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Adaptation strategies employed by rural women in the face of climate change impacts in Vhembe district, Limpopo province, South Africa

Adaptation
strategies
employed by
rural women

Louis Nyahunda and Happy Mathew Tirivangasi

*Unit of Institutional Change and Social Justice, University of Free State, Bloemfontein,
South Africa and
Department of Research Administration and Development, University of Limpopo,
Polokwane, South Africa*

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Abstract

Purpose – This study documented adaptation strategies employed by rural women in Vhembe district as they reel with climate change impacts. Women are heavily plagued by climate change impacts than any other genders worldwide. This is attributed to their high dependence on the natural resources for survival, low adaptive capacity, illiteracy, social ascribed roles that limit their participation in climate change initiatives like men and high poverty levels. Despite the daunting fact of women's vulnerability to climate change and its vagary impacts, women are agents of social change who have not remained passive victims to climate change and its impacts.

Design/methodology/approach – This study adopted a qualitative methodology guided by multi-case study design. A sample of 25 participants was selected through simple random and purposive sampling techniques. Data were collected using Focus Group Discussions and individual interviews and analysed thematically. Rural women and traditional leaders served as key informants and participated in the study.

Findings – The study established that the effects of climate change on rural women are real; however, there is a cocktail of strategies employed by women in Vhembe district in response to these effects. The strategies include livelihood and crop diversification, use of indigenous knowledge systems and harnessing of social capital among other household-based adaptation strategies.

Originality/value – The study recommends that the best way of assisting rural women in adapting to climate change is through the amelioration of poverty, enhancing capacity building for women and elimination of all systems that serve as barriers to effective adaptation.

Keywords Climate change adaptation, Strategies, Rural women, Vhembe district

Paper type Research paper

1. Introduction

Climate change adaptation refers to mechanisms and initiatives put in place by human and natural systems to curb the vulnerability to perceived or real climate change impacts (IPCC, 2014). In the same line of argument, Akinnagbe and Irohibe (2014) further assert that the purpose of adaptation is for reduction of exposure to risk, development of the capacity to cope with imminent harms and to draw opportunities out of the risk through innovation. It is important to note that women are mostly encumbered by climate change impacts because they are always trapped under the conditions which make them vulnerable to climatic shocks such as poverty, social exclusion, patriarchal dominance in decision-making, limited access to information, lack of land and property rights and ascribed gender roles (Alam, 2015; UN-Women, 2016). Arguably, the United Nations Framework Convention on Climate Change (UNFCCC, 2014) posits that the effects of climate change such as droughts, heat waves and floods highly impact women as compared to men. This is because the natural environment they depend on for food security is now susceptible to the changing climate (Cherotich *et al.*, 2012; Nyahunda *et al.*, 2020; Tirivangasi *et al.*, 2021a). Nevertheless, women are important role



players in addressing the effects of global warming. Women play an important role in food security, but they are highly encumbered by climate change impacts (Nyahunda, 2021).

In developing countries, rural women constitute the poorest population because of their dependence on rain-fed agriculture for subsistence and livelihood (Ndaruzaniye, 2013). Paradoxically, Alam *et al.* (2015) contend that women are not passive victims to the vagary effects of climate change despite being heavily burdened by its impacts than men. Women are also valuable agents of change endowed with important progressive environmental perspectives and indigenous knowledge. These are pertinent in proffering climate change adaptation mechanisms (Nyahunda and Tirivangasi, 2020). Additionally, women are coming up with indigenous solutions leading to resilience in communities. On the same note, women are environmentally assertive and sensitive than men, and they perceive risks and repose great concern to the changing climate (Eriksen, 2013). In support of the latter, Williams (2018) argues that women show expertise towards dealing with climate change impacts, and this knowledge is a culmination of their consistent interaction with the environment and exposure to climate change impacts in their daily work and responsibilities. Most importantly, women can set out viable priorities for climate change adaptation and mitigation than men.

In Vhembe district, most small-scale farmers particularly women are prone to the climatic risks and shocks and have been reeling with the climate-induced shocks for some time. Their vulnerability is exacerbated by poverty and illiteracy which in turn is limiting their adaptive capacity and resilience (Mpandeli and Maponya, 2014).

