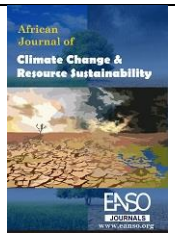
Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956



African Journal of Climate Change and Resource Sustainability
ajccrs.eanso.org
Volume 4, Issue 1, 2025
Print ISSN: 790-962X | Online ISSN: 790-9638
Title DOI: https://doi.org/10.37284/2790-9638

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community

Alfred Mapolisa[1], Vincent Itai Tanyanyiwa[1], Liliosa Pahwaringira[1], Nicholas Mwareya[1], Stephen Tsekea[1], Davie Mapfunde[1], Kudzanayi Tavirimirwa[1] & Mary Chawira[1]*

[1] Zimbabwe Open University, Zimbabwe.
[*] Author for Correspondence ORCID ID; https://orcid.org/0009-0001-2753-1528; Email: mapolisaa@zou.ac.zw

Article DOI: https://doi.org/10.37284/ajccrs.4.1.2956

Date Published:

06 May 2025

Keywords:

Climate Change, Climate Change Awareness, Rural Communities, Perceptions, Vulnerable Community.

ABSTRACT

Climate change is a global reality, yet awareness in Africa, particularly Zimbabwe, remains critically low, hindering effective mitigation and adaptation. This study assessed climate change awareness among 200 purposively selected rural residents in Ward 33, Buhera South District, Zimbabwe, examining awareness levels and their influencing factors. Employing a mixed-method approach integrating both qualitative and quantitative techniques, a survey explored residents' knowledge of climate change causes, impacts, mitigation strategies, and perceptions. A Climate Change Awareness Index (CCAI) was constructed to quantify understanding. Results revealed a significantly low average CCAI score, indicating knowledge gaps despite some demonstrated awareness. Statistical analysis demonstrated that demographic characteristics, (age, gender, and education level) significantly influenced awareness, with older, male, and more educated residents exhibiting higher levels. However, overall understanding remained limited. These findings underscore the urgent need for targeted interventions. The study recommends that the Ministry of Environment and Climate Change implement comprehensive awareness campaigns and capacity-building programs. These initiatives should include community workshops designed to educate rural populations about climate change causes, impacts, and mitigation strategies. Furthermore, the development and distribution of accessible educational materials are crucial for disseminating accurate information. By empowering rural communities with knowledge, they can actively participate in climate change mitigation and adaptation efforts, thereby enhancing their resilience to the impacts of a changing climate.

APA CITATION

Mapolisa, A., Tanyanyiwa, V. I., Pahwaringira, L., Mwareya, N., Tsekea, S., Mapfunde, D., Tavirimirwa, K. & Chawira, M. (2025). Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community. *African Journal of Climate Change and Resource Sustainability*, *4*(1), 268-283. https://doi.org/10.37284/ajccrs.4.1.2956.

CHICAGO CITATION

Mapolisa, Alfred, Vincent Itai Tanyanyiwa, Liliosa Pahwaringira, Nicholas Mwareya, Stephen Tsekea, Davie Mapfunde, Kudzanayi Tavirimirwa and Mary Chawira. 2025. "Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community", *African Journal of Climate Change and Resource Sustainability* 4 (1), 268-283. https://doi.org/10.37284/ajccrs.4.1.2956.

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

HARVARD CITATION

Mapolisa, A., Tanyanyiwa, V. I., Pahwaringira, L., Mwareya, N., Tsekea, S., Mapfunde, D., Tavirimirwa, K. & Chawira, M. (2025) "Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community", *African Journal of Climate Change and Resource Sustainability*, 4(1), pp. 268-283. Doi: 10.37284/ajccrs.4.1.2956.

IEEE CITATION

A. Mapolisa, V. I. Tanyanyiwa, L. Pahwaringira, N. Mwareya, S. Tsekea, D. Mapfunde, K. Tavirimirwa & M. Chawira "Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community, Kenya: A Call for Sensitizing Future Generations", AJCCRS, vol. 4, no. 1, pp. 268-283, May.

MLA CITATION

Mapolisa, Alfred, Vincent Itai Tanyanyiwa, Liliosa Pahwaringira, Nicholas Mwareya, Stephen Tsekea, Davie Mapfunde, Kudzanayi Tavirimirwa & Mary Chawira. "Climate Change Awareness in Rural Zimbabwe: Insights from a Vulnerable Community". *African Journal of Climate Change and Resource Sustainability*, Vol. 4, no. 1, May. 2025, pp. 268-283, doi:10.37284/ajccrs.4.1.2956.

INTRODUCTION

Climate change represents one of the most profound and urgent threats to humanity, necessitating immediate and decisive action to mitigate irreversible damage to our planet (GoZ, 2009). The Intergovernmental Panel on Climate Change (IPCC, 2013) has projected that Africa will disproportionately experience the severe consequences of climate change, a vulnerability amplified by the continent's existing developmental challenges. These impacts manifest in a range of critical areas, including diminishing water resources, significant reductions in agricultural productivity, as exemplified by declining maize yields, and the geographical expansion of vector-borne diseases such as malaria. Furthermore, increased risks of forest fires, declining fish populations, and heightened flooding due to sea-level rise and intensified rainfall patterns are anticipated (Climate Change Working Paper No. 3, 2012). Notably, the most vulnerable populations, often those reliant on natural resources for their livelihoods, bear the heaviest burden of these impacts (Climate Change Working Paper No. 3, 2012). This susceptibility is further exacerbated by a pervasive lack of awareness regarding climate change and its associated threats (GoZ, 2009). This critical knowledge gap impedes the development of community resilience and underscores the imperative for robust climate change education and awareness initiatives, particularly within rural communities where vulnerability is most pronounced.

Statement of the Problem

Zimbabwe faces a significant challenge in addressing climate change due to low public awareness, particularly in rural communities most affected by its impacts. Despite government recognition of the issue and plans to integrate climate change education into curricula, awareness remains low, hindering effective national adaptation and mitigation strategies. This study aims to investigate climate change awareness in rural Zimbabwe to inform policy and educational campaigns.

