Research Article

Biodiversity Conservation: An Examination on Environmental Conservation Within the Communities of Chongwe District

*[1]Willah Nampasa, [1]Kelvin Chibomba

About Article

About Author

[1] Department of Humanities, Information and Communications University, Lusaka, Zambia

ABSTRACT

The purpose of the study was to examine environmental conservation within communities under biodiversity conservation. The general objective of the study was to examine environmental conservation within rural communities. The specific objectives include examining knowledge levels of rural communities on environmental conservation; establishing the effectiveness of strategies used by communities on environmental conservation; ascertaining how government policy engages with the community on environmental conservation and evaluating the effectiveness of mitigation measures on environmental conservation by rural communities. A descriptive case study approach was adopted to match the nature of the topic. The study used open ended questionnaires and guided oral interviews. In this research, the target population was 100 participants of which 60 were community members and 40 were policy makers. A random sampling of respondents was used to pick the respondents. In this study, the sample size of 100 respondents was be targeted using purposive sampling. The main instruments used are questionnaires and personal interviews. The questionnaires comprised closed and open-ended questions. Questionnaires were administered or handed out to the respondents depending on their business operating schedules. Qualitative and quantitative data analysis was done. Quantitative data was used because it was easier to present using tables and qualitative data helped express the data collected. The data collected was analyzed using tables and figures. For the qualitative data, the descriptive method was used, while for quantitative data analysis was done using Microsoft Word and Excel to generate tables and other graphic illustrations. The results showed that 37.5% of participants had a high knowledge level, and an equal percentage of participants exhibited moderate knowledge level. Meanwhile, 25% of the participants had low knowledge level. With regards to how effective the strategies used by communities on environmental conservation, it was found that there is a significant relationship between the conservation strategy used by the communities and their perceived effectiveness. To find out how government engages the community on environmental conservation we first had to find out how many participants were aware of the government policy regarding the topic and it was discovered that 65% of the participants were aware suggesting that a significant portion of the community were informed about the policy. The distribution on how effective the mitigation measures are in environmental conservation reviewed a mixed perception among the participants, with a relatively balanced view between those who see the measures as effective and those who do not. Based on the findings it was recommended that continued engagement of the communities should be maintained. High level government actors must be in attendance of Community meetings to bring about key government decisions.

Contact @ Willah Nampasa
wnampasa@gmail.com

1. INTRODUCTION

1.1. Background to the study

Environmental problems represent some of the most complex and pressing contemporary social issues. Beyond physical changes to the environment, threats such as those posed by global climate change present formidable challenges, from public health hazards to threats to social and political institutions, community infrastructure, and livelihoods (Doherty & Clayton, 2017; Intergovernmental Panel on Climate Change [IPCC], 2017, 2014; Swim *et al.*, 2018). These destabilizing features can have both social causes and social consequences. For instance, carbon dioxide is currently being produced by the collective consumption of fossil fuels at approximately twice the rate at which it is being removed from the atmosphere by natural processes. As a result, the current period is the warmest on record in the history of modern civilization, with impacts that disproportionately affect poorer nations (Wuebbles *et al.*, 2017). Within nations, communities of colour, women, and members of other disadvantaged groups are disproportionately affected by a wide range of environmental hazards that can exacerbate social inequality. This is well-illustrated by the lingering economic devastation of Hurricane Katrina on black, Latino, and indigenous communities in the US Gulf Coast region more than a decade after the hurricane struck (Bullard *et al.*, 2017; Fussell, 2015).

Climate change is also expected to amplify human conflict by exacerbating well-documented drivers such as economic shocks, poverty, community displacement, and water and food insecurity (IPCC, 2014). Psychological research on environmental decision-making has traditionally focused on individual-level factors that influence proenvironmental behavior such as problem awareness and personal concern (Dietz *et al.*, 2017; Steg & Vlek, 2019). However, like all social issues, environmental conservation can be understood as a multilevel problem, with individual-, group-, and macrolevel (e.g., economic) causes and consequences. As each new round of climate negotiations illustrates, the ways in which people understand and engage with environmental problems are powerfully influenced by how others, including members of ingroups and outgroups, respond to the problem—processes that social psychologists are uniquely positioned to study Pearson *et al.*, 2016). Generally, conservation refers to any behavior aimed at protecting and caring for the natural environment (Saunders, 2023). Examples of conservation range from relatively low-impact behaviors such as recycling to high-impact actions such as using energy-efficient technologies like solar panels or electric cars. Conservation behaviors can be further classified along two key dimensions: curtailment behaviors (recurring, low-cost behaviors such as turning off lights when not in use and turning down a thermostat) and efficiency behaviors (infrequent, high-cost behaviors, such as purchasing energy-efficient appliances or increasing home insulation) (Karlin *et al.*, 2014; Stern, 2020; Stern & Gardner, 2008).

