

# Rethinking indigenous climate governance through climate change and variability discourse by a Zimbabwean rural community

Shingirai Stanley Mugambiwa and Joseph Rudigi Rukema  
*Discipline of Sociology, University of KwaZulu-Natal College of Humanities,  
Durban, South Africa*

## Abstract

**Purpose** – The purpose of this paper is to assess indigenous climate governance through climate change and variability discourse by a rural Zimbabwean community. In Zimbabwe, climate governance has largely been presented from a political angle as indicated in the current climate governance structure. Apparently, the structure does not directly involve rural communities who at the same time suffer the most from the effects of climate change. Hence, the study intends to demonstrate that the manner in which humans perceive climate change influences their responses and actions vis-à-vis climate governance.

**Design/methodology/approach** – This qualitative study used 20 participants from a rural community in Zimbabwe. Their experiences were used as lances through which indigenous climate governance could be envisioned and executed. In-depth interviews were used to collect data and thematic content analysis was used to analyse data.

**Findings** – The study found that climate change perceptions and observations of weather conditions informs the community's decisions on how to adapt to the impacts of climate change vis-à-vis indigenous knowledge systems (IKS) climate governance. The study also proposed a paradigm shift from a Western-oriented climate governance structure that currently exists in Zimbabwe to an indigenous model through a proposed IKS governance structure. This was considered significant because of the fact that it closely accommodates the community based on their lifestyle.

**Originality/value** – The study proposes a paradigm shift from a Western-oriented climate governance structure that currently exist in Zimbabwe to an indigenous model through a proposed IKS governance structure. This is arrived at by assessing climate change perceptions, narratives and experiences by community members. This is of particular importance because a few scholars have explored climate governance via IKS.

**Keywords** Climate change, Indigenous knowledge systems, Climate governance, Mutoko district

**Paper type** Research paper

## Introduction

Rural communities have over the years been exposed to various hash climatic conditions that impact their livelihoods and daily activities. Such conditions include droughts and



floods as a result of erratic rainfall patterns. Hence, from the climate change perceptions, narratives and experiences expressed by community members, this paper proposes an indigenous knowledge-based climate governance structure. The reason for this is the limitations brought about by the governance structure that currently exists in Zimbabwe. [Dodman and Mitliin \(2015\)](#) present a politics-based climate governance structure that is not inclusive of rural communities that suffer the most from the impacts of climate change. The communities largely rely on a subsistence economy, i.e. they use rains to water their crops and practice water harvesting for further irrigation of their crops and they make use of natural grass as grazing fields for their domestic animals. Hence, in the event of drought or floods, their lives are highly impacted; furthermore, rural communities' perceptions of climate change are based on variations in temperature and rainfall patterns demonstrated by rising temperature trends and scarce rainfall ([Hachileka and Vaatainen, 2011](#); [Maponya and Mpandeli, 2013](#)).

A plethora of scholars define climate change perceptions as awareness of change in climatic conditions and their impacts on people's livelihoods ([Mazvimavi, 2010](#); [Simba \*et al.\*, 2012](#); [Rankoana, 2016](#)). It is important for communities to understand climate change because humans are responsible for the emissions and concentration of greenhouse gases in the atmosphere that cause climate change ([IPCC, 2007](#)). There is a need to investigate community perceptions of climate change for any adaptation and mitigation options to the impact of climate change to succeed ([Mazvimavi, 2010](#)). The knowledge of climate change perceptions of a society is important in dealing with the hazards caused by climate change. This is because it provides an insight into ways in which the problem is understood and encourages societies to take part in crafting solutions for their problems vis-à-vis indigenous climate governance. Such interventions have the potential to succeed because they have public support ([Simba \*et al.\*, 2012](#)). Furthermore, communities' perceptions of climate change are important because they can be used to produce an effective participatory methodology for climate change adaptation and resilience capacity building, which can be considered as indigenous climate governance.

## Background

Climate change is one of the most complex problems facing the globe today. Its impacts would significantly add to the development challenges of ensuring food security and poverty reduction in the developing world in general and in Zimbabwe in particular. Climate change has direct and profound effects on the environment, economy and health and safety of communities ([Global Humanitarian Forum \[GHF\], 2009](#)). Because most developing countries have agro-based economies, they are more vulnerable to climate change impacts compared to the developed world. Vulnerability is the inability to resist a hazard or to respond when a disaster has occurred. It depends on several factors such as people's age, state of health, local environmental and sanitary conditions with respect to any hazards ([Proag, 2014](#)). Statistics reveal that more than 2.8 billion people are physically vulnerable to climate change and 4 billion people are vulnerable to climate change and variability in socio-economic terms ([GHF, 2009](#)). The effects of climate change require global cooperation to provide possible solutions ([Grundmann, 2007](#)). There is a need for communities to understand the facts about climate change. Proponents of this view contend that the majority of members of the community fail to engage and cope with climate change because they lack basic knowledge of its causes, impacts and adaptation methods ([Lorenzoni \*et al.\*, 2007](#)).

