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## Environmental Education (EE) efforts in a rural drought-prone district in Zimbabwe: Micro innovations with growth potential

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### Abstract

*In Sub-Saharan Africa, climate change is evident due to the frequency of drought cycles. This paper explores the Environmental Education (EE) efforts for reducing the impact of climate change in drought prone Gwanda district, Zimbabwe. The paper focuses on how climate change mitigation and adaptation stakeholders within the community can initiate EE programs which have the potential to be upscaled to macro innovations. A qualitative interpretive case study approach was used with three data generation tools (interviews, a focus group discussion and document analysis). The sample comprised 38 participants. The study was guided by the Sustainable Rural Livelihoods Framework (1998). The study revealed that for EE programmes to be effective, they have to harness local factors. The study found that formal field days, information and skills sharing among neighbours during letsema/lidaba and Indigenous Knowledge Systems were micro innovations with growth potential to build farmers' generative resilience to climate change.*

**Keywords:** Environmental education; climate action; climate change mitigation; climate change adaptation; climate change; drought



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## Introduction

Climate change mitigation and adaptation in Zimbabwe can reportedly be traced back to three decades ago, particularly in 1992, when the country experienced major developments in implementing climate change initiatives after signing and ratifying the United Nations Framework Convention on Climate Change (UNFCCC) (United Nations Development Programme, 2018). However, it is argued that climate change continues to negatively affect the nation, despite climate action developments experienced some decades ago (Chanza & Gundu-Jakarasi, 2020). Farmers in rural Zimbabwe who are dependent on largely rain-fed agricultural production are vulnerable to droughts associated with climate change (Dube, 2015; Ndlovu et al., 2020; Phiri et al., 2019). This research explores Environmental Education (EE) efforts against the backdrop of climate change, that seek to advance solutions to low adaptive capacity. This was the first case study to explore environmental education efforts in climate change mitigation and adaptation in Gwanda rural district, Zimbabwe. Gwanda district was

chosen as a case study because it is an arid region of Zimbabwe severely affected by droughts exacerbated by climate change (Dube et al., 2018; Ndlovu et al., 2020).

This study itself examined the role of EE in improving mitigation and adaptation efforts to climate change in communities of Gwanda rural district. A study undertaken in Zimbabwe, that had a similar focus to this current study, was carried out by Makoni in 2013 and it focused on EE in secondary schools. However, the study mainly focused on EE in the school curriculum, and there is thus a research gap both globally and nationally regarding EE efforts in rural communities. Furthermore, a better understanding of the micro innovations for climate action with growth potential is significant to inform policies and planning meant to promote sustainability in the agricultural sector. We acknowledge that communal farmers are better positioned to implement climate change mitigation and adaptation strategies. The case study approach allows for a holistic consideration in the local management of the complex issue of mitigating and adapting to climate change. It also provides information about how these

experiences may assist in supporting other rural communities in their mitigation and adaptation to climate change. Thus, this paper has the capacity to provide insights for future and current EE efforts to enhance climate change mitigation and adaptation strategies. The research findings could assist in the design and implementation of effective EE in promoting community resilience to the effects of climate change.

### **Environmental education efforts in Sub-Saharan Africa**

The governments and non-governmental organisations (NGOs) employ many EE initiatives in Sub-Saharan Africa (SSA) to address the negative impacts of climate change. We discuss these EE initiatives under three headings: environmental education projects, education curriculum, and non-formal education at home.

#### *a) Environmental education projects*

South Africa has been a trailblazer and South African EE dates back to the 1970s when the Wildlife Environment Society of Southern Africa (WESSA)

launched the Umgeni Valley Project in Natal in 1973 (Mukute et al., 2012). The project's goal was to create teaching materials for EE in the country and to promote climate action collaboration between the formal and non-formal education sectors. Many organizations have started EE projects over the years. The National Environmental Awareness Council (NEAC), for example, includes teachers, children, and youth in its annual EE programmes. Furthermore, a decade later, in 1982, the South African government went a step further by hosting the first international congress at Mooi River (Bryan et al., 2009; Palmer, 1998).