Research Objectives

This paper aims to provide a micro-level analysis of climate change awareness among vulnerable rural communities in Buhera South, Zimbabwe, who are particularly hard hit by climate change impacts.

Therefore, the objective of this paper is to specifically examine:

- Rural people's understanding of key climate change concepts, including climate variability, drought, changing rainfall patterns, climate change causes and observed climate change impacts.
- Factors influencing rural people's awareness, perception of certain issues regarding climate change and access to climate change information, including training, access to information sources, and institutional support.

LITERATURE REVIEW

Defining Climate Change and Variability:

Climate change is characterized by long-term shifts in temperature and weather patterns,

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

manifesting as changes in average conditions and increased variability in extreme weather events, typically spanning decades or longer (Ogalleh et al., 2012; Codjoe & Owusu, 2011; Umar et al., 2008). These shifts profoundly impact natural ecosystems and human societies, affecting agricultural productivity, water resources, human health, and infrastructure. In contrast, climate variability refers to natural fluctuations in climate conditions around a long-term average, encompassing variations in temperature, precipitation, wind patterns, and the frequency of extreme weather events (Ziervogel et al., 2006). While distinct from long-term climate change, changes in climate variability, such as more frequent or intense extreme events, are integral aspects of climate change (Smit et al., 2000). Understanding both climate change and variability is crucial for developing effective adaptation and mitigation strategies.

Anthropogenic Drivers of Climate Change:

While natural factors can influence climate, the current warming trend is primarily attributed to anthropogenic activities, notably the burning of fossil fuels, industrial pollution, deforestation, and land-use changes (IPCC, 2007). These activities contribute to global warming through two primary mechanisms: the increased concentration of greenhouse gases, such as carbon dioxide, in the atmosphere due to fossil fuel combustion and industrial processes (Canadell et al., 2010), and the reduced capacity of ecosystems to absorb carbon dioxide due to deforestation and land-use changes (IPCC, 2007). In Zimbabwe, deforestation for agriculture and fuelwood exacerbates this problem. The cumulative effect of these activities is a rapid increase in atmospheric greenhouse gas concentrations, leading to the observed warming trend.

Climate Change Awareness in Africa:

Rural African populations often observe and adapt to changing weather patterns; however, their understanding of global climate change as a broader phenomenon is often limited (Taderera, 2010). This knowledge gap stems from insufficient climate change awareness campaigns in sub-Saharan Africa (UNFCCC, 2007) and the prioritization of immediate challenges, such as poverty, food insecurity, and limited access to education, over long-term environmental concerns (UNDP, 2007). This lack of focus hinders the development and implementation of effective adaptation and mitigation strategies.

Zimbabwe's Climate Vulnerability and Policy Responses:

Despite experiencing climate variability, a significant portion of Zimbabwe's population remains unaware of the broader issue of climate change (GoZ, 2009). Recognizing climate change as a critical development challenge, the Zimbabwean government developed the National Climate Change Response Strategy (NCCRS), facilitated by the Institute of Environmental Studies (IES) under the Ministry of Environment, Water and Climate (Global Water Partnership, 2012). The NCCRS was developed in response to the growing awareness of climate change's potential impact on Zimbabwe's agriculture-dependent economy. With over 70% of the population residing in rural areas and relying on climate-sensitive livelihoods, such as maize production and livestock rearing, the country is particularly vulnerable to the effects of changing weather patterns (Global Water Partnership, 2012). For example, drought conditions have become more frequent and severe, impacting crop yields and livestock survival.

Impacts and Adaptation Needs:

Climate change and variability are projected to expand marginal lands, threatening agricultural livelihoods (IPCC, 2007). Consequently, adaptation and awareness-raising initiatives are crucial for communities to cope with increasingly frequent and intense extreme weather events and associated climatic variations (Adger et al., 2003). In Zimbabwe, where a large proportion of the population relies on rain-fed agriculture, climate change and variability pose a significant threat. Traditional farming systems are becoming increasingly unsustainable, as evidenced by declining maize yields due to more frequent droughts. Furthermore, agro-ecological regions in

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

Zimbabwe are shifting, with some areas experiencing drier conditions (Brown et al., 2012). For example, regions previously suitable for certain crops are no longer viable. This necessitates increased climate change awareness to empower communities to adapt to these changing conditions and make informed decisions about alternative livelihoods and farming practices.

Study Focus and Rationale:

Raising public awareness about climate change through education is crucial for fostering community involvement in mitigation and adaptation efforts. However, climate change awareness remains low in many rural communities, hindering effective action. This study addresses this critical gap by assessing climate change awareness levels among rural residents in Buhera South District, Zimbabwe, a region experiencing increased drought frequency and water scarcity. A Climate Change Awareness Index (CCAI) will be used to measure awareness levels. The study will also investigate how demographic factors, including age, gender, and education level, influence climate change awareness within this vulnerable population.

Theoretical Framework

This study aims to assess climate change awareness levels and identify factors influencing those levels among rural residents in Buhera South District, Zimbabwe. The study also seeks to provide recommendations for effective climate change awareness campaigns. To achieve these objectives, this study draws upon learning theories, specifically the Information Processing Theory and the Three-Term Contingency Theory, to explain how climate change awareness can be developed within rural communities. While awareness and learning are distinct concepts, they are interconnected. Learning, as defined by Wexley and Latham (1991) and Barker (1997), involves a relatively permanent change in behaviour resulting from experience or practice. Awareness, on the other hand, involves developing a sense of understanding or concern about an issue, event, or subject, potentially leading to changes in perception and behaviour (Choong et al., 2006). Effective learning processes can facilitate the development of awareness.

Information Processing Theory:

This theory as noted by Wogalter and Laughery (1996) is crucial for understanding how rural residents acquire and process climate change information. One of the study's objectives is to assess knowledge gaps. By understanding how information is encoded, stored, and retrieved, we can identify barriers to effective communication. This theory directly informs the development of the survey questions, ensuring they assess not just knowledge, but also how that knowledge is processed. This theory helps to inform the study's recommendation for the development and distribution of accessible educational materials.