Furthermore, [Moyo \*et al.\* \(2012\)](#) suggests that communities' perceptions of climate change are important in adaptation because they determine decisions in agricultural

planning and management by farmers vis-à-vis indigenous climate governance. This indicates that farmers' livelihoods, as well as decisions they make to adapt to the effects of climate change, are influenced by their perceptions of climate change and variability (Maddison, 2006). A number of studies have demonstrated that local communities in Africa are aware of devastating changes in their living conditions because of climate change (Mugambiwa and Tirivangasi, 2017; Chikosi *et al.*, 2018; Mugambiwa and Dzomonda, 2018). The changes include malnutrition, poverty, increased risks of disease, floods and depletion of biodiversity as a result of climate change, and environmental variability is largely believed to be either direct or indirect effects of climate change (Gandure *et al.*, 2011; IPCC, 2013; Mugambiwa, 2018). Perceptions of climate change by local communities differ based on particular communities' experiences. However, Rankoana (2016) is of the view that perceptions of climate change by local communities are based on variations in temperature and rainfall patterns. These variations are supported by observations and projections on climate alterations because of increased temperatures and erratic rainfall patterns by scientists around the world (Rankoana and Mothiba, 2015).

### **Climate governance and the Zimbabwean climate governance structure**

The national and local politics of climate governance in low and middle-income countries and cities are under-explored. Paradoxically, more focus is placed on technical solutions to support adaptation and resilience (Dodman and Mitlin, 2015). This is largely limiting inasmuch managing climate change adaptation is essential in rural communities. As such, unless critical decisions are made and implemented, climate change will not be addressed. Zimbabwe has faced numerous political, social, economic and environmental challenges over the years, and the intensity of these challenges motivate citizens to become actively engaged in addressing the consequences of climate change. The Initial Climate Change National Communication to the UNFCCC was made in 1998 and its Second National Communication was made in 2013. In 2016, a national climate change policy document was produced, and it did not say much about the use of indigenous knowledge systems (IKS) in climate governance.

The governance structure for climate change in Zimbabwe as presented by Dodman and Mitlin (2015) is composed of the following elements:

- National Climate Change Office, which is based in the Ministry of Environment and is funded by the UNDP. Its responsibility is engaging with UNFCCC and producing national communications.
- National Climate Change Task Team, which is coordinated by the Office of the President and Cabinet. It receives a small budget allocation from the central government. The members of the task team are the Permanent Secretaries from relevant ministries such as environment, water, agriculture and economic planning. This body is responsible for producing the National Climate Change Response Strategy such as the National Climate Change Plan.
- National Climate Change Steering Committee, which has a wider range of participants from government and civil society, and is intended to guide the production of the National Climate Change Response Strategy.

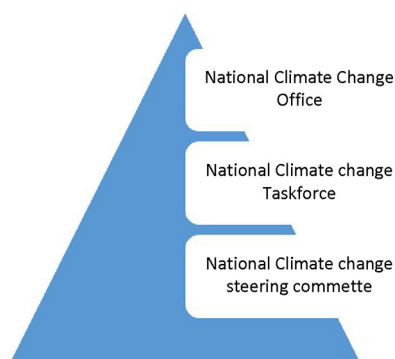
The main focus among scholars is the climate governance structure presented by Dodman and Mitlin (2015), which is entirely political and discriminatory of rural communities. However, this study presents the structure in a triangular form to explicitly portray its nature. Of particular importance is the fact that its effectiveness is questionable because all

levels are deemed “National”. This implies the structure does not involve citizens on the ground such as rural communities who work the land for their survival. [Figure 1](#) demonstrates the nature of the structure.

### Climate change perceptions in Africa

In a study that was conducted in 11 African countries, [Maddison \(2007\)](#) discovered that a significant number of farmers believed that temperatures had increased and that precipitation had declined. Communities in Africa understand and interpret climate change through their observations of weather conditions and their impacts on farming activities. In another study by [Gbetibouo \(2008\)](#) conducted in the Limpopo Basin of South Africa, a majority of farmers perceived climate change based on an observable increase in temperature and a decrease in rainfall over the past 20 years. In addition, “local perceptions and interpretations of climate change can be broad and diverse among communities and within different social groups” ([World Bank and UN/ISDR, 2007](#); p.13). Nevertheless, what is evident from these studies is that communities are observing changes, which in some cases are supported by historical rainfall and temperature data that confirms climate change. A study by [Ogalleh et al. \(2012\)](#) found that, in the Laikipia District of Kenya, climate change is perceived as the occurrence of severe droughts in several years and loss of livestock and crops, which resulted in food shortage and decrease in crop yields. Similarly, [Rankoana \(2016\)](#) found that, in the Mogalakwena community of South Africa, climate change is perceived as changes in temperature and rainfall patterns. The study found that there are observations of a drastic increase in temperature, which dates back to the 1970s, and are responsible for excessive hot and dry summer and wet winter. Moreover, in [Rankoana’s \(2016\)](#) study, climate change was perceived as persistent rainfall hazards such as a drought that resulted in the loss of livestock, soil erosion and depletion of biodiversity.