Furthermore, the South African government promotes EE through the implementation of the Eco-Schools programme (Ontong & Le Grange, 2015). The Eco-Schools Programme is a global Foundation for Environmental Education (FEE) programme that operates in 54 countries. It was launched in South Africa in 2003, with the Wildlife and Environment Society of South Africa (WESSA) chosen as the primary implementer. South Africa is Sub-Saharan Africa's most industrialized country and it plays an important role in promoting EE to mitigate and adapt to climate change

(Dube et al., 2016; Dube & Phiri, 2013).

Similarly, many programmes in Mozambique have spearheaded EE. It is reported that the major environmental priorities in Mozambique concern local and institutional aspects such as EE, legal compliance, and institutional capacity development. Community leaders collaborate in the sustainable use of the environment by working on a variety of EE tasks such as mobilizing communities on issues like sanitation, forest fire prevention, and local conflict resolution (Stringer et al., 2014). The government of Mozambique established national programmes for addressing environmental issues to reduce the adverse effects of climate change (McSweeney et al., 2015).

### *b) Education sharing platforms*

According to Lotz-Sisitka (2010), in recent years, environmental awareness has been perceived as the core of sustainable development in rural South Africa. According to the Department of Environmental Affairs (DEA) (2018), the South African government is promoting knowledge-

sharing platforms in rural areas and it is committed to continuing to support community-based organizations, academia, NGOs, the business community, and civil society organizations that provide platforms for the exchange of ideas and knowledge in order to build climate resilience in rural areas. This encourages learning from the experiences of rural communities through local collaborations with NGOs, academia, the business community, and civil society organizations to aid in climate change adaptation. However, the level of participation continues to be a source of concern. The current issue is that, while there is more global environmental awareness, there is still a lack of participation at the local level. Most likely, there is a lack of evaluation, in which people do not fully comprehend the benefits of investing time and resources in EE. According to Mukute and Pesanayi (2014), the South African education system has not fully recovered from its discriminatory apartheid past. In comparison to urban schools, most rural schools are under-resourced.

In Botswana, the government's climate change education responses include social media platforms such as

the Botswana Climate Change Network's Facebook page and the Twitter platform, [twitter.com/BCC-Network](https://twitter.com/BCC-Network). It is reported that the radio and television programmes discuss how communities can respond to immediate risks such as cyclones and droughts, which are common weather hazards caused by climate change (Crawford, 2016; Mugari et al., 2020).

### *c) Educational curriculum*

Sub-Saharan African governments share a vision of creating an environmentally educated nation (Mukute & Pesanayi, 2014). Efforts have been made at all levels of education to incorporate EE into the entire curriculum. Teachers in Botswana have been trained to teach EE in their schools since 1996, and this training has been done through in-service workshops. Furthermore, the government of Botswana implemented a Revised National Policy on Education (RNPE) in 1994, which mandated the incorporation of EE into the entire curriculum, and teachers were required to teach the concept of EE across the curriculum (Ketlhoilwe, 2007). EE has been incorporated into Mozambique's national curricula, and the primary

environmental priorities in Mozambique are with the rural population, whose livelihoods are solely dependent on the exploitation of natural resources. The EE curriculum contains the guidelines of natural resources exploitation. Environmental laws are taught to students in schools and colleges in order to combat environmental issues such as climate change and land degradation.

### *d) Non-formal education in homes*

South African municipalities identify individuals and communities within their communal areas that are more vulnerable to climate change and deliver targeted climate change vulnerability reduction programmes to these individuals and communities (Roberts, 2008; Smith, 2013). These programmes aid in the development of knowledge and capacity for climate-resilient rural livelihoods. Communities in these areas also require EE empowerment to understand the consequences of continued wood use. By the time the solar power system programme is implemented in the region, households will be able to transition smoothly away from the use of wood.