Research suggests that efficiency behaviors like adopting more fuel-efficient vehicles and upgrading home heating and cooling equipment are often more environmentally impactful than curtailment behavior as they typically require less monitoring of habits and can produce more substantial gains in energy savings over time (Dietz *et al.*, 2009). Nevertheless, some high-impact efficiency behaviors, such as purchasing fuel-efficient vehicles, may be costly or difficult to adopt without regulatory or other financial incentives and many curtailment behaviors, such as carpooling and other changes in driving behavior, can be highly impactful when adopted (Dietz *et al.*, 2019). Thus, both types of actions represent promising behavioural targets for interventions that seek to promote environmentally sustainable behavior.

1.2. Statement of the problem

Evolutionary approaches to conservation suggest that people inherit behavioral and psychological proclivities through adaptations to the specific environmental demands and small-scale social systems in which humans evolved (Van Vugt *et al.*, 2014). In modern society, these adaptations can serve as barriers to large-scale conservation efforts and include tendencies toward (a) self- and group-serving interests (prioritizing individual, kin, or community interests over those of a larger collective), (b) a focus on proximal versus distal needs (i.e., preferring smaller immediate versus larger delayed rewards), and (c) attention to relative versus absolute resource levels and discounting invisible dangers (Van Vugt, 2019; Van Vugt *et al.*, 2014). Although each of these biases can impede conservation behavior, they can also be leveraged to promote pro-environmental actions. In particular, strategies that aim to match evolved psychological tendencies with contemporary habits may be especially effective in fostering sustained conservation behavior. These include highlighting environmental harm to kin and close others, emphasizing the social value and prevalence of pro-environmental behaviors, and emphasizing immediate, local, and personal risks posed by environmental threats (van der Linden et al, 2015; Van Vugt *et al.*, 2014). However, care should be taken in employing these strategies. Levine and Kline (2017), for example, found that under certain conditions personalized threats can backfire. From a social psychological perspective, many environmental problems, such as climate change, represent quintessential commons problems, in which the prioritizing of self over collective interests can lead to the exploitation of a common pool of limited resources (Ostrom *et al.*, 2012; Van Vugt, 2019). Although people are often aware of societal proscriptions against overusing shared resources, they may nevertheless fear being cheated out of their share of a limited resource, which can motivate resource depletion over time (Gifford, 2017; Van Vugt *et al.*, 2014). This study therefore seeks to examine environmental conservation within rural communities.

1.3. General Objective

The general objective of the study is to examine environmental conservation within rural communities.

1.4. Specific objectives

The specific objectives of this study were to:

i. To examine knowledge levels of rural communities on environmental conservation

ii. To establish effectiveness of strategies used by communities on environmental conservation

iii. To ascertain how government policy engages with the community on environmental conservation

iv. To evaluate effectiveness of mitigation measures on environmental conservation by rural communities

1.5. Research questions

i. How are the knowledge levels of rural communities on environmental conservation?

ii. How effective are the strategies used by communities on environmental conservation?

iii. How does government policy engage with the community on environmental conservation?

iii. How effective are the mitigation measures on environmental conservation by rural communities?
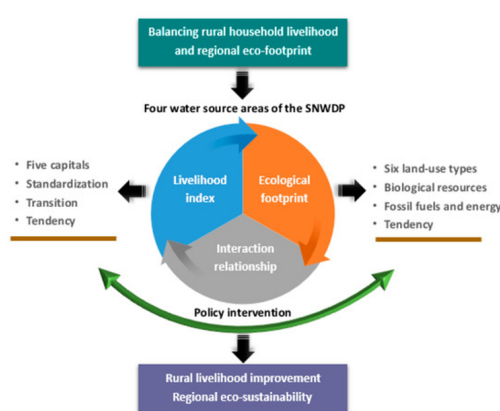
1.6. Theoretical/Conceptual Framework

Figure 1. Conceptual Framework

Evolutionary approaches to conservation suggest that people inherit behavioural and psychological proclivities through adaptations to the specific environmental demands and small-scale social systems in which humans evolved (Van Vugt et al., 2014). In modern society, these adaptations can serve as barriers to large-scale conservation efforts and include tendencies toward (a) self- and group-serving interests (prioritizing individual, kin, or community interests over those of a larger collective), (b) a focus on proximal versus distal needs (i.e., preferring smaller immediate versus larger delayed rewards), and (c) attention to relative versus absolute resource levels and discounting invisible dangers (Van Vugt, 2009; Van Vugt et al., 2014). Although each of these biases can impede conservation behavior, they can also be leveraged to promote proenvironmental actions.

In particular, strategies that aim to match evolved psychological tendencies with contemporary habits may be especially effective in fostering sustained conservation behavior. These include highlighting environmental harm to kin and close others, emphasizing the social value and prevalence of proenvironmental behaviors, and emphasizing immediate, local, and personal risks posed by environmental threats (van der Linden et al., 2015; Van Vugt et al., 2014). However, care should be taken in employing these strategies.