Furthermore, [Moyo et al. \(2012\)](#) asserted that, in Zimbabwe, communities perceive climate change based on how the weather has changed over the years. This indicates the state of weather conditions in the previous two or more decades and the changes that have been observed over the past few years. In the study, farmers used the term “poor season” to refer to any year with reduced crop production because of insufficient rainfall and other crop production constraints ([Moyo et al., 2012](#)). Another study by [Simba et al. \(2012\)](#) on farmer



**Note:** Adapted from Dodman and Mitlin (2015)

**Source:** Author

**Figure 1.**  
The political climate  
governance structure

perceptions on climate change and variability in semi-arid Zimbabwe found that perceptions of climate change are based on the livelihood impacts climate change has on communities, i.e. the social and economic impacts. This indicates that, in most Zimbabwean rural communities, climate change is perceived based on lack of sufficient rainfall, droughts and climate variability.

### Research methods

#### *Description of the study setting*

Figure 2 shows the map of Zimbabwe and the location of Mutoko district. Mutoko is a district in Mashonaland East Province, Zimbabwe. It is located in the eastern part of Zimbabwe, and it covers 4,092.5 square kilometres (Mvumi *et al.*, 1998). According to the 2012 population census, Mutoko has 146,127 people (Moyo, 2016). The area is dominantly occupied by the *Buja* people. The subsistence economy of Mutoko rural community is based on conservation farming, which makes use of natural environmental processes to conserve moisture, enhance soil fertility and improve soil structure, and to reduce soil erosion and the presence of diseases and pests. It does this in three main ways, namely, minimal soil disturbance, the retention of crop residues and crop rotation (Fanelli and Dumba, 2011). The most favourable crops in the area include maize, groundnuts, vegetables, sunflower, sorghum, cotton, pearl millet and finger millet. The reason for the dominance of such crops

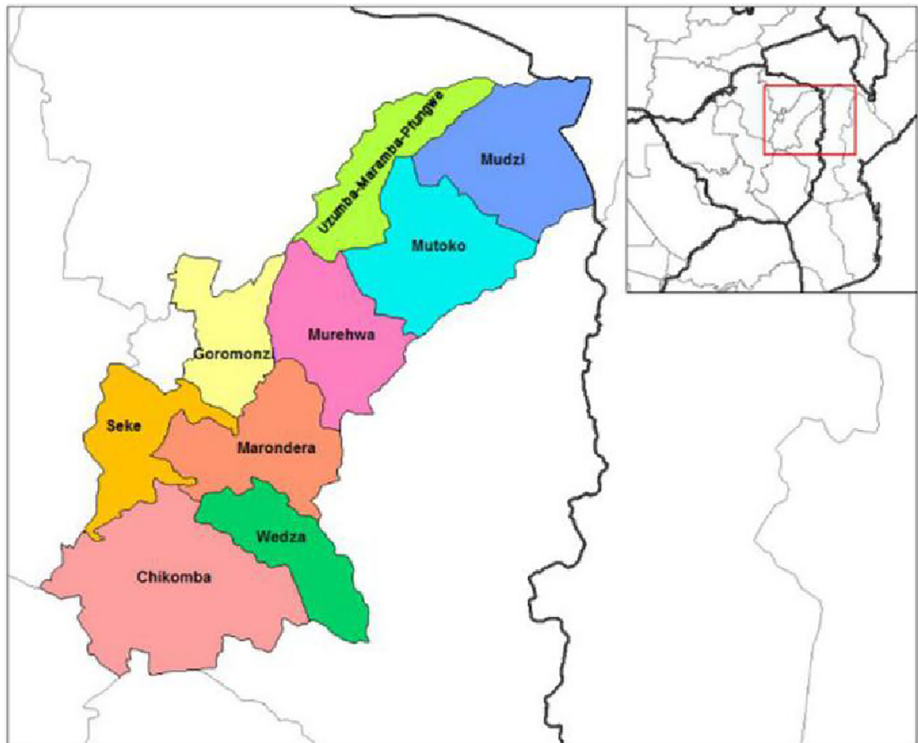


Figure 2.  
Map of Zimbabwe  
and location of  
Mutoko

Source: Zimbabwe Department of the Surveyor-General (2016)

---

in the area is because of the type of soils and climatic conditions. Vegetables are an important component in the farming systems of Mutoko, and almost 80 per cent of the households have vegetable gardens with an average of 0.3 ha. The most commonly grown vegetables include but are not limited to tomatoes, onion, green leafy vegetables, cabbage, beans, peas and cucumber (Mvumi *et al.*, 1998).