South African households are embarking on a variety of EE initiatives in order to adapt to climate change. Children at home share with their parents the information they learn in school such as phasing out inefficient appliances and the importance of taking public transportation instead of driving a private vehicle (Ontong & Le Grange, 2015). Farming, gardening, and cleaning responsibilities at home provide children with direct experiences with environments that foster positive feelings and attitudes toward the environment. Thus, sustainable practices performed by children at home, such as gardening, composting, mulching, and soil erosion mitigation, aid in the acquisition of EE. Children also perform indoor practices in their homes that promote EE and eventually they become environmental stewards. For instance, children are engaged in energy efficiency practices, waste recycling, and waste reduction, which help them learn about the important habits of environmental protection (Maponya et al., 2013; Ndlovu, 2016).

Across the border, in Botswana, children at home share with their parents the knowledge they gain from school about the importance of

replacing inefficient appliances with public transportation rather than private vehicles (Ketilhoilwe & Silo, 2016; Silo & Mswela, 2015). Children's farm, gardening, and cleaning responsibilities at home expose them to environments in a way that enhances the acquisition of EE (Ketilhoilwe, 2007; Silo & Sinvula, 2018). For example, children are involved in energy efficiency practices, waste recycling, and waste reduction, which helps them learn about the important habits of environmental protection.

Households in Mozambique are also undertaking a variety of EE initiatives, in order to adapt to climate change. Informal climate change education is passed down from generation to generation as households engage in activities that reduce poverty, diversify food security, build resilience to climate and market fluctuations, and promote improved technologies. Children have access to EE at home, as well as farm activities that provide practical learning experiences for climate change mitigation and adaptation. Conservation agriculture is a component of Mozambique's agricultural and socio-economic development, at the household level in

rural areas, and it provides opportunities for EE teaching (Nkala et al., 2011). As a result, involving children in household farming and gardening activities promotes the transmission of EE from parents to children.

A theoretical framework to understand EE initiatives in the study area is presented in the following section.

### Sustainable Rural Livelihoods Framework (SRLF) as the theoretical framework

SRLF, as theorised in Carney’s SRLF (1998), assists to understand micro innovations for sustainable livelihoods in Gwanda district. Thus, this study used a holistic and people-centred approach called Sustainable Rural Livelihoods (SRL). According to the British government’s Department for

International Development (DFID) (1999), SRL is an analytical tool used to improve livelihoods, particularly the livelihoods of needy individuals and communities. Carney (1998) states that the SRLF was developed by the Sustainable Rural Livelihoods Advisory Committee to promote sustainable livelihoods and it serves as a relevant analytical tool as it explores how EE can promote climate change mitigation and adaptation. It is inherently responsive to people’s interpretations of and priorities for their livelihoods in their communities. Figure 1 shows the SRL framework developed by Carney (1998).

Figure 1 below illustrates the framework provided by Carney which comprises three main components: the vulnerability context, the livelihood assets, and transforming structures and processes. These three main components influence livelihood

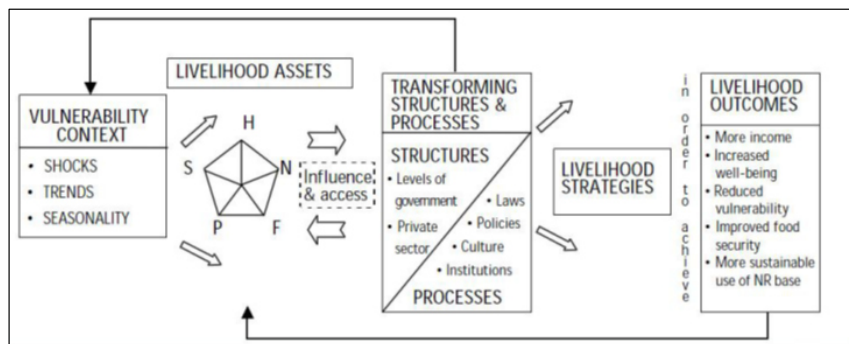


Figure 1: Sustainable Rural Livelihoods (Carney, 1998).

strategies that eventually lead to livelihood outcomes. Thus, the framework serves as the best analytical tool for the study, which aims to explore micro innovations with growth potential.