1.6.1. Psychological Drivers of Conservation Behavior

Psychological research on conservation has focused largely on individual-level factors and behaviors in the private sphere, rather than group-level processes and social behaviors that can influence environmental decision-making (Dietz et al., 2007; Steg & Vlek, 2009; Stern, 2000). However, like other social issues, environmental conservation is fundamentally a multilevel problem, with individual, group-level, and macrolevel cultural influences on behavior.

1.6.2. Individual-Level Perspectives

Psychological approaches to climate change have been significantly informed by investigations of how individuals assess risk, process complexity and uncertainty, respond to incentives, and perceive temporal and spatial dimensions of environmental threats (Gifford, 2011; Stern, 2011; Weber, 2013). Research from the area of judgment and decision-making highlights how basic information-processing limitations can impede individual and collective efforts to address major environmental problems like climate change (Gifford, 2011; Weber, 2013; Weber & Stern, 2011). Cognitive biases, such as a tendency to discount future costs of present energy consumption and a motivation to continue investing in ineffective or costly policies and practices, can hinder resource conservation efforts (Gifford, 2011; Morgan & Keith, 2008). Similarly, findings from behavioural economics research highlight the power of information (e.g., rapid and accurate feedback about energy use; Fischer, 2008), intrinsic incentives (Stern, 2011), and low- or no-cost actions (e.g., weatherizing homes; Dietz et al., 2009) to promote curtailment and efficiency behaviors. Affect has also been shown to play an important role in shaping environmental beliefs and policy support. For instance, the American public tends to construe climate impacts in more distal (versus proximal) ways, which can dampen emotional responses to climate threats and undermine collective motivations to act (Gifford, 2011; Leiserowitz, 2006; Smith & Leiserowitz, 2012).

1.6.3. Knowledge and Conservation

Although knowledge and exposure to environmental problems is generally associated with engaging in conservation behaviors (Bamberg & Möser, 2007), information alone is often insufficient for promoting long-term behavior change or can even backfire (Abrahamse & Sheeran, 2005; Poortinga et al., 2003; Costanzo et al., 1986). Exceptions to this general finding can be found when people are broadly unfamiliar with an environmental problem (e.g., 40% of the global public and over 65% of respondents in the world's largest developing nations reported being unaware that the planet is warming in Gallup World Poll surveys conducted in 2007 and 2008 (Lee et al., 2015), or when people learn that a conservation behavior is convenient, inexpensive, and easy to execute (Steg & Vlek, 2009). Nevertheless, when gains in knowledge about the nature of environmental risks do prompt change in conservation behavior, effects are typically modest and relatively transitory, pointing to the need to consider other factors that drive proenvironmental behavior, such as social information about what others believe, experience, and do (Abrahamse & Sheeran, 2005).

1.6.4. Personal Values, Attitudes, and Beliefs

Approaches that emphasize personal values, beliefs, and experiences related to the environment and human-environment interactions have informed psychological research on conservation. Value-belief-norms theory posits that core value orientations predict beliefs and concern about environmental problems and their associated risks (Stern, 2000). These in turn predict beliefs about one's capacity to help alleviate these threats and a sense of obligation to act (proenvironmental personal norms), which then leads to the enacting of proenvironmental behavior

1.7. Significance of the study

The findings from this study will serve to inform the policy and decisions regarding environmental conservation within rural communities in the country. This will help create an enabling environment for people to operate in a sound environment. In academia, this study will benefit other scholars who are engaging in studies related to strategic planning in general and strategic planning related to environmental conservation within rural communities. in particular. This work will serve as a reference guide to such studies for them to build upon. Lastly, this study will benefit communities in Zambia since it investigates elements of planning process and the importance of environmental conservation within rural communities which may be incorporated to improve on the strategic planning activity, this will be of value to planners. The findings of this study can be used by these development specialists in devising plans and strategies so that they can use in environmental conservation within rural communities.

2. LITERATURE REVIEW

Climate change as a fact of life is particularly formidable to low income rural communities whose livelihoods heavily depend on rain-fed subsistence agriculture like those in the focus of this study, the Mazungunye communal lands (IPCC 2012). According to Hellmuth *et al.* (2007), climate change presents risks to lives and livelihoods at the individual level and to the economy and the infrastructure at regional and national levels. Rural people are believed to be particularly vulnerable to climate change. Their vulnerability is not attributed to climate change only but is also a combination of social, economic and environmental factors that interact with it (Turpie & Visser, 2013). A study conducted by Chazovachii *et al.* (2012 concluded that communal farmers in Masvingo Province have not been passive victims of the vagaries of climate change and variability. They have rationally responded to it through various adaptation and mitigation strategies, both individually and collectively. However, as observed by Ofoegbu *et al.* (2015), rural communities have remained vulnerable to climatic-induced shocks although they are employing a plethora of mechanisms to mitigate the effects of climate change. This is because their high exposure to climate change risks does not match their adaptive capacity. The researchers identified such factors (challenges) as barriers to adaptation, which became the focal point of the study. According to Gukurume (2014), in Zambia many studies have tried to understand the effects of climate change on agriculture, health and the economy, as