Three-Term Contingency Theory (Operant Conditioning):

This theory by Skinner (1953) is relevant to understanding how to promote behaviours that demonstrate climate change awareness. The study aims to provide recommendations for awareness campaigns. By understanding how positive reinforcement and negative consequences influence behaviour, we can develop strategies to encourage climate-friendly practices. This Theory is important to the recommendation of community workshops, where positive reinforcement can be demonstrated.

Classical Conditioning:

This theory first developed by Pavlov (1902) can be used to explain how local, observable impacts of climate change can act as stimuli for raising awareness. This theory helps us to understand how the rural residents have gained what knowledge they already possess. This theory justifies the study's focus on a rural community that is already experiencing the impacts of climate change.

Framework Informing Methodology:

- The survey used in this study is designed to assess not only residents' knowledge of climate change but also their understanding of its causes, impacts, and mitigation strategies.

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

This approach directly aligns with the Information Processing Theory, which emphasizes the importance of attention, encoding, storage, and retrieval.

- The study also examines how demographic factors influence climate change awareness. This analysis helps to identify specific groups that may require targeted interventions, reflecting the principles of operant conditioning, which emphasizes the importance of tailoring interventions to specific populations.
- The study will gather information on what local climate change impacts the residents have observed, to link with classical conditioning.

By integrating these learning theories, this study develops a framework for understanding how climate change awareness can be effectively fostered within rural communities. This framework emphasizes the importance of: (1) providing relevant stimuli (e.g., local climate change impacts), (2) communicating information effectively, and (3) reinforcing behaviours that demonstrate climate change awareness. These principles are directly applied in the study's recommendations for awareness campaigns and capacity-building programs.

MATERIALS AND METHODS

Study Area

This study was conducted in Ward 33 of Buhera South District, Zimbabwe. The district is characterized by recurring droughts and high levels of food insecurity, making it particularly vulnerable to the impacts of climate change. According to the 2022 national census, the population of Buhera South District was 271,920, with 125,773 males and 146,147 females (ZIMSTAT, 2023). Ward 33 had a population of 13,247 (6,204 males and 7,043 females) (ZIMSTAT, 2023). Buhera District has the highest percentage of food-insecure households in Zimbabwe (27.2%) (ZIMVAC, 2009), a situation likely exacerbated by climate variability and drought. Most residents in the district practice subsistence farming on communal land administered by local chiefs. This reliance on rain-fed agriculture further increases their vulnerability to climate change impacts.

Ward 33, Buhera South lies within the driest region of Zimbabwe, where cattle ranching is the primary viable livelihood. Rain-fed agriculture is often not a profitable option due to the limited rainfall. This scarcity of rainfall is further exacerbated by the limited number of water reservoirs in the area. Consequently, many residents have diversified their livelihoods, supplementing or replacing agriculture with the harvesting of forest products, such as baobab fruits, for both subsistence and commercial purposes. This practice, while providing a source of income, can put additional pressure on local forest ecosystems. The area is also susceptible to occasional flash floods, further compounding the challenges faced by the community. Buhera South was selected for this study due to its vulnerability to the negative impacts of climate change, including drought, water scarcity, and the associated challenges to livelihoods.

Research Design

This study employed a qualitative approach to gain in-depth insights into the experiences, views, and perceptions of rural communities in Buhera South regarding climate change. A descriptive design, utilizing open-ended questions within a survey format, was deemed most appropriate as it allowed for a rich exploration of community narratives and perspectives on climate change (Mugenda & Mugenda, 2003). This approach was particularly valuable for understanding the various ways in which individuals perceive and respond to environmental changes. Primary data was collected through self-administered questionnaires containing open-ended questions and through direct field observations such as farming practices, water sources and livelihoods practices. Secondary data such as rainfall data and drought frequency records were obtained from the Meteorological Department and agricultural extension reports from AREX Extension Offices. This multi-faceted approach provided a

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

comprehensive understanding of climate change awareness within the community. Ward 33 was selected as a case study due to its specific vulnerabilities to climate change impacts, as discussed in the previous section.

Sample Size and Sampling Procedures

This study aimed to analyze the level of climate change awareness among rural community members in Buhera South. A sample of 200 respondents was selected using purposive and snowball sampling, two methods chosen because they allowed the researchers to target individuals with specific knowledge or experience related to climate change and agriculture. Snowball sampling, as described by Deacon et al. (1999), is a process where "like a snowball rolling down a hill, a snowball sample grows through momentum: initial contacts suggest further people for the researcher to approach, who in turn may provide further contacts." This method was chosen because the farming communities in Buhera South can be characterized as closed or informal social groups. These communities are relatively small and interconnected, with strong social ties and established networks. This interconnectedness makes snowball sampling particularly effective for accessing individuals who share similar experiences and knowledge related to local environmental conditions, including climate change. By leveraging the social knowledge and recommendations of initial contacts, the study was able to map these tight social networks and reach community members who might otherwise be difficult to access. This was crucial for understanding the shared perceptions and experiences related to climate change within these communities. However, it is important to acknowledge that snowball sampling may introduce some bias, as the sample may not be fully representative of the broader population of Buhera South, potentially over-representing certain viewpoints or social groups.

A sample size of 200 respondents, representing approximately 1.5% of the total population of Ward 33 (13,247 residents), was deemed appropriate for this study. This proportion was considered sufficient to capture the diversity of views within the community while also being feasible within the study's resource constraints. The sample was stratified by age and gender to ensure representation of these key demographic groups, with the proportion of respondents within each stratum reflecting the overall population distribution within the ward. While this sample size provides valuable insights into the community's perspectives, it is important to acknowledge that the findings may not be fully generalizable to all rural communities in Zimbabwe due to the specific characteristics of Ward 33, such as its reliance on rain-fed agriculture, cattle herding and its susceptibility to drought.

Data Collection Methods and Instruments

To ensure maximum community participation, fieldwork was conducted for one month immediately following the rainy season, when residents had increased availability after completing their agricultural work. Data collection involved a combination of methods. Semi-structured interviews were conducted with key informants to gather in-depth insights into their perspectives on climate change and its impacts. A questionnaire containing open-ended questions was administered to community members to gather broader perspectives on their experiences and perceptions.