#### *Research methodology*

The study used a qualitative method and an exploratory research design. Hair *et al.* (2003) define exploratory research as research conducted to gain new insights and discover new ideas. Hence, a qualitative, exploratory study was designed to probe the perceptions and experiences of the community on issues pertaining to climate change and climate governance. The use of a qualitative research design enabled the researcher to interact with the study's participants. Data presented in this study are the results of a cross-sectional study conducted for a period of 30 days. The main focus of the cross-sectional inquiry was on land use, i.e. farming activities engaged by the participants who are directly affected by climate change. Twenty participants were randomly drawn from the community. Purposive sampling was used to select members of the study sample. Bryman (2012) points out that, in criterion purposive sampling, the sample units are selected because they have particular characteristics that will enhance the exploration and understanding of the aims and objectives of the study. To qualify for participation in the study, community members should have been either aged 50 years and above and/or had lived in the area for the previous 10 years or more. The reason for the age restriction was to engage people who were capable of giving a comparative explanation of climate change between the period they were young and the time data that was collected. Nevertheless, the age variable together with the longevity of stay in the area was important in selecting participants to become part of the study sample. However, identifying the particular characteristics was somehow difficult such that the researcher had to consider individuals who had a general understanding of climate change despite age or longevity of stay in the area.

#### *Data collection and analysis*

Data were collected using in-depth interviews and the variables considered were gender, age of respondents, period of stay in the area, education and occupation. To fully comprehend the perceptions of climate change by community members, a qualitative research method was used to collect data. Interviews were conducted with 20 community members in their own households. All participants spoke in Shona; consequently, the interviews were conducted in Shona and translated verbatim into English. Data were analysed through thematic content analysis (TCA). Braun and Clarke (2006) define TCA as a method used for identifying, analysing and reporting patterns in the data. TCA proceeds by breaking down the information collected into themes. The researcher identified trends and patterns that developed from the collected data. The patterns were then coded and classified into different categories that were used to analyse the perceptions of climate change in the community. Community members were coded as respondent one to thirty and no actual names were used.

#### **Findings**

##### *Envisioning climate governance through community experiences and perceptions of climate change*

Community members in this study perceived climate change as changes taking place in weather conditions over a long period of time. They narrated their experiences in relation to



climate change. The most common sentiments were that there is a lack of information and coordination on how to tackle the challenges they are facing as a result of climate change. It emerged that most of the time households come up with their own strategies to adapt to the effects of climate change. However, a majority of participants emphasised on the importance of Agricultural Technical and Extension Services (AGRITEX) officers who are deployed by the Ministry of Agriculture to assist farmers on how to effectively engage on their activities. The general consensus was that, because of a lack of resources, AGRITEX officers no longer frequent the communities and their visits are occasional. To that effect, the community's productivity is compromised; hence, this study points to that as a threat to good climate governance. This is due to the fact that the role of AGRITEX officers is considered integral to indigenous climate governance because they equip households with essential skills for their daily activities. It has also emerged from the findings that AGRITEX officers have frequently encouraged smallholder farmers to prioritise millet and sorghum instead of maize and other crops that consume more water. The argument for this suggestion was that the crops are drought-resistant. Interestingly, [Mugambiwa \(2018\)](#) claims that replacing maize with sorghum and millet among smallholder farmers is a practice that acknowledges and cherishes the traditional way of life of the Shona people because their ancestors used to exercise the same practice at the order of the spirit mediums in response to anticipated drought.

Furthermore, the perceptions of climate change by the community are immensely important in proposing an indigenous climate governance structure for the community. It has emerged that the community was not aware of what the term "climate change" meant, but they knew that there is a change in weather conditions. As such, during the interview process, the researcher described climate change in the Shona language as "*shanduko yemamiriro ekunze*", which can be loosely translated as changes in weather conditions. Most respondents acknowledged that there were numerous changes that they were noticed in weather conditions over the years, and the changes signify a shift from weather conditions they observed in the past. Apart from understanding the changes occurring, the community has also emphasised that there is a need for the local leadership to equip them with knowledge on how to deal with the changes they are currently witnessing. The argument was that the chief should organise for community engagements where the community share ideas on how to deal with the effects of climate change. One respondent indicated:

We have witnessed that there are numerous changes occurring in weather conditions. We used to receive rain around mid-October but in recent years the first rains come around mid-December and are experiencing extremely hot temperatures as compared to the last fifty years or so. This is a serious challenge that if not addressed, it will seriously damage the lives of many people in this community. I suggest that community engagements with the guidance of the chief and the local leadership will significantly help in addressing the challenges we are currently facing.

[Occupation: Farmer, Age: 68, Gender: Male]

The sentiments by the participant suggest a strong element of indigenous climate governance. The process of climate governance begins with decision-making and consensus for a common good among members of the community. Sharing ideas as a community will significantly help households in many ways. For instance, one respondent emphasised that the rains they receive in recent times are not sufficient enough for them to grow their crops because of the subsequent shift in rain patterns to the effect that in some seasons the rains are more and in others they are less. Lack of sufficient rains for crops is a challenge that could be addressed by a community that works together to find solutions to their challenges.