well as strategies to mitigate climate change, just to mention a few, but there is little evidence that any studies have been dedicated to unearthing the challenges faced by rural people in their efforts to mitigate the effects of climate change. It was the fundamental intention of this study to close the knowledge gap by unravelling the challenges faced by rural people in mitigating the effects of climate change in Chongwe.

2.1. Personal critique and research gaps

Climate change as a fact of life is particularly formidable to low income rural communities whose livelihoods heavily depend on rain-fed subsistence agriculture like those in the focus of this study, the Mazungunye communal lands (IPCC 2012). According to Hellmuth *et al.* (2007), climate change presents risks to lives and livelihoods at the individual level and to the economy and the infrastructure at regional and national levels. Rural people are believed to be particularly vulnerable to climate change. Their vulnerability is not attributed to climate change only but is also a combination of social, economic and environmental factors that interact with it (Turpie & Visser, 2013). A study conducted by Chazovachii *et al.* (2012 concluded that communal farmers in Masvingo Province have not been passive victims of the vagaries of climate change and variability. They have rationally responded to it through various adaptation and mitigation strategies, both individually and collectively. However, as observed by Ofoegbu *et al.* (2015), rural communities have remained vulnerable to climatic-induced shocks although they are employing a plethora of mechanisms to mitigate the effects of climate change. This is because their high exposure to climate change risks does not match their adaptive capacity. The researchers identified such factors (challenges) as barriers to adaptation, which became the focal point of the study. According to Gukurume (2014), in Zambia many studies have tried to understand the effects of climate change on agriculture, health and the economy, as well as strategies to mitigate climate change, just to mention a few, but there is little evidence that any studies have been dedicated to unearthing the challenges faced by rural people in their efforts to mitigate the effects of climate change. It was the fundamental intention of this study to close the knowledge gap by unravelling the challenges faced by rural people in mitigating the effects of climate change in Chongwe

The majority of the studies have not been conducted in Zambia. Instead, they have been carried out in neighbouring countries like Zimbabwe and the rest of the world, particularly Asian ones.

3. METHODOLOGY

A descriptive case study approach will be adopted to match the nature of the topic. The study will use open ended questionnaires and guided oral interviews. Target population in this research comprises of all those potential participants that could make up the study group. In this research, the target population will be 100 participants from 60 community members and 40 policy makers. Random sampling of respondents will be carried out. The respondents will be picked from various stakeholders in Chongwe. This will be done in order to extract correct and accurate information because the problem at hand required

such consideration. The sample size refers to the number of elements or units that the researcher draws from the population of respondents for research exercise. In this study, the sample size of 100 respondents will be targeted using purposive sampling. The main instruments to be used are questionnaires and personal interviews. The questionnaires will comprise closed and open-ended questions. Questionnaires will either be administered or handed out to the respondents depending on their business operating schedules. Qualitative and quantitative data analysis will be done. Quantitative data will be used because it is easier to present using tables and qualitative data helped express the data collected. The data collected will be analyzed using tables, figures. The researcher used both qualitative and quantitative method. For the qualitative data, the researcher used descriptive method, while for quantitative data will be analyzed using Microsoft Word and Excel to generate tables and other graphic illustrations.

4. RESULTS AND DISCUSSION
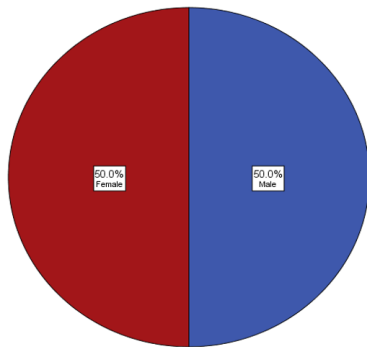### 4.1. Presentation of research Findings

Figure 2. Demographics

The pie chart shows an equal gender distribution among the participants in the study, with 50% male and 50% female participants. This balanced representation indicates that both genders are equally involved in biodiversity conservation efforts within the communities of Chongwe District.
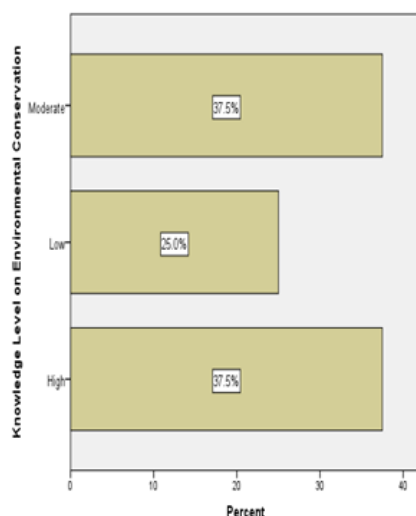