### **Research design and methodology**

The study entailed qualitative research methods as it was positioned within the interpretive paradigm, since the study is on EE in climate change mitigation and adaptation. The research instruments included semi-structured interviews and focus group discussions with key informants: EMA officers, AGRITEX officers, and community members. Document analysis was also used in addition to interviews and focus groups. Convenience and purposive sampling were used to access the key participants.

### **Research paradigm**

The research paradigm employed in this research is the interpretive paradigm, because we were keen to access and explore the emotions, experiences, and views of farmers, AGRITEX, and EMA officers in Gwanda rural district by identifying

and understanding the micro innovations with growth potential for climate change mitigation and adaptation.

### **Case study**

We used an explanatory case study to identify and explore micro innovations with growth potential. This type of case study involves specific research on a certain topic mining for deep understanding (Elper, 2019; Singh, 2017). Thus, the explanatory case study allowed for a detailed understanding of the micro–EE efforts in climate change mitigation and adaptation.

### **Sampling**

The study employed both convenience and purposive sampling in the following way: the study participants were specifically communal farmers and AGRITEX and EMA officers of Gwanda; convenience sampling was used to choose the communal farmers from wards 12 and 16 in Gwanda rural district located along the main roads for easy accessibility. The critical objective of convenience sampling is to generate data from research participants who are “easily accessible



to the researcher” (Etikan, 2016: 2). Furthermore, it is reported that even though convenience sampling may conclude generalisations, the information retrieved could nonetheless be of value.

Leedy and Ormond (2010) aver that a purposive sampling technique ensures that participants with desired information about the topic are selected. Silverman (2010: 148) explains that “Purposive sampling allows us to choose a case because it illustrates some features or processes in which we are interested”. Within Gwanda rural district, we purposively selected two wards, 12 and 16. These wards were chosen because they are located in the southern part of Gwanda rural district, experiencing severe drought conditions. In addition, the two wards were suitable for the phenomenon under study because they are under the spotlight of NGOs such as World Vision and Care in addressing adverse impacts of climate. Therefore, as revealed in Simuchimba and Luangala (2007: 11), “in purposive sampling rich information rather than the number of participants is important”. Therefore, the AGRITEX and EMA officers can be argued to be well-informed participants in terms of the successes

and challenges of EE efforts on climate change mitigation and adaptation amongst the communities in Gwanda rural district.

## Research findings

The findings are based on the four themes that emerged during the analysis of the data generated during the interviews and focus group discussion with community members, namely:

- Formal field days organised by AGRITEX officers
- Information and skills sharing amongst neighbours during *letsema/lidaba* (voluntary work on behalf of other families)
- Indigenous Knowledge Systems (IKS) through taboos and traditional practices
- Kinship Learning from neighbours

### *Theme 1: Formal field days and meetings organised by AGRITEX officers*

The participants indicated that they conduct field days and meetings in wards 12 and 16, Gwanda rural district. During field trips, farmers mainly share information on climate

change's adverse impacts and strategies for mitigation and adaptation. They consider field trips as one of the most effective EE initiatives:

*In our district, we have realised some effective environmental education efforts that work best for us, and we are strongly encouraging all people to embrace these environmental education efforts. One of the most effective efforts is field days, and we strongly encourage people to partake in these programs so that they can have an opportunity to learn and share experiences (Tlou A1).*

During field trips and meetings, productive farmers are used as resource persons to share their strategies to cope with climate change. This also serves as evidence that EE is shared through field trips and meetings to enhance resilience and reduce vulnerability to climate change in the communities.