This is because if the rains are not sufficient, the other alternative available is the use of water harvesting for irrigation. Water harvesting is not a process that can be executed by an individual. Rather, it requires a community to come together and identify streams and rivers they could use in water harvesting. Also, doing this as a community is important because the process requires manpower and the community will provide it.

Moreover, the other challenge that the community echoed is the dying of crops before harvesting because of extreme heat. The study also found that, in the 1980s, the community used to receive sufficient rainfall; however, starting from the early 1990s, the amount of rain they received began to reduce. However, from around 1992 to this day, rainfall is not predictable anymore. This implies that the community also perceived climate change based on the shift in rainfall patterns and temperatures and its effects. Comparative explanation of weather conditions by the community substantiated the community's perception of climate change as the occurrence of a shift in temperature and rainfall patterns. To that effect, one of the participants indicated that:

The changes we are witnessing in seasons are immensely visible in the sense that long back we used to receive more rains and reap more harvest but nowadays the rains are unpredictable sometimes our crops die from heat because of lack of sufficient rains.

[Age: 70; Gender: Male; Occupation: Farmer]

Despite the fact that the participant did not suggest any way in which these issues could be dealt with, this study proposes extensive involvement of the Village Development Committee (VIDCO), Ward Development Committee (WADCO) and the Rural District Development Committee. These are committees made up of people who are directly involved in the day-to-day activities of the community. The argument is that the government should equip the committees with knowledge and skills to deal with issues pertaining to climate change adaptation and resilience. This is better off compared to the current climate governance structure, which is significantly lacking in the involvement of people on the ground, as indicated earlier in this paper.

#### *Climate change adaptation as a component of climate governance*

The study's results revealed that the manner in which the community perceives climate change is instrumental in their crafting of adaptation strategies vis-à-vis indigenous climate governance. Most respondents indicated that because of variations in temperature and rainfall patterns that they now frequently experience, they have used various strategies to adapt to the effects of climate change in farming and other daily activities. These strategies include what they call "mujogo" in their local language. "Mujogo" (traditional mulching) is a process whereby they dig holes for their crops and when they drop the seed it will be covered with dry grass and water to fast-track the growing process of the plant. This activity is common in the community to show that it has been communicated and developed by the community as it is unique to them. A process close to this is crop residue mulching, which Erenstein (2002) described as a process whereby, at the time of crop emergence, at least 30 per cent of the soil surface is covered by the organic residue of the previous crop.

The community also makes good use of riverside wells to sustain their crops. The other strategy that the community uses is tilling of the land before rainfall in preparation of agricultural activities. Apart from tilling the land before the rainfalls, the community also stores water for agricultural purposes by building temporary walls around riverbanks so that when the river dries up they will sustain their crops through irrigation from river bank



wells. Generally, the respondents demonstrated that even though climate change has numerous impacts on their livelihoods, they equally have workable strategies such as crop rotation, crop change from growing maize to sorghum and millet and water harvesting. All these strategies are unique and efficient since they have been communicated and developed by community members over time. Hence, they can be considered to be indigenous practices that the community embarks on to adapt to the effects of climate change. In that regard, the manner in which the processes are conducted constitutes climate governance.

*Proposed indigenous knowledge systems climate governance structure*

Based on the experiences and perceptions presented by the study's participants, this study proposes an IKS climate governance structure. The structure has the local community as central to the process of climate governance. This suggests that all processes and activities evolve from the community and are aimed at developing and improving adaptation strategies for the community. Decision-making should begin in the community with the guidance of the local chief and other relevant stakeholders such as local headmen "Sabhuku." The community is also central because they understand the nature of challenges they are facing better; as such, they are in a better position to provide solutions that are efficient and effective. WADCOS and VIDCOs are committees of individuals from the community, and AGRITEX officers are individuals deployed by the Ministry of Agriculture to assist smallholder farmers in rural communities. Hence, the collective involvement of these individuals is essential to climate governance; consequently, for successful indigenous climate governance, the local chief, AGRITEX officers and VIDCO/WADCO should work closely with the community in decision-making and all other activities and processes related to climate change adaptation, mitigation and resilience vis-à-vis IKS climate governance. Figure 3 is an illustration of the proposed IKS climate governance structure.

**Discussion**

The current study found that Mutoko community members perceive climate change in numerous ways such as climate variability, unpredictable rainfall and temperature variations. Perceptions of climate change by local people are based on practice, experience and observations, as well as assists farmers to make informed decisions about how to



**Figure 3.**  
Proposed IKS climate  
governance structure

**Source:** Author

respond to environmental changes (Chambers, 1983; Newsham and Thomas, 2011). The process of decision-making by farmers has been considered to be an integral element of IKS climate governance. Moreover, the perceptions are validated by projections on climate alterations via temperature variations and erratic rainfall patterns by scientists worldwide (Maponya and Mpandeli, 2012). Erratic rainfall patterns and temperature variations are of paramount importance for providing a comparative explanation of the changes communities in Mutoko have experienced in weather conditions over the years. These are aspects that communities regularly witness; as a result, they perceive climate change on the basis of such changes. Consequently, in the event that there are changes, anyone would be quick to notice. In that regard, almost all community members in the study concurred that there is a shift in weather conditions.