1.1 Women and the climate change discourse

Baten and Khan (2010) contend that climate change is a global phenomenon disproportionately affecting humanity, and women bear the brunt burden of its effects than men. Data released by Statistics South Africa (2013) indicate that people located in semi-arid areas are often the poorest with lowest incomes which underline their vulnerability to climate change. Women constitute most farming work executors in Africa apart from other responsibilities they shoulder such as cooking, laundry, water and firewood collection. Notably, women shoulder the responsibility of managing the natural resource base including land and water. These resources are susceptible to the vagary effects of climate change including variable rainfall patterns on cropping systems (Babungura, 2013; Ndaruzaniye, 2013; UN-Women, 2016; Tirivangasi, 2018; Nyahunda and Tirivangasi, 2019). Furthermore, Otzelberger (2014) argues that climate change is causing traditional food sources to be unpredictable and inaccessible for women. Rural women are facing perennial loses to incomes and harvests, thereby plunging them into poverty and food insecurities (Nyahunda and Tirivangasi, 2021).

The projection provided by the United Nations Developmental Plan (UNDP, 2014) depicts that about 90m women will be food starved in Africa by 2050 due to climate change. Most rural women in Africa are crippled within webs of poverty trapping them in very dimension, and they are unable to meet the medical costs during times of family illnesses. Subsistence rain-fed agriculture is the main source of livelihood in rural areas of sub-Saharan Africa, and women who constitute 80% of subsistence farmers in the world face low agricultural output due to variable rainfall patterns caused by climate change (FAO, 2014). Demetriades and Esplen (2010) opine that notwithstanding the daunting fact that women face structural and systematic constraints in adapting to the effects of climate change, women are embarking on a plethora of adaptation mechanisms towards present and predicted climate change impacts.

In the same terrain of thought, Nhamo (2014) corroborated by Nyahunda and Tirivangasi (2020) reveals that women are playing essential roles in the environmental space; they are holders of important knowledge which can foster climate change mitigation and adaptation which assist in developing mechanisms to addressing areas such as water, energy,

agriculture, biodiversity and food security which are being impacted by climate change. Similarly, [Cherian \(2015\)](#) asserts that women have accumulated vast knowledge pertaining to risk and disaster reduction and adaptation strategies, and they must be recognized as real ambassadors in championing sustainable livelihood mechanisms essential for climate change adaptation.

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1.2 Theoretical frameworks

This study was guided by the Social Ecological Resilience Theory. Social ecology is premised on the belief that human beings often referred to as subsystems, their anthropogenic activities which form part of their livelihoods and the natural environment (the ecological subsystem) directly or indirectly interact and are interdependently integrated ([Adger, 2006](#)). As for [Rutter \(2012\)](#), resilience refers to an organized way of overwhelming the stressing stimuli without a distorted way of psychosocial functioning. The adjustments can take place at system level that is social, ecological or economic. Accordingly, [Holling and Gunderson \(2002\)](#) denote that resilience to climate change is a process whereby societies, systems or in other instances individuals and communities shift from their common way of living in response to the climatic change-induced stimuli. The Social Ecological Resilience Theory underpins that stressful and disturbing circumstances are common to any system. In response, adaptation to the disturbances should holistically focus on the advantages and opportunities that may develop out of the prevailing challenges ([Nelson et al., 2007](#)). According to [Seixas and Berkes \(2003\)](#), both social and ecological systems are affected by climate change as integrated systems. In these, the human activities are linked to the ecosystem which people directly or indirectly interact with.

Considering the above, for a social ecological system to be considered as a resilient entity, it must have the capacity to withstand disturbances that is climate change and other extreme weather events whilst maintaining its normal way of functioning and identity. In other words, resilient systems possess the capability to adapt to climatic-induced shocks and stresses, to discover and reorganize and to identify opportunities, learn and adapt ([Holling and Gunderson, 2002](#)). As founded by [Walker et al. \(2004\)](#), when a social ecological system is trapped in any disturbance, coping mechanisms are ignited. The nucleus of the Social Ecological Resilience theory is adaptive capacity which means the capacity of the social ecological systems to adjust/change and identify learning opportunities to the stressful stimuli while maintaining its basic structure, identity and normal way of functioning ([Hinkel, 2011](#)). Adaptive capacity gives an opportunity to the social ecological systems to extract advantages dovetailed by climate change ([Smit and Wandel, 2006](#)). Through the proponents of the Social Ecological Resilience Theory, the researchers established that rural women in Vhembe district are experiencing disturbances in the form of climate change as a system, and they are rationally responding to such disturbances (climate change) by employing organized strategies that foster adaptation and resilience either individually or collectively.