Figure 3. Knowledge Level on Environmental Conservation

4.1.1. Examining knowledge levels of rural communities on environmental conservation

The bar graph presents the distribution of knowledge levels among participants regarding biodiversity conservation within the communities of Chongwe District. The data reveals that 37.5% of participants have a high knowledge level, and an equal percentage of participants exhibit a moderate knowledge level. Meanwhile, 25% of the participants have a low knowledge level. This balanced representation between high and moderate knowledge levels indicates a well-informed participant base, though the presence of a quarter of participants with low knowledge highlights the need for ongoing education and awareness initiatives in the community.
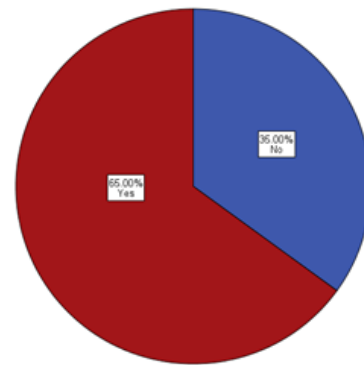

Figure 4. Participation in Conservation Activities

The pie chart displays the participation rates in conservation activities among the study participants. A majority of 65 participants representing 65% are actively involved in conservation efforts, while 35 participants who are representing 35% are not. This indicates a higher level of engagement in environmental conservation within the community, reflecting a strong commitment to biodiversity preservation among many individuals. However, the presence of participants not engaged in these activities suggests there are opportunities to further encourage and support community involvement in conservation initiatives.

Table 1. Knowledge Level and Participation in Conservation Crosstabulation

			Participation in Conservation		Total
			No	Yes	
Knowledge_Level	High	Count	2	13	15
		Expected Count	5.3	9.8	15.0
	Low	Count	7	3	10
		Expected Count	3.5	6.5	10.0
	Moderate	Count	5	10	15
		Expected Count	5.3	9.8	15.0
Total		Count	14	26	40
		Expected Count	14.0	26.0	40.0

Table 2. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.498a	2	.014
Likelihood Ratio	8.703	2	.013
N of Valid Cases	40		

The crosstabulation analysis explores the relationship between knowledge levels (high, moderate, low) and participation in conservation activities (yes, no) among the study participants. The chi-square test results show a Pearson Chi-Square value of 8.498 with a p-value of 0.014.

Since the p-value is less than the standard significance level of 0.05, we reject the null hypothesis. This indicates that there

is a statistically significant relationship between knowledge levels and participation in conservation activities among the participants.

• *High Knowledge Level:* Most participants with high knowledge levels (87 out of 100) are involved in conservation activities.

Low Knowledge Level: A majority of participants with low knowledge levels (70 out of 100) are not involved in conservation activities.

• *Moderate Knowledge Level:* Participants with moderate knowledge levels are relatively evenly split, with a slight majority (67 out of 100) participating in conservation activities

4.1.2. To establish effectiveness of strategies used by communities on environmental conservation

Table 3. Conservation Strategy and Perceived Effectiveness

Conservation Strategy	Effective	Not Effective	Somewhat Effective	Total
Awareness Campaigns	8	4	8	20
None	0	20	0	20
Soil Erosion Control	4	0	12	20
Tree Planting	16	0	4	20
Waste Management	12	0	8	20
Total	40	28	32	100

The crosstabulation data indicates the distribution of perceived effectiveness across various conservation strategies:

• *Detailed Analysis:* Awareness Campaigns: Out of 20 participants, 8 found the campaigns effective, 4 found them not effective, and 8 found them somewhat effective. The expected counts were well matched with actual counts, implying a balanced perception of effectiveness among the participants.

• *No Conservation Strategy:* All 20 participants who reported no conservation strategy found it not effective, indicating a clear perception of ineffectiveness when no specific strategy is employed.

• *Soil Erosion Control:* Among the 20 participants, 4 found it effective, none found it not effective, and 12 found it somewhat effective. This shows mixed perceptions, but with a lean towards moderate effectiveness.

• *Tree Planting:* This strategy had the highest perceived effectiveness, with 16 out of 20 participants rating it as effective and only 4 rating it as somewhat effective. No participants found it not effective, indicating strong support for tree planting initiatives.

• *Waste Management:* Perceived as effective by 12 participants and somewhat effective by 8, this strategy also shows a positive perception overall, with no participants finding it not effective.

Table 4. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.536a	8	.008
Likelihood Ratio	22.592	8	.004
N of Valid Cases	25		

4.1.3. 15 cells (100.0%) have expected count less than 5. The minimum expected count is 1.40.