The study's results reveal that the community used to receive first rains around the end of October, and the rains were sufficient enough for them to grow their crops but now they no longer receive large amounts of rainfall. Kotir (2011) asserts that changes in rainfall amount and patterns have severe effects on soil such that it increases erosion rates and soil moisture, both of which are important for crop yields. Perceptions of climate change as demonstrated by community members in the current study are in line with a study conducted by Niles and Mueller (2016) in the regions of Marlborough and Hawke's Bay in New Zealand where the majority of farmers believed that summer temperatures had increased. Climate governance through IKS is prevalent on the African continent as indicated in a study by Nkomwaa *et al.* (2014) on IKS and climate change adaptation strategies in agriculture in Malawi where communities use indigenous practices to adapt to the effects of climate change.

Furthermore, climate variability was perceived as a shift in rain patterns, which had observable impacts on community activities. Hence, variability is a fundamental part of climate change in that a change in mean climatic conditions is experienced through changes in the nature of particular yearly conditions (Smit *et al.*, 2000). In the current study, low rainfall and extremely hot weather conditions were considered as indicators of the shift in weather conditions, i.e. variations in temperatures and rainfall patterns. Respondents articulated that there is a huge difference in climate between now and the past 50 years. It has been established that the change is not merely in rainfall patterns but also in temperature variations. These results are in line with the findings of a study by Nkomwaa *et al.* (2014) whereby villages in Malawi testified that the changes they notice now in rainfall patterns and temperature variations were not evident in the previous years and such changes greatly affect their agricultural practices. Ziervogel *et al.* (2014) assert that significant changes in temperature patterns were reported from around 1960-2009; during that period, the mean annual temperature increased by 1.5 times the global average of 0.5°C over the previous five decades.

Moreover, respondents provided strategies used to adapt to climate change effects that are essential in IKS climate governance. These strategies include mulching, tilling the land before the first rains and creating temporary walls on river banks, which were used to adapt to what the community perceived as climate change. Gyampoh *et al.* (2014) observed that rural communities vulnerable to climate change have strong coping capacities because the changes they regularly experience in weather conditions make them devise numerous strategies to cope with the effects of climate change. Adapting to drought, scarcity of rain decreased the production of crops is accomplished through community-based measures to sustain human livelihoods. The results from a current study on adaptation strategies were quite diverse against a background of Eignenauer (2004) who asserts that scientists and planners often emphasise on the extrapolation from one set of adaptation practices rather

than take lessons from the variability and diversity of farmers' coping and adaptation practices.

### Concluding remarks

In conclusion, this study presented IKS climate governance as the best alternative for rural communities because they are not directly involved in the governance structure that was presented by [Dodman and Mitlin \(2015\)](#). In this study, climate change is largely perceived based on observations of variations in temperature, rainfall patterns and changes in many other observable weather conditions over the years. These observations and experiences have been used as indicators of the community's knowledge of climate change. Therefore, the involvement of the community is considered essential because it broadens the platform of decision-making on critical issues pertaining to climate change. The community should be involved through dialog with all stakeholders so that they get to understand the real challenge the community faces pertaining to climate change. Close involvement of relevant stakeholders, such as VIDCOs and WADCOs, is regarded to be of paramount importance. Consequently, it is apparent that IKS climate governance is centred on the local community because all the stakeholders considered are directly involved in the day-to-day activities of the community.

### Recommendations

Based on the results of this study, the researcher recommends that knowledge of climate change should be extensively disseminated in rural communities. This is because most of the people in rural communities might be informed about climate change; however, not all of them are knowledgeable about its possible effects. Moreover, the way in which communities perceive climate change is not always scientifically correct. The dissemination of climate change knowledge would correct misconceptions on climate change and help in providing sustainable mitigation strategies.