2. Description of the case study location

The study was conducted in the Vhembe district municipality as shown in [Figure 1](#), which is in the Limpopo province of South Africa. The district comprises of Makhado, Thulamela, Musina and the Collins Chabane local municipalities. In Vhembe district, there are approximately 1.3m people, with females accounting for 54.4% of this population. Most of the people, accounting for 48.7% of the population, live in the Thulamela municipality. The rest of the population is distributed as follows: Makhado 44.4%, Collins Chabane 6.6% and Musina 3.3% ([Madzivhandila, 2016](#)). Tshivenda-speaking people constitute 69% of the population, followed by Xitsonga speakers who constitute 27%. The landscapes of Makhado, Collins

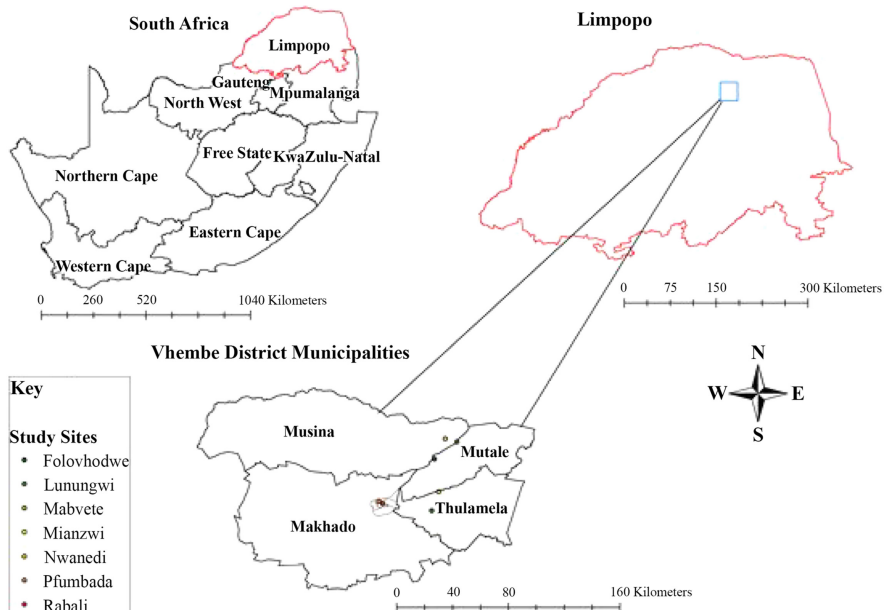


Figure 1.
Map of Vhembe district municipalities

Source(s): Phophi *et al.* (2020, p. 2)

Chabane and Thulamela municipalities are made up of semi-arid savannah zones and woodland vegetation (Rosmarin, 2008). This study was conducted in four villages randomly selected from the four municipalities in the district, namely Tshiungani, Tshivale, Maniini and Maviligwe. As for Mpandeli and Maponya (2014), in Vhembe district, a significant portion of the land here is used for agricultural purposes and most smallholder women farmers are reeling under the impact of climate change and most of the land receives annual rain of between 300 and 400 mm. The map of the study location is illustrated in Figure 1 below:

2.1 Sampling methods

The study adopted a qualitative research approach guided by multiple case study design that operates within the traditional framework of an exploratory study. Qualitative method was adopted to allow the participants to provide a thorough detailed account of their experiences of climate change in the following sectors: agriculture and food production, livestock production, water resources, health and wild resources. Qualitative research allowed the researchers to interact with research participants to gain their insights on the effects of climate change on their lives and livelihoods (Babbie and Mouton, 2012). The researchers adopted the multistage sampling technique where more than two sampling methods were used at different stages. Multi-case study design produces utmost sturdiness to the conclusions to proceed out of the study. The use of multi-case studies is synonymous to replication of a study or experiment (Bartlett and Krawczyk, 2017). This means that results from one case should be simultaneously equated with the results from other cases. The process of replication under the multi-case design implies that the selected cases were similar so is the prediction of the results (Stake, 2013). In multistage sampling, clusters are selected at the first stage using the probability sampling method, particularly stratified sampling. Sampling unfolds in stages from state, provinces, districts, villages and households (Akhavan and Pezeshkan, 2014).