*Theme 2: Information and skills sharing amongst neighbours during letsema/lidaba (a Sotho term for voluntary work on behalf of other families)*

The research findings revealed that communities in Gwanda district believe in voluntary work on behalf of other families. This form of voluntary work is known as *letsema* and it is conducted mainly during farming activities such as ploughing and harvesting. During *letsema*, community members share farming skills, which is one of the key strategies for climate change education because most farmers who are being assisted are those who would have obtained a good harvest. They use the *letsema* platform to share their farming experiences, which is key to climate change education and environmental education.

*Theme 3: IKS through taboos and traditional practices*

The research findings also revealed that EE is promoted through the use of taboos. It is a taboo to cut some indigenous trees in the community. "Trees like *Combretum imberbe*

(umtswiri) and (Lonchocarpuscarpasa) ichithamuzi are prohibited from being cut. Some trees are used to bury the deceased such as *Ziziphus mucronata* (imphafa) (Tsibo from FGD 1). Thus, IKS support scientific EE efforts to conserve indigenous trees. As revealed, it is taboo to burn umtswiri wood because it invites bad luck in livestock and it is believed that the domestic animals will only bear male offspring. Farmers are discouraged from exploiting such trees because of the perceived bad luck associated with the cultural prohibition of the exploitation and use of these trees.

#### *Theme 4: Kinship learning from neighbours*

Research participants revealed that talking to neighbours and informing them of what one is doing is very important in mitigating and adapting to climate change. Community members have established good relationships to share climate action strategies. As such, some neighbours are embarking on common adaptation strategies such as transhumance. The research findings revealed that the majority of farmers in wards 12 and 16 practice transhumance. One of the

research participants reflected on what influenced him to start transhumance: “I had heard of transhumance before, but it wasn’t until I saw it in action for a neighbour that I decided to give it a try, and it has shown to be really effective”.

During the winter, these farmers and their animals relocate to areas with water and meadows. It was discovered that neither NGOs nor government officials support transhumance. As a result, it is the farmers’ initiative, and community members are practising it on their own and learning from one another.

These EE efforts above were identified as micro innovations with growth potential. The government, NGOs and other relevant stakeholders should use these initiatives to enhance national and global climate action. Since the majority of people do not have access to television, research participants believe that learning from each other is more successful than some macro climate action activities such as national EE programmes on national television. One of the research participants mentioned the following shortcomings of macro EE projects in the study area:

*Yes, I am aware of national environmental education programs, but some of them are a waste of time and irrelevant to us, for example, the issue of media and internet websites don't benefit us rural people, we don't have gadgets to access the information which is disseminated through the media (Vundla F7).*

The verbatim quote above revealed that communities do not have media for communicating information, such as radios and televisions to access information from national programmes. There is also a lack of signal to access national radio stations. Thus, communities in wards 12 and 16 are constrained in their access to information for climate change from radio and television programmes.

## **Discussion**

*Micro innovations for climate action as a pathway to building farmers' generative resilience to climate change*

This study established EE initiatives which are effective in the study area,

and some initiatives still need some improvements to maximize benefitting the communities they serve. There is evidence of EE programmes such as field days and meetings in wards 12 and 16, Gwanda rural district. During field trips, farmers mainly share information on climate change's adverse impacts and strategies for mitigation and adaptation. The research findings revealed that productive farmers are used as resource persons to share their strategies to cope with climate change. This also serves as evidence that EE is shared through field trips to enhance resilience and reduce vulnerability to climate change in the communities. However, the research findings revealed that the frequency of these field trips was a cause for concern. More financial support is required to enhance these field trips so that each AGRITEX officer can have transport money or motorbike fuel to conduct field trips across the entire ward.