Questionnaire Survey

A questionnaire containing both closed-ended and open-ended questions was used to collect data. Section A gathered demographic information, including gender, age, marital status, and education level. Section B explored respondents' knowledge of climate change concepts, awareness of climate change organizations (IPCC, UNFCCC, UNDP, etc.), information sources, and length of residency in the area. Open-ended questions allowed for a deeper exploration of respondents' perceptions of climate change impacts and adaptation strategies, while closed-ended questions assessed their knowledge of specific climate change facts and concepts. Questions about climate change organizations

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

were included because knowledge of these organizations, whose work is directly related to climate change, was considered an indicator of broader climate change awareness. The questionnaires were self-administered to 195 respondents. Efforts were made to ensure a balanced representation of male and female participants in the sample.

All 200 respondents, comprising 195 rural farmers and 5 key informants, participated in the questionnaire survey. Questionnaires included both open-ended questions about perceptions of climate change and closed-ended questions about knowledge of climate change causes. The key informants consisted of a community leader, a local councillor, a parliamentarian, an agricultural extension worker, and a meteorological officer. These key informants were chosen for their expertise and insights into local governance, agricultural practices, and climate trends. Follow-up questions in addition to the questionnaire explored lived experiences with climate change impacts, and traditional coping mechanisms.

Document Analysis

Document analysis was conducted on rainfall data and drought frequency data obtained from the Meteorological Department. This data provided historical trends related to climate variability in the region. Additionally, crop yield data and community vulnerability assessments related to climate change were analyzed from reports provided by the AREX Extension Offices. These documents offered insights into the impacts of climate change on local agriculture and community resilience. In addition, direct field observations were conducted to assess observations such as farming practices, water sources and livelihoods practices.

Data Processing and Analysis

A mixed-methods approach was used for data analysis. Qualitative data, derived from open-ended questions in the questionnaires, field notes, and diary entries, was analyzed thematically. The process involved transcribing the data, identifying recurring themes and patterns, coding the data, and interpreting the findings. NVivo was used to assist with the coding and analysis of the qualitative data. The qualitative findings are presented as narratives and summarized in thematic tables. Quantitative data from the closed-ended questions in the questionnaires was analyzed using SPSS version 24. A database was created in SPSS, and all data were cleaned and screened for errors before entry to ensure accuracy in subsequent analyses. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to characterize demographic data and respondents' awareness of temperature and rainfall changes. Cross-tabulations were performed to explore the relationships between age and perceptions of climate change risk, gender and access to climate information, education level and adoption of adaptation strategies. These cross-tabulations aimed to determine if there were statistically significant associations between these variables. The results of the quantitative analysis are presented in tables and figures.

Constructing the Climate Change Awareness Index (CCAI)

To assess climate change awareness, a Climate Change Awareness Index (CCAI) was developed. Each question in the questionnaire was assigned a score based on the respondent's answer. Responses were ranked on a scale of -5 to +5 based on the accuracy of the answer, the level of understanding demonstrated, and the consistency with scientific consensus. A score of +5 represented a fully correct and comprehensive answer, while a score of -5 represented a completely incorrect or contradictory answer. Each question was then weighted based on its perceived importance in assessing climate change awareness. The weights, ranging from 2 to 18, were assigned based on the relevance of the question to core climate change concepts, and the importance of the concept for understanding climate change impacts and adaptation. Table 1 presents the ranking criteria and weights assigned to each question. The final score for each question was calculated by multiplying the rank of the response by the weight of the question. The sum

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

of these weighted scores for all questions constituted the respondent's climate change awareness score. The CCAI for each respondent was then calculated by expressing their climate change awareness score as a percentage of the maximum possible total score for the questionnaire. The following equation was used to calculate the CCAI:

$$CCAI(\%) = \frac{\sum_{i=1}^{n} R_i \times W_i}{\sum_{i=1}^{n} R_m \times W_i} \times 100 \quad (1)$$

Equation (1) Climate Change Awareness Index Formular.

In this equation, CCAI is the climate change awareness index for one particular respondent, n denotes the number of questions considered for the index construction, R_i is the rank obtained from the *i*-th question, R_m is the maximum rank that can be obtained from the *i*-th question and W_i is the weight of the *i*-th question.

A CCAI score of 100% indicates a complete and accurate understanding of all assessed climate change concepts, while a score of 0% indicates no understanding of the assessed concepts. Scores above 70% were considered "high awareness," scores between 40% and 70% were considered "moderate awareness," and scores below 40% were considered "low awareness".

Table 1: Showing Weight of Individual Questions and Final Maximum Score

Question	Weight	Max Score
How much do you know about climate change?	5	25
Have you ever heard about climate change?	5	25
Have you ever attended a seminar/workshop on climate change?	2	10
Have you ever heard about IPCC?	3	15
Have you ever heard about UNFCC?	3	15
Have you ever heard about the Kyoto Protocol?	3	15
Climate change means?	18	90
Have you observed any variation in climate in your area?	7	35
How many years have you observed the changes in climate?	6	30
In what ways has the climate changed in your area?	10	50
In your view, what are the probable causes of climate change?	15	75
How has climate change affected you?	8	40
Does greenhouse gas emissions cause climate change?	7	35
Can climate change be mitigated by reducing the use of fossil fuels?	6	30
Zimbabwe is being affected by climate change	2	10
Total	100	490

Ethical Considerations

This research prioritized the ethical treatment of participants, ensuring no physical or psychological harm. Necessary approvals were obtained from local authorities. Ethical clearance to conduct the research in the study area was obtained from the relevant authorities, including the Buhera District Administrator, the Buhera Rural District Council, and local traditional leaders. Participation was voluntary, with informed consent obtained and documented before questionnaire distribution. Participants could decline or withdraw without consequence. Confidentiality and anonymity were assured, data was securely stored, and no personal incentives were offered beyond community feedback upon study completion.