The four municipalities were considered as different strata where villages with women who met the criteria to be explained below were selected following the simple random sampling method. Simple random sampling was adopted to select the four villages in different municipalities, namely Maniini in Thulamela, Tshiungani in Musina, Maviligwe in Collins Chabane and Tshivale in Makhado municipalities. The sampling frame was constructed using two-digit figures starting with 00 for the first community listed. At this point, the researchers selected each tenth community on the list. Purposive sampling was used to select participants who were rural women and social workers who served as key informants in this study. Purposive sampling allows the selection of participants according to the study's needs clearly aimed at gathering information on the phenomena under study (Creswell, 2009). Twenty-five participants participated in this study.

To qualify for inclusion in the study, community members (women) were supposed to practice subsistence farming and have resided in the same village for a minimum period of 10 years. Only women and traditional leaders from the selected villages participated in the study. The researchers ensured trustworthiness by verifying collected data and addressed biases that might affect the process of drawing conclusions (Babbie and Mouton, 2012). This was done through ensuring that the findings closely and possibly reflect the meanings as described by the participants. The four components of trustworthiness outlined by Williams and Hill (2012) were adhered to in this study, that is, transferability, dependability, credibility and conformability. To ensure transferability, the research context and methodology were provided to enable future researchers to assess the transferability of the research findings without any difficulty. In this way, any researcher who wants to transfer or compare the findings of this study should take all the above factors into consideration.

The researchers ensured dependability by providing a detailed account of how data were collected through provision of the research designs executed during the study. In addition, the researchers ensured that data were correctly recorded with community members during focus group discussions and individual interviews with key informants. To ensure credibility, the researchers made sure that the information in this study is a true reflection of what the participants divulged during the data collection process. Data were collected in a natural setting without any influence of the researchers on how the participants should have responded or behaved during the discussions. The researchers ensured conformability by making sure that as far as possible, the results of the study are objective and are not based on biases, motives and perspectives of the researcher. In this study, conformability will be demonstrated by the audio taping of data, which will later be transcribed and audited.

2.2 Data collection and analysis

Data were collected through in-depth individual interviews and focus group discussions. Focus groups comprise of individuals selected and gathered in a group to discuss their personal experiences of the subject under study (Smith and Firth, 2011). Focus group discussions were used to interview community members, and semi-structured indepth interviews were used on traditional leaders who served as key informants. Considering that the lead researcher was not well versed with the indigenous languages spoken in these municipalities, that is, Tshivenda and Xitsonga, he hired three research assistants to assist with data collection and translation. Notably, four focus group discussions were held with one focus group conducted in each of the municipalities. Each focus group had five participants. In the same vein, the researchers held five individual interviews with traditional leaders who served as key informants. On that note, one individual interview was conducted in three municipalities except for Tshiungani village in Musina municipality where the researchers interviewed two traditional leaders. It is also worth mentioning that the traditional leaders that participated in the study granted the researchers the right to community entry in their

respective communities. A Thematic Content Analysis (TCA) was used to analyse the findings. The researchers used the steps developed by [Braun and Clarke \(2006\)](#) to analyse the data collected from focus group discussions and semi-structured individual interviews. In the initial stage, after the translation of data from Xitshonga and Tshivenda languages, the researchers familiarized themselves with the data by rereading the transcripts and generated initial codes by means of data reduction to align themes with the study aim. After the data reduction, the researchers developed preliminary themes which were aimed at focussing on the problem statement of the study. The themes were reviewed to ensure that they are on a par with the aim of the study and were defined to see if there is a need for the development of subthemes. Given that there was no need for subthemes, the researcher went on with the last step of writing up the manuscript.

2.3 Ethical considerations

This paper is an extract from the PhD thesis of the lead author obtained from the University of Limpopo in South Africa. As such, the Turfloop Research and Ethics Committee (TREC) and the Vhembe District Municipality granted permission for the lead author to conduct this study. Letters of permission to conduct the study were issued by TREC and the Vhembe District Municipality Limpopo (TREC/186/2018/PG). Participants were requested to sign consent forms pledging their voluntary participation in the study. The researchers adhered to the ethical standards of anonymity, confidentiality, voluntary participation and avoidance of harm. These were briefly explained to the participants and were also included in the consent forms.