Verbatim responses from the research participants availed various micro initiatives for disseminating EE to the general members of the community, for example, through field days. Field days refer to selected days where agricultural extension officers select a farm to be visited by

community members to learn some successful farming strategies. It further emerged from the data that people in the district have identified micro innovations, which they believe can achieve climate change mitigation and adaptation through environmental education programmes. The research findings revealed that there is *letsema* where community members will be doing some voluntary work on behalf of other families and during the process, they will be sharing their climate change mitigation and adaptation experience. This process of sharing information includes practical lessons through demonstrations.

Indigenous knowledge holders play a leading role in EE at the micro (community) level. They share their intellectual and social capital with the young generation, hence assisting in the protection and management of natural resources. The indigenous knowledge systems in the form of taboos enhance EE by instilling traditional practices which preserve trees and the environment at large. Similarly, Manyani and Bob (2017) found that traditional norms help people to be attached to the environment, thus mitigating the effects of climate change. In addition,

Hazzah et al. (2013) shared a similar view that cultural beliefs are associated with the sacredness of forests and trees, which reduce their exploitation and enhance carbon sinks. Chanza and De Wit (2016) also found that customary practice helps to establish an intrinsic bond between people and their environment, which achieves sustainability.

The following section presents key determinants of the effectiveness of climate action micro innovations.

### **Key determinants of climate action micro innovations with growth potential**

Micro innovations for climate action with potential growth are mainly dependent on EE and financial support. According to Sibanda (2022: 165), “the role of Environmental Education and financial support to reduce situated vulnerability, can diminish cultural resistance and it enhances resilience to sustainable rural African livelihoods, necessary for climate change mitigation and adaptation in drought-prone rural communities”. COVID-19 has deepened the vulnerability of Gwanda rural communities hence the need for generative resilience through effective

EE and financial support. As such, in this paper, EE and financial support are married to each other because adequate finance is needed to implement EE in Gwanda. EE can reduce the vulnerability of individuals and communities, thereby increasing their resilience to climate change. Furthermore, the research findings revealed that climate change mitigation and adaptation strategies are impossible without finances in a poor rural community because finances are required to ensure EE programmes unfold. Research participants commented that poverty is a barrier to climate change mitigation and adaptation in wards 12 and 16 of Gwanda district. Similarly, Dube et al. (2016) reported that rural poverty significantly limits climate action in rural communities. Thus, farmers cannot utilize and access national environmental education programmes on radio or television due to poverty and poor infrastructure. Finance can provide for the inclusion of staff (such as agricultural extension officers) in EE programmes. Agricultural extension officers need to be trained to go to farms, meet with people, organize workshops and move around the farms monitoring the implementation of mitigation and

adaptation strategies. Thus, EE and financial support can reduce vulnerability, overcome resistance, and promote resilience, resulting in sustainable livelihood outcomes.

## Conclusions and recommendations

The research findings revealed that the local communal farmers benefit from micro-innovations for EE such as formal field days organised by AGRITEX officers, information and skills sharing amongst neighbours during *letsema/lidaba* (voluntary work on behalf of other families), IKS through taboos and traditional practices and kinship learning from neighbours. However, only a few farmers practised these micro innovations for EE and climate change action. There is a need to market these locally based EE initiatives and climate change mitigation and adaptation innovations to benefit the entire district. The NGOs and government departments should embark on research in climate change mitigation and adaptation strategies that suit the local communities and address their needs. Most importantly, the local communities must be consulted when designing EE programmes to establish

mutual, co-beneficial relationships that can reduce the possibility of resistance to climate change mitigation and adaptation strategies.

### Disclosure statement

No conflict of interest was reported in this paper.

### Authors' biographies

Dr Aroriso Sibanda is a PhD holder (Doctor of Philosophy in Social Science Education, UKZN, South Africa). He is currently working on research projects that explore staff and students' lived experiences at tertiary institutions, environmental education, climate change education, and fracking in South Africa.

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