The chi-square test results show a Pearson Chi-Square value of 20.536 with a p-value of .008, indicating statistical significance at the 0.05 level. This suggests that there is a significant relationship between the conservation strategy used by the communities and their perceived effectiveness

4.1.4. To ascertain how government policy engages with the community on environmental conservation
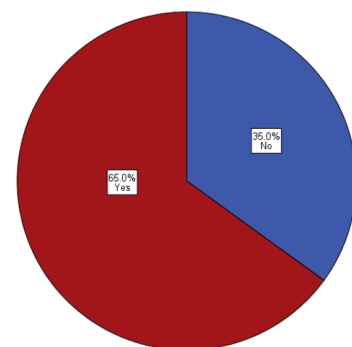
Figure 5. Participants' awareness of government policy

The pie chart presents the participants' awareness of government policy related to environmental conservation. Out of 100 respondents, 65% indicated that they are aware of the government policy, while 35% are not aware. This majority awareness suggests that a significant portion of the community is informed about the policy, which is crucial for

effective biodiversity conservation efforts. However, the 35% who are unaware highlights the need for further information dissemination and education within the community.

4.1.5. To evaluate effectiveness of mitigation measures on environmental conservation by rural communities
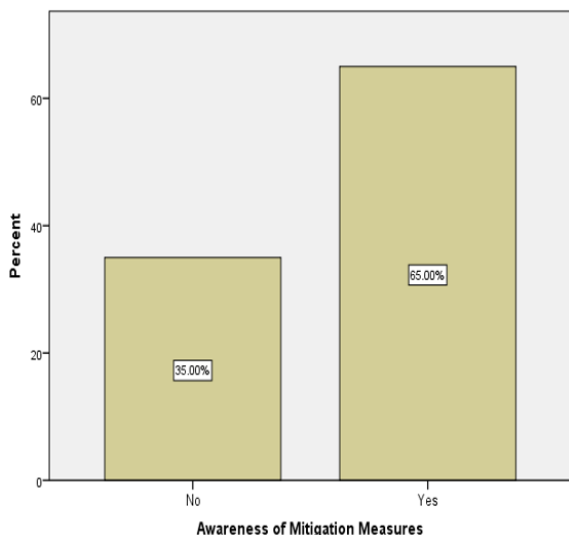

Figure 6. Awareness of Mitigation Measures

The bar graph shows that 65% of the 100 respondents are aware of mitigation measures related to biodiversity conservation, while 35% are not aware. This majority awareness indicates that a significant portion of the community is informed about the strategies and actions necessary to mitigate environmental issues. However, the fact that 35% of respondents are unaware highlights a critical area where further educational outreach and community engagement are needed.

4.1.6. To ascertain how government policy engages with the community on environmental conservation.

Table 5. Awareness of Government Policy

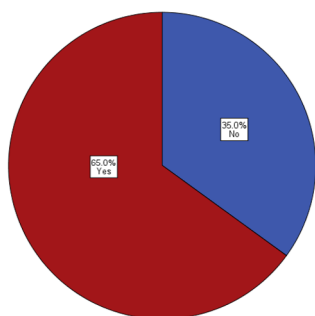| Valid	Frequency	Percent	Valid Percent	Cumulative Percent
No	7	35.0	35.0	35.0
Yes	13	65.0	65.0	100.0
Total	20	100.0	100.0	

Figure 7. Participants' awareness of government policy

The pie chart presents the participants' awareness of government policy related to environmental conservation. Out of 100 respondents, 65% indicated that they are aware of the government policy, while 35% are not aware. This majority awareness suggests that a significant portion of the community is informed about the policy, which is crucial for effective biodiversity conservation efforts. However, the 35% who are unaware highlights the need for further information dissemination and education within the community.
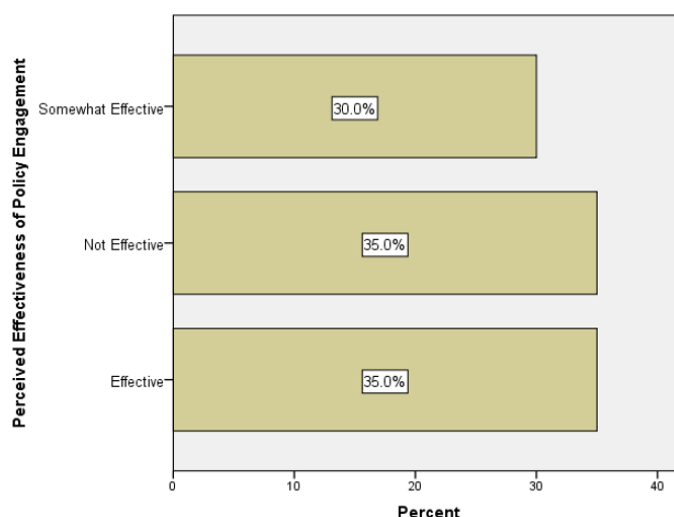

Figure 8. Perceptions of the effectiveness of policy engagement

The bar graph represents participants' perceptions of the effectiveness of policy engagement in the context of environmental conservation. Out of 100 respondents:

35% (35 participants) perceive the policy engagement as effective. This indicates a significant proportion of the community believes that the current policies and their implementation are making a positive impact on environmental conservation efforts.