3. Findings and discussion

This study found that in as much as women are ravaged by climate change impacts, they are not passive victims to the vagary effects of climate change. It emerged in this study that most rural women in Vhembe district are embarking on a cocktail of activities to adapt and mitigate to climate change impacts. The adaptation strategies employed by rural women are presented in the following themes.

3.1 Livelihood diversification

[Gukurume \(2013\)](#) defines livelihood diversification as a process by which rural households embark on diversification of a portfolio of activities and social support capabilities for survival and in order to improve their standard of living. This study established that agricultural activities in rural communities of Vhembe district are now marred by uncertainties owing to climate change and variability. To reduce the risk of further ravages from failed harvests, a commendable number of participants in all municipalities reported to have diversified their activities to sustain their livelihoods. According to [Daidone et al. \(2013\)](#), most studies that analyse the impact of climate change and variability in Africa focus on livelihoods. This study revealed that livelihood diversification is a common strategy amongst rural women against the uncertainty of agricultural activities owing to climate change. From the narrations provided by the participants and observations made by the researchers, it is evident that most households are engaging in a cocktail of livelihood activities and diversified income portfolios. The following statements confirm this:

Farming is now like gambling and if we remain stuck thinking things are going to change, we are going to die. I do a lot of things as long I get food for my children and money to send them to school (FGD, Maniini village).

We are hustling our way out of this messy by doing a lot of things to feed our families. There is nothing coming out of these fields (FGD, Tshivale village).

The continuous deterioration in agricultural productivity has made a significant proportion of households resorting to a diverse of livelihood mechanisms and economic activities throughout the year. The common activities were forms of casual labour such as weeding and harvesting in the neighbouring irrigated areas. Artisanal fishing in Nandoni and Vondo dams (Thulamela and Collins Chabane) was identified as another livelihood diversification activity. Firewood trading was reported to be another economic activity common amongst women. The researchers argue that selling of firewood has backlashes on the environment because it is causing the continuous cutting down of trees leading to deforestation which the people must protect. Most participants in Musina, Collins Chabane and Makhado reported to be embarking in beer brewing as a source of income. In Collins Chabane, this was reported to have some consequences on some women who reported that due to the highest level of alcoholism, they are being subjected to domestic violence from their male counterparts. Petty trading emerged as another economic activity amongst women particularly in Makhado, Collins Chabane and Thulamela where participants reported to be selling fruits, vegetables from their backyard gardens, sugar canes and mango achar, among other things. This study further established that participants from female households had the freedom of diversifying economic portfolios as compared to those from male-headed households. This speaks to the conundrums of patriarchal dominance rampant in the communities that restrict women from exploring viable opportunities essential for climate change adaptation.

The [International Panel for Climate Change \(IPCC\) \(2014\)](#) posits that climate change is a threat to human life and their livelihoods. As for [Somorin \(2010\)](#), livelihoods are ways through which people make a living. In that terrain, [Musara \(2018\)](#) highlights that what is imperative on climate change and livelihoods is adopting sustainable livelihoods which people can cope with, maintain and use for adaptation to stresses and shocks whilst providing benefits for other livelihoods without suffocating the natural resource base. The proponents of the Social Ecological Resilience Theory which guided this study points to key indicators of social resilience such as diversity of income sources, the level of education and participation in decision-making, ability to self-organize and access to credit ([Tompkins and Adger, 2004](#)). Activities undertaken by rural women such as petty trading and menial jobs are ex-post adaptation mechanisms from main activities such as agriculture which has been decorated by dwindling harvests and droughts emanating from climate change occurring in the communities. As for [Kamwi et al. \(2018\)](#), diversification of livelihoods warrants resilience in the face of adverse trends or sudden shocks such as climate change.

3.2 Crop diversification

This study revealed that most rural women are responding to the effects of climate change by diversifying their range of crops migrating to drought-resistant crops such as finger millet and sorghum. It emerged in this study that most participants in all the municipalities are resorting to planting early maturity crops given the long dry spells experienced which are not suitable for maize crops. The planting of butternuts, okra, pumpkin, chillies, cabbage and African spinach was reported and observed in this study. These crops were reported to be important for household consumption and early market value. Drought-resistant crops are doubling as both food and cash crops allowing most rural women to adapt to climate change impacts. The following narrations confirm this:

We are trying a lot of things because things have changed, we cannot rely on one thing. Some crops are doing well, and others are failing so if you try as many, you will not run a big loss as usual (FGD, Maviligwe village).