### References

- Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101.
- Bryman, A. (2012), *Social Science Research Methods*, 4th ed., Oxford University Press, Oxford.
- Chambers, R. (1983), *Rural Development: Putting the Last First*, Longman, Essex.
- Chikosi, E.S., Mugambiwa, S.S., Tirivangasi, H.M. and Rankoana, S.A. (2018), "Climate change and variability perceptions in Ga-Dikgale community in Limpopo province, South Africa", *International Journal of Climate Change Strategies and Management*, available at: <https://doi.org/10.1108/IJCCSM-01-2018-0004>
- Dodman, D. and Mitlin, D. (2015), "The national and local politics of climate change adaptation in Zimbabwe", *Climate and Development*, Vol. 7 No. 3, pp. 223-234, doi: [10.1080/17565529.2014.934777](https://doi.org/10.1080/17565529.2014.934777).
- Eignenauer, J.D. (2004), *Summary of Seeing like a State*, Yale, Bakersfield, CA.
- Erenstein, O. (2002), "Crop residue mulching in tropical and semi-tropical countries: an evaluation of residue availability and other technological implications", *Soil and Tillage Research*, Vol. 67, pp. 115-133.
- Fanelli, C.W. and Dumba, L. (2011), "Conservation farming in rural Zimbabwe", *Agricultures*, available at: [www.agriculturesnetwork.org/](http://www.agriculturesnetwork.org/) (accessed 24 May 2016).

- Gandure, S., Walker, S. and Botha, J.J. (2011), "Farmers' perceptions of adaptation to climate change and water stress in a South African rural community", *Environmental Development*, available at: <http://dx.doi.org/10.1016/j.endev.2012.11.004> (accessed 9 April 2015).
- Gbetibouo, G.A. (2008), "Understanding farmer's perceptions and adaptation to climate change and variability: the case of Limpopo basin, South Africa. Policy brief 15-8", *Environment and Technology Policy Division*, International Food Policy Research Institute (IFPRI).
- Global Humanitarian Forum (2009), "Human Impact Report 2009", available at: [www.ghf-ge.org/human-impact-report.pdf](http://www.ghf-ge.org/human-impact-report.pdf) (accessed 28 June 2017).
- Grundmann, R. (2007), "Climate change and knowledge politics", *Environmental Politics*, Vol. 16 No. 3, pp. 414-432.
- Gyampoh, B.A., Amisah, S., Idinoba, M. and Nkem, J. (2014), "Using traditional knowledge to cope with climate change in rural Ghana", in *Proceedings, Third International Conference on Climate and Water, Helsinki, Finland, Finnish Environment Institute (SYKE)*, pp. 205-213.
- Hachileka, E. and Vaatainen, S. (2011), *Climate Change Coping and Adaptation Strategies: Case of Chiawa Community in Zambezi, Zambia*; Solitaire Press, Windhoek, Namibia.
- Hair, B., Babin, B.J., Money, A.H. and Samouel, P. (2003), *Essentials of Business Research*, Wiley, New York, NY.
- IPCC (2007), *Climate change 2007: The physical science basis. Contribution of working group to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M., Miller, H.L. (Eds). Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, New York, NY.
- IPCC (2013), *Climate change 2013: Impacts, adaptation and vulnerability. Contribution of working group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hansson, C.E. (Eds). Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, New York, NY.
- Kotir, J.H. (2011), "Climate change and variability in Sub-Saharan Africa: a review of current and future trends and impacts on agriculture and food security", *Environment, Development and Sustainability*, Vol. 13 No. 3, pp. 587-605.
- Lorenzoni, I., Nicholson-Cole, S. and Whitmarsh, L. (2007), "Barriers perceived to engaging with climate change among the UK public and their policy implications", *Environmental Change*, Vol. 17 Nos 3/4, pp. 445-459.
- Maddison, D. (2006), "The perception of and adaptation to climate change in Africa", CEEPA Discussion Paper No. 10. Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa, p. 47.
- Maddison, D. (2007), "The perception of and adaptation to climate change in Africa", Policy Research Working Paper 4308. The World Bank.
- Maponya, P. and Mpandeli, S. (2013), "Perceptions of farmers on climate change and adaptation in Limpopo province of South Africa", *Journal of Human Ecology*, Vol. 42 No. 3, pp. 283-288.
- Maponya, P. and Mpandeli, S. (2012), "Climate change and agricultural production in South Africa: impacts and adaptation options", *Journal of Agricultural Science*, Vol. 4 No. 10.
- Mazvimavi, D. (2010), "Climate change, water availability and supply", *SARUA Leadership Dialogue Series*, Vol. 2, pp. 81-89.
- Moyo, A. (2016), "Dry times in Mutoko district", *The Sunday Mail*. 6 March 2016, available at: [www.sundaymail.co.zw/](http://www.sundaymail.co.zw/) (accessed 24 May 2016).