RESULTS AND DISCUSSION

Gender and Mean CCAI Score

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

The research revealed a statistically significant ($p < 0.05$) gender variation in CCAI scores (Figure 1a), with males exhibiting slightly higher scores than females. While the magnitude of the difference was relatively small, its statistical significance highlights the importance of considering gender as a potential factor influencing climate change awareness in Buhera South. Several factors could contribute to the slightly higher CCAI scores among males. It's plausible that males have greater access to certain information channels, such as agricultural extension services or community meetings, as suggested by Patchen (2006). Alternatively, cultural roles and responsibilities might influence exposure to climate-related information, particularly if men are primarily responsible for agricultural decisions.

This finding indicates a possible influence of gender on climate change awareness and is consistent with research conducted in other contexts. For instance, Acquah (2011), in a study of climate change awareness in central Ghana, also reported a similar trend, although the specific nuances of gender roles and information access may vary between regions. This suggests that gender-based disparities in climate change awareness are not unique to Zimbabwe but may be a broader phenomenon in developing countries.

However, it is crucial to acknowledge that the differences in CCAI scores between males and females in our study were relatively small, suggesting that both genders possess a certain level of climate change awareness. This nuanced finding sets our study apart from some studies that report larger gender disparities for example McCright (2010) analyzed data from the American general public over 8 years using Gallup data. This large-scale, national survey might capture broader societal trends and differences in how men and women access and perceive climate change information in a developed country context. Therefore, while our research confirms the influence of gender, it also underscores the importance of context-specific analyses.

By comparing our findings with those of Acquah (2011) and other studies, we can develop a more comprehensive understanding of the interplay between gender and climate change awareness, facilitating the design of more effective and inclusive interventions.

Figure 1a: Mean CCAI Scores by Gender

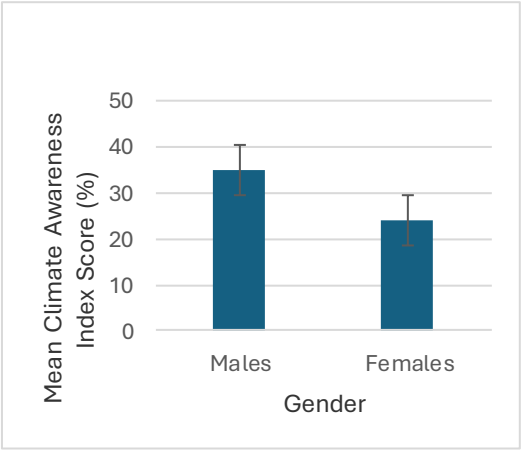
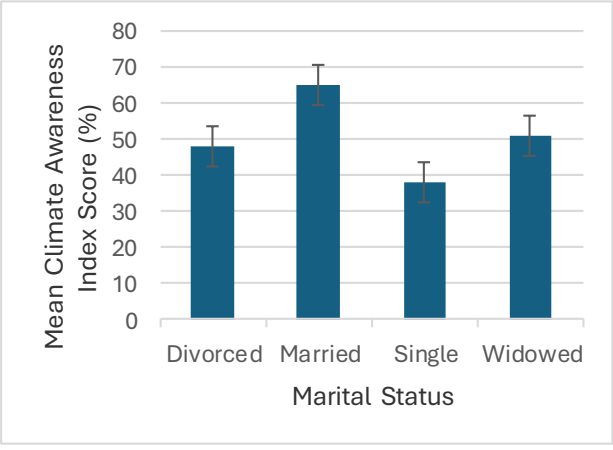


Figure 1b: Mean CCAI Scores by Marital Status



Marital Status and Mean CCAI Scores

CCAI scores also varied significantly by marital status (Figure 1b, $p < 0.05$). Married couples exhibited the highest mean CCAI scores, followed by divorced, widowed, and single individuals. This pattern suggests that marital status influences access to and dissemination of climate change information within rural communities in Buhera. Several factors could explain the higher scores among married couples. It is plausible that shared information within households leads to greater exposure to climate change information. Divorced

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

and widowed individuals may retain information acquired during previous marriages, contributing to their higher scores compared to single individuals.

These findings are consistent with research conducted in other African contexts. For instance, Acquah (2011), in a study of climate change awareness in central Ghana, similarly found that married individuals demonstrated greater awareness than unmarried individuals, although both groups exhibited significant knowledge gaps. This suggests that the influence of marital status on climate change awareness may be a recurring phenomenon across different regions in Africa.

Furthermore, our findings align with the broader literature on information dissemination within families. Pe'er et al. (2007), for example, highlighted the role of families, particularly parents, as primary sources of knowledge and awareness for children. While our study focuses on adult awareness, the principle of shared information within family units may still apply, particularly within married couples. This suggests that the sharing of information within a household between adults mirrors the information sharing between adults and children.

However, it is important to note that our study also diverges in some aspects from existing research. While marital status emerged as a significant factor, the overall low CCAI scores across all groups indicate a persistent knowledge deficit, which underscores the unique challenges faced by rural communities in Zimbabwe. This highlights the need for context-specific interventions.

The lower CCAI scores among single individuals in our study indicate a need for targeted interventions to improve their access to information and resources related to climate change. Future research could explore the specific mechanisms through which married couples share and discuss climate change information, as well as the information needs of single individuals in these communities.

Age and Mean CCAI Scores

Climate change awareness, as measured by CCAI scores, also varied significantly with age (Figure 2a). Age is therefore a key demographic factor influencing climate change awareness, a finding partially consistent with Saroar and Routray (2010), who identified age as a critical predictor of familiarity with climate issues. Their research concluded a positive correlation between age and familiarity with climate extreme events, suggesting that awareness generally increases with age. While our study aligns with this trend for younger to middle-aged adults, it diverges in older age groups.