I taught my family that we can no longer rely on maize only for porridge because maize crops are failing. Now we have resorted to other crops like sorghum, they are doing well in this heat (FGD, Tshiungani village).

This validates findings by [Gukurume \(2013\)](#) that climate change manifesting through drought and erratic temperatures has encouraged most rural communities to embark on some contingent responses to drought by employing an amalgamation of options and diversification of livelihood strategies and crop varieties. The researchers emphasize that crop diversification could serve as a panacea for food insecurity and a broad-based adaptation mechanism for sustainable livelihoods. The following narration from one of the key informants confirms this:

You know we are highly depended on agriculture in this community and failure of some crops does not mean we are stopping farming; we are trying other crops like sorghum and millet. These crops also have a cultural significance to us because we use them for beer brewing for our rituals and other ceremonies (Key informant, Tshiungani village).

A significant proportion of participants in Musina, Makhado, and Thulamela municipality are practising crop diversification due to information disseminated to them through agricultural extension services from the local government and non-governmental organizations. Soil and water conservation techniques were used to avoid the risk of flooding and improve soil moisture and organic matter retention. It further emerged in this study that most rural women in all the municipalities have adopted mixed cropping and in response to shortening growing and rainfall seasons. It was further found that they are contemplating changing their planting and harvesting periods. One participant mentioned the following:

Our planting calendar has now changed, we wait for the rain, and so our planting season is now determined by the rain if there is no rain then they do not plant (FGD, Maviligwe village).

This is consistent with findings made by [Chazovachii \(2012\)](#) which reveal that multiple cropping is now the most commonly practised system in Africa where smallholder farmers only sow their seeds in advance expecting rainfall or after crop failures, they sow again when they receive rainfall. Change in cropping patterns involves experimenting new crops and assessing their viability to withstand the long dry spells or moderate rainfall ([FAO, 2014](#); [Nyahunda and Tirivangasi, 2021](#)). It was observed that animals such as goats, sheep and indigenous poultry are becoming dominant as rural people are trying to withstand droughts. Small livestock rearing such as indigenous poultry, sheep and goats is at an increase in most rural communities of Africa as smallholder farmers devise coping mechanisms to the effects of climate change. As for [Brazier \(2015\)](#), these small livestock easily adapt in dry areas, and they are ideal for drought-prone areas such as Vhembe district.

3.3 Use of indigenous knowledge systems (IKS)

This study established that traditional knowledge and indigenous knowledge systems (IKSs) are useful to inform adaptation strategies devised by most rural women in all the villages sampled for this study. [Masoga and Kaya \(2011\)](#) define indigenous knowledge as a body of knowledge accumulative based on practice, belief and coordinated adaptive techniques passed through generations on cultural transmission basis denoting how human beings create a relationship with the environment. In the same line of argument, [Chakwizira et al. \(2010\)](#) connote that most rural people have amassed traditional adaptation techniques through experience accumulated by interaction with the environment and knowledge orally transmitted across generations.

Against the above explanations, this study found that rural women particularly the elderly easily predict the likelihood of a severe drought or low rainfall and that would allow them to

adequately make advance preparations to curb impending climatic catastrophes. These traditional coping strategies are largely based on experience that have been accumulated over the years and transmitted from one generation to the other. The following narration confirms this:

I can tell whether there is need to plant or not by observing nature or behaviour of wild animals. These tell us whether we are going to have a good harvest or not (FGD, Tshivale village).

The researchers emphasize that it is worth mentioning that rural farmers (women) have developed convoluted systems of gathering, predicting, interpreting and making decisions related to weather. The following excerpt was extracted from key informant interviews with traditional leaders who are believed to be custodians of indigenous knowledge systems.

We predict good and bad farming seasons through analysing the direction of the moon (facing north) symbolized start of planting season. Black ants (termites), the visibility of too many black ants indicated that it was a rainy season, so we know we could plant. (Key informant, Tshivale village).

Different colours of clouds could tell if it is going to rain the following day. A circular halo around the moon is taken to mean that heavy rains are expected and very high temperatures during the dry months of September/October/beginning of November (Key informant, Tshiungani village).