- Moyo, M., Mvumi, B.M., Kunzekweguta, M., Mazvimavi, K., Craufurd, P. and Dorward, P. (2012), "Farmer perceptions on climate change and variability in semi-arid Zimbabwe in relation to climatology evidence", *African Crop Science Journal*, Vol. 20 No. 2, pp. 317-335.
- Mugambiwa, S.S. and Dzomonda, O. (2018), "Climate change and vulnerability discourse by students at a South African university", *Jamba: Journal of Disaster Risk Studies*, Vol. 10 No. 1, p. a476.
- Mugambiwa, S.S. and Tirivangasi, H.M. (2017), "Climate change: a threat towards achieving 'sustainable development goal number two' (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) in South Africa", *Jamba: Journal of Disaster Risk Studies*, Vol. 9 No. 1, p. a350, available at: <https://doi.org/10.4102/jamba.v9i1.350>
- Mugambiwa, S.S. (2018), "Adaptation measures to sustain indigenous practices and the use of indigenous knowledge systems to adapt to climate change in Mutoko rural district of Zimbabwe", *Jamba: Journal of Disaster Risk Studies*, Vol. 10 No. 1, p. a388, available at: <https://doi.org/10.4102/jamba.v10i1.388>
- Mvumi, B., Donaldson, T. and Mhunduru, J. (1998), "A Report on Baseline Data Available for Mutoko District, Mashonaland East Province", University of Zimbabwe, Harare.
- Newsham, A.J. and Thomas, D.S.G. (2011), "Knowing, farming and climate change adaptation in North-Central Namibia", *Global Environmental Change*, Vol. 21 No. 2, pp. 761-770.
- Niles, M.T. and Mueller, N.D. (2016), "Farmer perceptions of climate change: associations with observed temperature and precipitation trends, irrigation, and climate beliefs", *Global Environmental Change*, Vol. 39, pp. 133-142.
- Nkomwaa, E.C., Joshua, M.K., Ngongondo, C., Monjerezi, M. and Chipungu, F. (2014), "Assessing indigenous knowledge systems and climate change adaptation strategies in agriculture: a case study of Chagaka Village, Chikhwawa, Southern Malawi", *Physics and Chemistry of the Earth*, Vol. 69, pp. 164-172.
- Ogalleh, S.A., Vogl, C.R., Eitzinger, J. and Hauser, M. (2012), "Local perceptions and responses to climate change and variability: the case of Laikipia District, Kenya", *Sustainability*, Vol. 4 No. 12, pp. 3302-3325, doi: [10.3390/su4123302](https://doi.org/10.3390/su4123302).
- Proag, V. (2014), "The concept of vulnerability and resilience", *4th International Conference on Building Resilience, Building Resilience, 8-10 September 2014, Salford Quays*.
- Rankoana, S.A. (2016), "Perceptions of climate change and the potential for adaptation in a rural community in Limpopo province, South Africa", *Sustainability*, Vol. 8 No. 8, pp. 672, doi: [10.3390/su8080672](https://doi.org/10.3390/su8080672).
- Rankoana, S.A. and Mothiba, T.M. (2015), "Perceptions on climate change and its effects on the health conditions of mogalakwena community members in Limpopo province, South Africa", *Journal for Physical, Health Education, Recreation and Dance*, pp. 244-254. Supplement 1:1 (October).
- Simba, F.M., Chikodzi, D. and Murwendo, T. (2012), "Climate change scenarios, perceptions and crop production: a case study of Semi-Arid Masvingo province in Zimbabwe", *Journal of Earth Science and Climate Change*, Vol. 3 No. 124, doi: [10.4172/2157-7617.1000124](https://doi.org/10.4172/2157-7617.1000124).
- Smit, B., Burton, I., Klein, R.J.T. and Wandel, J. (2000), "An anatomy of adaptation to climate change and variability", *Climatic Change*, Vol. 45 No. 1, pp. 223-251.
- World Bank and UN/ISDR (2007), Report on the Status of Disaster Risk Reduction in the SubSaharan Africa (SSA) Region. World Bank and United Nations International Strategy for Disaster Reduction, available at: [www.unisdr.org/partner-netw/wb-isdr/wb-isdr](http://www.unisdr.org/partner-netw/wb-isdr/wb-isdr) (accessed 19 March 2016).
- Ziervogel, G., New, M. and Van Garderen, A.M. (2014), "Climate change impacts and adaptation in South Africa", *Wiley Interdisciplinary Reviews: Climate Change*, Vol. 5 No. 5, pp. 605-620.
- Zimbabwe Department of the Surveyor-General (2016), available at: <http://trove.nla.gov.au/people/1253984?c=people> (accessed 5 July 2017).

**Further reading**

Feldman, R.S. (1999), *Understanding Psychology*, 5th ed., McGraw Hill.

Fowler, R. and Rockstrom, J. (2001), "Conservation tillage for sustainable agriculture an agrarian revolution gathers momentum in Africa", *Soil and Tillage Research*, Vol. 61 Nos 1/2, pp. 92-107.

Jerie, S. and Ndabaningi, T. (2011), "The impact of rainfall variability on rainfed tobacco in Manicaland province of Zimbabwe", *Journal of Sustainable Development in Africa*, Vol. 12 No. 1, pp. 132-143.

Weingart, P., Engels, A. and Pansegrau, P. (2000), "Risks of communication: discourses on climate change in science, politics and the mass media", *Public Understanding of Science*, Vol. 9 No. 3, pp. 261-183.

**Corresponding author**

Shingirai Stanley Mugambiwa can be contacted at: [mugambiwashingirai@gmail.com](mailto:mugambiwashingirai@gmail.com)