30% (30 participants) consider the policy engagement to be somewhat effective. These participants acknowledge some positive outcomes but believe there is room for improvement in how policies are engaged and implemented.

35% (35 participants) view the policy engagement as not effective. This group highlights the challenges and shortcomings of the current policies and their engagement, suggesting that the strategies in place are not adequately addressing the needs of the community or the environment.

This distribution reveals a divided perception among the participants, with equal proportions finding the policy engagement either effective or ineffective, and a substantial portion expressing moderate effectiveness. It underscores the necessity for ongoing evaluation and potential adjustments to policy engagement strategies to enhance their effectiveness and better serve the community's environmental conservation goals.

4.1.7. To evaluate effectiveness of mitigation measures on environmental conservation by rural communities
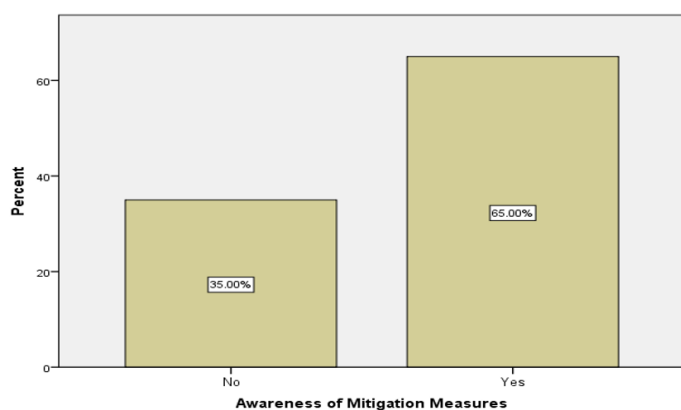
Figure 9. Awareness of Mitigation Measures

The bar graph shows that 65% of the 100 respondents are aware of mitigation measures related to biodiversity conservation, while 35% are not aware. This majority awareness indicates that a significant portion of the community is informed about the strategies and actions necessary to mitigate environmental issues. However, the fact that 35% of respondents are unaware highlights a critical area where further educational outreach and community engagement are needed. Increasing awareness of these measures is essential for fostering a more comprehensive and effective approach to environmental conservation within the community.
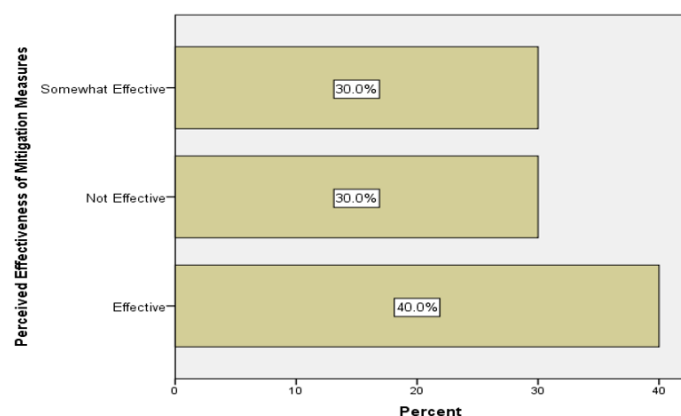

Figure 10. Perceived Effectiveness of Mitigation Measures

The bar graph presents participants' perceptions of the effectiveness of mitigation measures implemented for biodiversity conservation. Out of 100 respondents:

40% (40 participants) perceive the mitigation measures as effective. This indicates that a significant portion of the community believes that the strategies in place are successfully addressing environmental conservation needs and making a positive impact.

30% (30 participants) consider the mitigation measures to be somewhat effective. These participants recognize some benefits from the measures but feel there is room for improvement to fully achieve the desired outcomes.

30% (30 participants) view the mitigation measures as not effective. This group highlights the perceived shortcomings and challenges in the current approaches, suggesting that the

strategies may not be adequately meeting the conservation goals.

This distribution reveals a mixed perception among the participants, with a relatively balanced view between those who see the measures as effective and those who do not. The equal proportions of somewhat effective and not effective responses indicate a need for further evaluation and potential adjustments to the mitigation strategies to enhance their effectiveness and better serve the community's environmental conservation efforts.

4.2 Discussions

There was an equal gender distribution among the participants in the study, with 50% male and 50% female participants. This balanced representation indicates that both genders are equally involved in biodiversity conservation efforts within the communities of Chongwe District. Such equal participation suggests an inclusive approach to environmental conservation, engaging a diverse range of perspectives and experiences.