Indigenous knowledge is easily accessible and can be shared by many for the purpose of adaptation. The significance of indigenous knowledge is manifesting through usage of plants as mosquito repellents. Most participants in Musina and Collins Chabane mentioned that they burn plant materials such as citronella grass and aloe ferox to kill mosquitoes. Knowledge about the usage of plants as repellents has been passed from generation to generation. As for [Mavundza et al. \(2011\)](#), traditionally, plants have been used to kill mosquitoes in most African societies. As for [Nyong et al. \(2007\)](#), this traditional knowledge is very crucial in climate change awareness amongst rural communities because these people possess traditional knowledge that is hazard-specific. This knowledge is amassed from non-formal sources.

It emerged in this study that traditional knowledge is playing an important role for most rural women in terms of proper decision-making regarding climate change adaptation, early warning response and disaster risk reduction ([Rankoana, 2016](#)). In Collins Chabane where agricultural extension services were reported to be non-existent, the participants submitted that they depend on their traditional knowledge to devise viable farming methods. The following excerpt confirms this:

We rely on our old farming systems, our forefather's knowledge still works for us, and we do not get any assistance from anyone so it's better we stick to what we know (FGD, Maviligwe village).

The above narration demonstrates the extent of confidence rural people in Vhembe district have in the traditional knowledge they possess which serves as driver for adaptation to perceived climate risks. [Masoga and Kaya \(2011\)](#) posit that IKSs are beaconing resilience to climate change in Africa because it is the mostly accepted and easily embraced local adaptation strategy. This study further established that in Vhembe district, despite being a general Christian society, the people have not been completely detached from their ancestral doctrines. Within this belief, ancestral spirits have power and influence over daily activities and the lives of the living. As such, rain-making ceremonies are widely performed to ask for the rains during every farming season.

3.4 Harnessing of social capital

From the narrations submitted by participants, the researcher deductively concluded that most rural women are embracing social capital amidst climate-change-induced shocks. In this study, social capital refers to a web of networks created through social interaction that

reinforce trust and mutual benefit (Gukurume, 2013). The researchers observed that there are sets of relationships between community members fostering social cohesion, solidarity and unity during climatic-induced shocks. This web of relationships is allowing rural women across Vhembe district to withstand the effects of successive episodes of drought, sharing scarce resources such as water and adopting a collective community disaster rescue planning. The following excerpt confirms this:

We try to pick each other up in difficult times as a community and this level of solidarity is keeping us going. No one dies of hunger as long the next person has food. When my home was destroyed by floods, I seek refuge at my neighbour's place (FGD, Tshiungani village).

Through embracing of social capital, some community members with wells would allow other members to fetch water free of charge. Some reported to be sharing food with those without. Some participants submitted that they drive their livestock to other villages where there are better grazing lands. The study further found that social capital is manifesting through community prayer meetings which the participants reported to convene during disasters for divine intervention or calling for rains. This was reported in Musina. In Thulamela, the participants submitted that they have community savings clubs where there is a pool of money, they contribute monthly. This money is used to buy groceries by the end of every year which the members would equally share. Sometimes, the money can be used for credit facilities where members can borrow the money to cover emergencies and reimburse with some interest. The proceeds from these savings clubs could be used to buy food, farming inputs and to cater for other basic needs eroded by climatic shocks.

The researchers argue that social capital is fostering a sense of togetherness and community cohesion and social networks are providing a unique adaptation resource to rural women. Social groups are serving as sources of information, wisdom and support in most rural communities. The following narration confirms this:

We share ideas for survival amongst ourselves and we have our social clubs that serve as sources of information about our common challenges and empowerment (FGD, Maniini village).

The above narration bears testimony to the significance of social capital as an adaptation strategy to climate change in rural Vhembe. Yohe and Tol (2002) identified the determinants of adaptive capacity, many of which are societal in character that includes the stock of human and social capital, education and personal security. Social networks are enabling most rural women to be dynamic and highly adaptive in the face of livelihood threats such as successive droughts and subsequent food insecurity. In support of this, Musavengane and Simatele (2016) posit that social capital can be a vehicle through which the accumulation of different forms of capital can be achieved and contribute to environmental management.