In the present study, the relationship between age and CCAI scores was not linear. CCAI scores increased with age up to 45 years, then decreased in older age groups. A statistically significant ($p < 0.05$) difference in CCAI scores was observed between the age groups (below 31, 31–45, 46–60, and above 60 years). The middle-aged (31–45) economically active population demonstrated the highest climate change awareness. This non-linear relationship is intriguing. A possible explanation is that the middle-aged group in rural Buhera has greater access to modern Information and Communication Technology (ICT) than older individuals, who may have been born before the widespread availability of such technology. This access to ICT could be a crucial factor in acquiring climate change information. Conversely, individuals below 31 years of age, who are often still dependent, may have limited access to ICT resources due to financial constraints, potentially explaining their lower CCAI scores.

These findings notably contrast with those of Owolabi, Gyimah, and Amponsah (2012) in Ghana, who found that younger students in junior high schools were more aware of climate change than older individuals. This difference in findings may be attributed to the different contexts of the studies. The present research was conducted in rural areas with limited ICT access, whereas the Ghanaian study was conducted in an urban setting with presumably greater access to information and technology. This highlights the critical importance

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

of considering the specific socio-economic and technological context when examining age and climate change awareness.

Therefore, while our study confirms the influence of age, as suggested by Saroar and Routray (2010), it also demonstrates the nuanced and context-dependent nature of this relationship. Further research is needed to explore the complex interplay between age, access to information, and climate change awareness in different settings. By comparing our findings with those of Saroar and Routray (2010) and Owolabi, Gyimah, and Amponsah (2012), and other studies, we can develop a more comprehensive and contextually sensitive understanding of how age influences climate change awareness.

Figure 2a: Mean CCAI Scores by Age Group

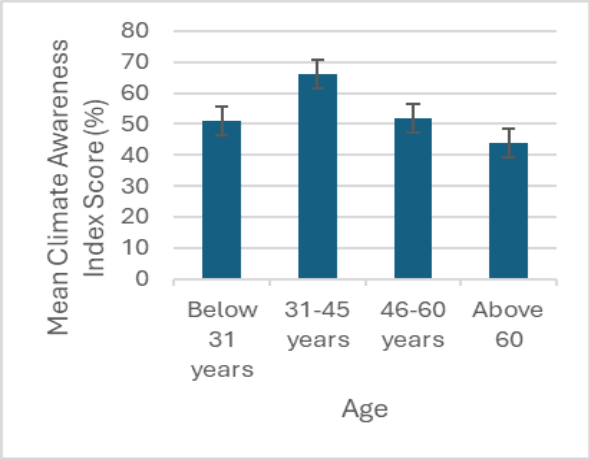
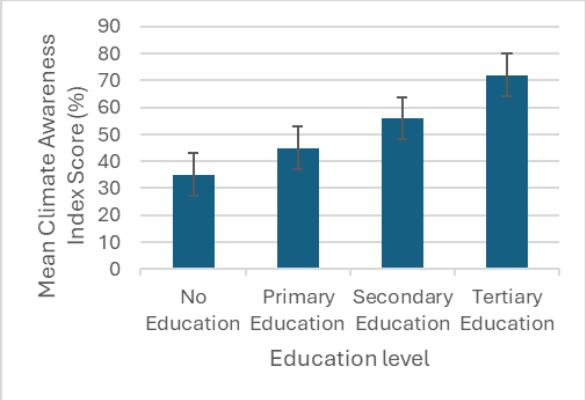


Figure 2b: Mean CCAI Scores by Education Level



Education Level and Mean CCAI Scores

The results indicate a strong positive relationship between education level and climate change awareness. As education level increases, mean CCAI scores also show a clear upward trend (Figure 2b). Individuals with tertiary education exhibited the highest mean CCAI scores, while those with no formal education had the lowest. This finding suggests that higher levels of education are associated with greater exposure to climate change information and a more comprehensive understanding of climate change issues. Individuals with tertiary education, having likely been exposed to concepts of climate change in their studies, demonstrated the highest level of awareness. Conversely, those with no formal education may have limited access to information channels and educational resources, potentially explaining their lower CCAI scores.

This finding aligns closely with the observations of Pe'er et al. (2007), who suggested that well-educated parents are generally more aware of climate change-related issues. Our study extends this observation beyond parents to a broader rural population, demonstrating a similar trend between education level and climate change awareness. This reinforces the critical role of education in disseminating climate change information and empowering individuals to understand and respond to climate change challenges.

However, while our study confirms the general trend highlighted by Pe'er et al. (2007), it is important to note the specific context of rural Zimbabwe. The challenges faced by individuals with limited formal education in accessing information and resources may be particularly pronounced in this setting. Therefore, while education is a significant factor, it is crucial to consider the socio-economic and infrastructural context in which education operates.

Furthermore, it is important to consider the differences between the populations studied. While Pe'er et al. (2007) focused on parents, our study examined a wider range of rural residents. This difference in populations highlights the broad influence of education on climate change awareness Rahman et al. (2014).

Future research could explore the specific pathways through which education enhances climate change awareness, such as access to

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

information sources, critical thinking skills, and engagement in community discussions. It would also be valuable to investigate the information needs of individuals with limited formal education and develop targeted strategies to improve their access to climate change information. By comparing our findings with those of Pe'er et al. (2007) and other studies, we can develop a more nuanced understanding of the relationship between education and climate change awareness, and tailor interventions to specific contexts and populations.

Period of Stay in the Area and Mean CCAI Scores

The findings of this study reveal a significant relationship between the period of stay in the area and climate change awareness (Figure 3). Mean CCAI scores tend to increase with the number of years residents have lived in Buhera South, an area demonstrably affected by climate change. A statistically significant ($p < 0.05$) difference in CCAI scores was observed between residents who had lived in the area for over 31 years, 16–30 years, and 1–15 years. This suggests that longer residence in an area affected by climate change is associated with greater climate change awareness. Residents who have lived in Buhera South for longer periods may have had more opportunities to observe the impacts of climate change firsthand, accumulating local knowledge and experience related to environmental changes. They may also have been exposed to more climate change information through community networks, local institutions, or long-term engagement with agricultural extension services. This accumulated experience and exposure could explain the higher CCAI scores observed among long-term residents.