The bar graph presents the distribution of age groups among 80 participants. The data reveals a diverse range of ages, with the highest frequencies observed in the age groups around 30 and 40 years old. These groups have frequencies slightly above 5 and close to 5, respectively. Participants in their 50s and 60s have moderate frequencies, while those in their 70s have the lowest frequency, slightly above 1. The mean age of the participants is 41.65 years, with a standard deviation of 12.4037 years. This distribution highlights the presence of a relatively younger demographic, with a significant representation of individuals in their 30s and 40s.

The bar graph presents the distribution of knowledge levels among participants regarding biodiversity conservation within the communities of Chongwe District. The data reveals that 37.5% of participants have a high knowledge level, and an equal percentage of participants exhibit a moderate knowledge level. Meanwhile, 25% of the participants have a low knowledge level. This balanced representation between high and moderate knowledge levels indicates a well-informed participant base, though the presence of a quarter of participants with low knowledge highlights the need for ongoing education and awareness initiatives in the community.

The pie chart displays the participation rates in conservation activities among the study participants. A majority of 65 participants representing 65% are actively involved in conservation efforts, while 35 participants who are representing 35% are not. This indicates a higher level of engagement in environmental conservation within the community, reflecting a strong commitment to biodiversity preservation among many individuals. However, the presence of participants not engaged in these activities suggests there are opportunities to further encourage and support community involvement in conservation initiatives.

• *Awareness Campaigns:* Out of 20 participants, 8 found the campaigns effective, 4 found them not effective, and 8 found them somewhat effective. The expected counts were well matched with actual counts, implying a balanced perception of effectiveness among the participants.

• *No Conservation Strategy:* All 20 participants who reported

no conservation strategy found it not effective, indicating a clear perception of ineffectiveness when no specific strategy is employed.

Soil Erosion Control: Among the 20 participants, 4 found it effective, none found it not effective, and 12 found it somewhat effective. This shows mixed perceptions, but with a lean towards moderate effectiveness.

• *Tree Planting:* This strategy had the highest perceived effectiveness, with 16 out of 20 participants rating it as effective and only 4 rating it as somewhat effective. No participants found it not effective, indicating strong support for tree planting initiatives.

• *Waste Management:* Perceived as effective by 12 participants and somewhat effective by 8, this strategy also shows a positive perception overall, with no participants finding it not effective. The interconnectedness between traditional ecological knowledge, adaptive capacity, and resilience in community-based conservation initiatives is not yet well understood and it has not been systematically analyzed to date.

The bar graph shows that 65% of the 100 respondents are aware of mitigation measures related to biodiversity conservation, while 35% are not aware. This majority awareness indicates that a significant portion of the community is informed about the strategies and actions necessary to mitigate environmental issues. However, the fact that 35% of respondents are unaware highlights a critical area where further educational outreach and community engagement are needed. Increasing awareness of these measures is essential for fostering a more comprehensive and effective approach to environmental conservation within the community.

5. CONCLUSION

Over the past half century, engaging communities situated amid areas of high biodiversity and other values of the natural world became a cornerstone of nature conservation practice. This is a dramatic change from the early days of nature conservation strategies. Previously, conservation practitioners around the world used a strict nature protection model, which evolved in the latter half of the 19th century in America. Spiritual, physical, and social elements grounded this model, driven by a largely romantic view of nature. Science came to the forefront later, with conservation practitioners working in consort with governments and lawyers to apply restrictive top-down mandates. Little to no input was solicited from affected communities. However, the exponential growth in the area allocated for nature protection around the world in recent years and the growing realization that biodiversity outside of protected areas may carry equal or more significance to that inside, and suffer from greater threats, is changing perspectives on the design and management of areas managed to protect nature. Conservation scientists are increasingly embracing the idea of working with local communities to achieve conservation goals, requiring them to expand their toolkit to embrace the work and contributions of social and behavioral scientists.

RECOMMENDATIONS

• There must be continued engagement with the communities. These community meetings must bring in key government decision-makers. Attendance and participation must include high-level government actors to change the rules and policies that often constrain community engagement in biodiversity conservation. There are also opportunities to build from important previous efforts

• The government must create a communications framework for community engagement in conservation. A solitary standalone event can provide a valuable spark to encourage greater commitment to evidence-based community engagement, but this spark will not endure unless the event also establishes a continuous communications framework to share, critique, and build on theory and practice.

• The framework should provide easy access for practitioners to post experiences, outcomes, lessons, interests, and needs, and should serve as a forum accessible to communities, NGOs, community-based organizations, governments, funders, and businesses. The funding to fully develop and build out the proposed framework needs securing prior to the implementation of the regional event to ensure that this essential instrument becomes a central output of the event.

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