3.5 Household and community-based adaptation strategies

This study documented some household and community-based adaptation strategies as discussions unfolded during focus group discussions and key informant interviews. These strategies were observed across different villages where the study was conducted, and they sought to respond to challenges posed by climate change in the water resources, food security, health and agriculture and livestock production spectrums. To save their livestock from climate risks, some households mentioned that they are planting trees to provide shelter for their livestock. Others resorted to destocking their livestock through selling or slaughtering for consumption. This strategy means a great loss in wealth and loss of draught power for different homestead activities such as ploughing, fetching water and firewood. Destocking can also take the form of lending relatives or friends staying in areas with better grazing lands. The following narration confirms this:

It is very sad to watch our livestock dying helplessly so we rather slaughter them and complement our nutrition. Sometimes we take them to our relatives where there are better grazing pastures (FGD, Maniini village).

The researchers emphasize that the transfer of livestock to where there are better grazing pastures is the most effective system as the owners would not lose their valuable assets. Other participants mentioned that they are practising barter trade exchanging their livestock for commodities they do not have. Poultry or livestock is usually traded with mealie meal from other areas. During drought, some participants submitted that they skip meals to having one meal per day or prioritizing feeding their children. Similar findings were reported by [Batima \(2006\)](#) that during climate-change-induced droughts, most women resort to providing one meal per day or them having to skip some meals for the sake of their children.

To circumvent the health impacts of climate change, this study found that a commendable proportion of participants are using treated nets to protect themselves from mosquitoes causing malaria, others are drinking boiled water to prevent diarrhoea and when the sun is too hot, most participants submitted that they seek shed. These findings were collaborated by [Tirivangasi et al. \(2021b\)](#), who observed that malaria has been reduced through public health interventions such as insecticide-treated bed nets, which protect against the malaria mosquito that bites at night. However, because the mosquito attacks throughout the day, netting is ineffective against dengue. During heavy rain down pours, some participants mentioned that they cover their entire huts with industrial plastic papers to prevent their houses from swiped away by rains. Confronted by water shortages for both agricultural production and domestic use, which is the most precarious impact of climate change felt in Vhembe district, some participants mentioned that they use grey water (bathwater and dishwater) to water their crops. Others indicated that they are practicing drip irrigation where they water their plants only at night. In the same vein, some participants especially in Musina municipality submitted that most water pipes in the communities are broken, and despite water shortages emanating from climate change, the water supply in the community is deplorable. Trapped under these unpleasant circumstances, most participants mentioned that they are channelling money from the social grants towards buying water for domestic use which is kept in JoJo tanks.

4. Conclusion

In a nutshell, this study revealed that notwithstanding the visible impacts of climate change on women's lives and livelihoods, women have developed a toolbox of activities to cushion their lives and livelihoods from the vagary climate change impacts. Most activities carried out by women in Vhembe district are ex-post adaptation mechanisms from main activities such as agriculture which has been marred by low returns owing to climate change. What can be extrapolated from this study is that the ravaging impacts of climate change on rural people makes adaptation an unescapable discourse. Furthermore, there is a ubiquitous acknowledgement among climate change scholars that without adaptation, climate change and its precarious impacts become detrimental on people's lives and livelihoods. Thus, if people fail to adapt to climate change impacts, they become vulnerable to social disruptions, ailments and deaths brought about by climate change. Emerging from this, what should be noted is that the adaptation strategies employed by rural women do not warrant effective adaptation and adaptive capacity to climate change. Considering this, rural women are confronted by an avalanche of challenges which serve as barriers to effective adaptation. This warrants the need for further research focussing on the challenges faced by rural women and how they can be circumvented.

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About the authors

Louis Nyahunda holds PhD in Social Work, Master of Social Work (cum laude) and Bachelor of Social Work Degrees from the University of Limpopo. He also holds a Senior Certificate in Civic Leadership from Unisa. He is a Post-Doctoral Research fellow at the University of Free State. His areas of research interest are climate change, climate justice, environmental social work, risk and disaster reduction, climate change adaptation and mitigation, women and children's issues.

Happy Mathew Tirivangasi is a Political and environmental sociologist. He recently completed DST-NRF Centre of Excellence in Human Development Grant for project entitled: Evaluation of humanitarian response strategies in the aftermath of climate change induced disasters in Southern Africa. He holds MA in Sociology from UL and MSc in Governance and Development from University of Antwerp. Happy is affiliated to University of Limpopo and Jyväskylä as a Research Associate and PhD Researcher, respectively. Happy Mathew Tirivangasi is the corresponding author and can be contacted at: mathewtirivangasi@gmail.com

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