While no directly comparable studies were found regarding the length of residence and climate change awareness, our finding aligns with broader concepts of experiential learning and the development of local ecological knowledge. For example, research on traditional ecological knowledge (TEK) consistently demonstrates that long-term residents of an area possess a deeper understanding of local environmental dynamics and are more attuned to subtle changes over time (Berkes, 2012). This suggests that the relationship we observed between length of residence and climate change awareness may be rooted in similar processes of experiential learning and knowledge accumulation.

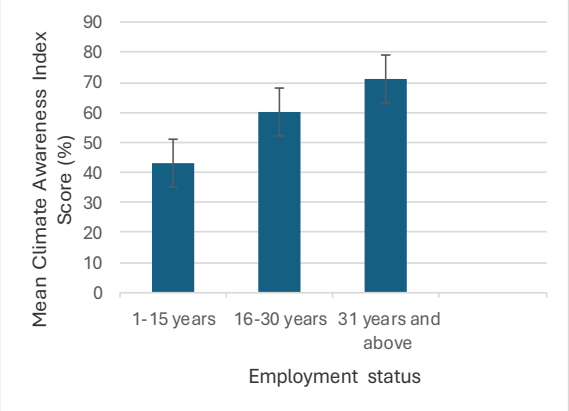
Furthermore, our findings resonate with research on place attachment and environmental perception. Studies have shown that individuals with a stronger sense of place attachment are more likely to be aware of and concerned about local environmental issues (Scannell & Gifford, 2010). It is plausible that longer residence in Buhera South fosters a stronger sense of place attachment, leading to increased awareness of climate change impacts.

However, it is important to acknowledge that the lack of direct comparative studies limits our ability to generalize these findings. Therefore, while our study provides valuable insights into the relationship between length of residence and climate change awareness, further research is needed to explore this relationship in other contexts and using different methodologies.

Further research could explore the specific ways in which long-term residents acquire and share climate change information within their communities, as well as the role of local knowledge in shaping adaptation strategies. By integrating the concepts of experiential learning, TEK, and place attachment, we can develop a more comprehensive understanding of how length of residence influences climate change awareness."

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

Figure 3: Mean CCAI Scores by Period of Stay



CONCLUSION

This study investigated climate change awareness among rural residents in Ward 33, Buhera South, Zimbabwe, a community vulnerable to the impacts of climate change. Data was collected using a structured questionnaire. Socio-demographic factors were examined to understand their influence on climate change knowledge and awareness, measured using a weighted Climate Change Awareness Index (CCAI). The results revealed that climate change awareness among the rural population of Buhera South Ward 33 varies significantly based on demographic characteristics. The average CCAI score was relatively low, indicating a need for concern regarding the level of climate change awareness in these communities. While residents demonstrated some understanding of climate change issues, significant knowledge gaps were identified. Specifically, gender, age, education level, marital status, and period of residence in the area were found to significantly influence climate change awareness. Despite widespread media coverage of climate change, rural residents appear to lack a comprehensive understanding of global and local climate change issues.

Recommendations

Based on these findings, the study recommends that the Ministry of Environment and Climate Change implement targeted climate change awareness campaigns and capacity-building programs for rural communities. These programs should include:

i. Community workshops: Organizing workshops to provide accurate and accessible information about climate change, its causes, effects, and mitigation strategies.

ii. Dissemination of educational materials: Developing and distributing educational materials such as pamphlets, posters and radio broadcasts that address common misconceptions and provide clear explanations of climate change concepts.

These initiatives will help to improve community understanding of climate change and promote the adoption of climate change mitigation and adaptation measures. By increasing awareness, rural residents will be better equipped to understand the challenges they face and participate in developing effective solutions. The socio-demographic variables used in this study were selected based on data availability and a thorough literature review. The findings of this study can serve as a baseline for measuring climate change awareness in other rural areas of developing countries. It is hoped that this research will stimulate further investigation of climate change awareness levels in diverse settings, including urban areas and different demographic groups.

Further research is needed to explore the specific pathways through which gender influences climate change awareness. Investigating access to information sources, participation in community activities, and decision-making roles within households could shed light on these gender-based differences.

Limitations of the Study

This study is subject to several limitations. Firstly, the study was conducted in a single ward within Buhera South, limiting the generalizability of the findings to other rural areas of Zimbabwe. Secondly, the cross-sectional nature of the study design prevents the establishment of causal relationships between socio-demographic factors and climate change awareness. Thirdly, the self-reported data may be subject to social desirability bias, potentially influencing the accuracy of the responses. Fourthly, the CCAI index, while useful,

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

is one way of measuring climate change awareness, and other methods might yield different results.

The qualitative aspect of this mixed methods study was not explored in depth within this paper, and future work could explore the qualitative data to provide a richer context.

Future Research Directions: Future research should address these limitations by conducting longitudinal studies to examine the temporal dynamics of climate change awareness. Studies could also explore the effectiveness of different awareness campaigns and educational interventions. Additionally, research could investigate the role of local knowledge and traditional practices in climate change adaptation. Furthermore, comparative studies across different rural and urban settings in Zimbabwe and other developing countries would provide a more comprehensive understanding of climate change awareness and its determinants. Future research could explore the qualitative data gathered during this study, to better understand the lived experiences of the population.

Acknowledgements

We are grateful to the Buhera Rural District Council for allowing us to conduct the research in their District. We thank the participants who took part in this study for their overwhelming support during the fieldwork. The comments and suggestions of the anonymous reviewers are also greatly appreciated.

Conflict of interest: The authors declare that they have no competing interests.

Funding: The authors declare that this study received no external funding or financial support and that all costs were borne by the authors.

REFERENCES

Acquah, H. D. (2011). Public awareness and quality of knowledge regarding climate change in Ghana: A logistic regression approach. *Journal of Sustainable Development in Africa*, *13*, 146–157.

Adger, W. N., Huq, S., Brown, K., Conway, D., & Hulme, M. (2003). Adaptation to climate change in the developing world. *Progress in Development Studies*, *3*(3), 179–195. https://doi.org/10.1191/1464993403ps060oa

Barker, L. M. (1997). *Learning and behaviour (biological, psychological, and sociocultural perspectives)*. Prentice-Hall.

