illustrated that climate change has a huge influence on livelihoods. Furthermore, the study sought to assess how climate change affects farmers' natural capital in the Insiza district. The findings exhibited that there has been a compromise in the natural resources lately. However, organisations are trying their best to teach and conscientise people to take care of the available natural resources. The results further indicated that financial capital of farmers in the Insiza district is influenced due to climate change. Due to low output resulting from climate change, the government no longer provide funding for farmers. Additionally, due to unstable weather patterns farmers are unable to generate sufficient income thereby being forced to sell their livestock to secure livelihoods. A practise they will not engage in if they produce was sufficient. Therefore, lack of finance makes it difficult for farmers to cope with their vulnerabilities. The human capital of farmers in the Insiza district is affected due to climate change. The findings showed that human capital is available, although there is a need to equip farmers with new skills to maximise output. However, to upskill require financial capital which most farmers do not have. An aspect of



social capital was also identified where farmers with support each other with skills that others lacked.

Finally, the findings highlighted the resilience strategies the Insiza district farmers adopted to improve livelihood outcomes and reduce their vulnerability to climate change. The farmers practised conservation farming. Due to inconsistent climate patterns, farmers have, over time, learnt to farm all year round with no fixed seasons. In the past, farmers survived with one income stream, but climate change has introduced a notion of diversifying income streams to make ends meet. Moreover, due to climate change, livestock farmers must exercise flexibility and consider keeping animals that thrive during a drought, such as a sheep. The practical implication of this study is concerned with identifying the gaps in assets that could help communal farmers increase their outputs. The noted financial constraints beg for policymakers and government authorities to come with support measures that would contribute towards the sustainability of these farmers. As noted with the farmer's coping strategies against climate change and the use of social capital in helping those with limited skills shows the drive to continuing with farming and exploring alternative survival strategies to ensure that rural livelihoods are secured.

Limitations of this study relates to its methodology, a comprehensive study with a bigger heterogenous sample might share more insights on the effects of climate change in Zimbabwe.

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