Berkes, F. (2012). *Sacred ecology* (3rd ed.). Routledge. https://doi.org/10.4324/9780429271616

Brown, D., Chanakira, R. R., Chatiza, K., Dhliwayo, M., Dodman, D., Masiiwa, M. & Zvigadza, S. (2012). *Climate change impacts, vulnerability and adaptation in Zimbabwe*. Climate Change Working Paper No. 3, IIED.

Canadell, J. G., Ciais, P., Dhakal, S., Dolman, H., Friedlingstein, P., Gurney, K. R. & Raupach, M. R. (2010). Interactions of the carbon cycle, human activity, and the climate system: A research portfolio. *Current Opinion in Environmental Sustainability*, *2*(5-6), 301–311. https://doi.org/10.1016/j.cosust.2010.10.003

Choong Weng Wai, Abdul Hakim Mohammed, & Buang Alias. (2006). Energy conservation: A conceptual framework of energy awareness development process. Department of Property Management, Faculty of Geo information Science and Engineering, Universiti Teknologi Malaysia.

Codjoe, S. N. A., Owusu, G., & Burkett, V. (2011). Climate change/variability and food systems: Evidence from the Afram Plains, Ghana. *Regional Environmental Change*, *11*(4), 753– 765. https://doi.org/10.1007/s10113-011-0211-3

Deacon, D., Pickering, M., Golding, P., & Murdock, G. (1999). *Researching communication: A practical guide to media and cultural analysis*. Arnold.

Global Water Partnership. (2012). *Zimbabwe's climate change response strategy*. Retrieved

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

from http://www.gwp.org/en/GWP-SouthernAfrica/GWP-SA-IN-ACTION/

GoZ. (2009). *Report on the climate change roundtable*. Kadoma, Zimbabwe.

IPCC. (2007). *Climate change 2007: Synthesis report. Contribution of working groups I, II and III to the fourth assessment report of the Intergovernmental Panel on Climate Change*. IPCC.

IPCC. (2013). *Climate change 2013: Synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change*. IPCC.

McCright, A. M. (2010). The effects of gender on climate change knowledge and concern in the American public. *Climatic Change*, *98*(1-2), 159-177.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches*. ACTS Press.

Ogalleh, S. A., Vogl, C. R., Eitzinger, J., & Hauser, M. (2012). Local perceptions and responses to climate change and variability: The case of Laikipia District, Kenya. *Sustainability*, *4*(12), 3302–3325. https://doi.org/10.3390/su4123302

Owolabi, H. O., Gyimah, E. K., & Amponsah, M. O. (2012). Assessment of junior high school students' awareness of climate change and sustainable development in central region, Ghana. *Educational Research Journal*, *2*(9), 308–317.

Patchen, M. (2006). *Social context and threats to social values*. Aldine de Gruyter.

Pavlov, I. P. (1902). *The work of the digestive glands*. Griffin. (Original work published 1897)

Pe'er, G., Goldman, D., & Yahalomi, D. (2007). Children's perception of environmental phenomena and knowledge of plant life: The effect of direct experience in nature. *International Journal of Science Education*, *29*(15), 1697-1712.

Rahman, S. M. A., Tasmin, S., Uddin, M. K., Islam, M. T., & Sujauddin, M. (2014). Climate Change Awareness among the High School Students: Case Study from a Climate Vulnerable Country. *International Journal of Built Environment and Sustainability*, *1*(1), 18-26.

Saroar, M., & Routray, J. K. (2010). Why does climate change awareness differ? Lessons learned from Bangladesh. Paper presented at the 2nd International Conference on Climate Change, Sustainability and Development in Semi-arid regions, Fortaleza, Brazil.

Scannell, L., & Gifford, R. (2010). Defining place attachment: A tripartite model. *Journal of Environmental Psychology*, 30 (1), 1-10. https://doi.org/10.1016/j.jenvp.2009.09.006

Skinner, B. F. (Burrhus Frederic) (1953). *Science and human behavior*. New York: Macmillan. ISBN 0029290406. OCLC 191686.

Speranza, M., Kiteme, C., & Opondo, M. (2009). Climate change and adaptation: A study of semi-arid areas of Kenya. *Climatic Change*, *93*(1), 161– 178. https://doi.org/10.1007/s10584-008-9473-6

Smit, B., Burton, I., Klein, R. J. T., & Wandel, J. (2000). An anatomy of adaptation to climate change. *Climatic change*, *45*(1), 223-251.

Taderera, D. (2010). *South African's awareness of climate change*. Catholic Parliamentary Liaison Office.

Umar, A. G., Omoayena, B. O., & Okonkwo, M. C. (2008). The climate scourge and implications for natural food security in Nigeria; Issues and challenges for extension service delivery. In J. Popoola (Ed.), *Climate change and renewable natural resource management* (pp. 29–34). Forestry Association of Nigeria.

Article DOI : https://doi.org/10.37284/ajccrs.4.1.2956

UNDP. (2007). *Fighting climate change: Human solidarity in a divided world*. UNDP.

UNFCCC. (2007). *Climate change: Impacts, vulnerabilities and adaptations in developing countries*. UNFCCC Secretariat.

UNICEF. (2013). *Situation report Zimbabwe*. UNICEF Harare Office.

Wexley, K. N., & Latham, G. P. (1991). *Developing and training human resources in organizations*. HarperCollins.

Wogalter, M. S., & Laughery, K. R. (1996). Warning! Sign and label effectiveness. *Psychological Science*, *7*(5), 333–338. https://doi.org/10.1111/j.1467-9280.1996.tb00371.x

Ziervogel, G., Nyong, A., Osman, B., Conde, C., Cortés, S., & Downing, T. (2006). *Climate variability and change: Implications for household food security*. AIACC Working Paper No. 20, International START Secretariat.

ZIMSTAT. (2023). (2022), *Population Census Results: Final report*. ZIMSTAT.

ZimVac. (2009). *Urban food security assessment*. Zimbabwe Vulnerability Assessment Committee.

