

[ASSESSING PUBLIC PERCEPTION ON EARLY WARNING SYSTEM: A CASE STUDY OF SEKENI I VILLAGE, CHIKWAWA]

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Abstract

This study investigates public perceptions of early warning systems (EWS) in Sekeni I Village, a community in Malawi's flood-prone Chikwawa district in the south. EWS plays an important role in disaster preparedness and risk reduction; however, their effectiveness is heavily influenced by public awareness, trust, and responsiveness. The research takes a mixed-methods approach, combining quantitative data from household surveys with qualitative insights from focus group discussions. The findings show that, while there is widespread awareness of EWS, significant barriers to message dissemination and interpretation persist. Radios and local leaders emerged as the most reliable sources of early warnings. Previous flood experiences, trust in information sources, and social influence from family and friends are all important factors in determining community responses. Indigenous knowledge remains an important component of risk perception, despite being increasingly threatened by climate change. Based on these insights, the study recommends enhancing community engagement through regular training and drills, strengthening communication infrastructure, and promoting stakeholder collaborations. The findings contribute to a deeper understanding of EWS perception in rural Malawi and offer practical recommendations for improving disaster resilience and adaptive capacity in similar contexts.

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Acronyms/abbreviations

DCCMS	Department of climate change and meteorological services
CB-EWS	Community-Based Early Warning Systems
MOAIWD	Ministry of Agriculture, Irrigation and Water Development
EWS	Early Warning Systems
UNDP	United Nations Development Program
WMO	World Meteorological Organisation
ISDR	International Strategy for Disaster Reduction

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1.0 Introduction

1.1 Background

Malawi as a country has been hit by different extreme weather events such as droughts, floods, cyclones and dry spells, and it will still be hit by these extreme events. These extreme events have affected a lot of households in different areas across the country and they are also affecting the government's economy year in and year out in recovering loss and damage. All these are happening because there is a gap of information between people in different areas and the weather forecasting process.

Early warning is a key component to taking appropriate measures with proper institutional arrangements in the disaster-prone areas. Early warning systems are essential during the pre-disaster stage of the disaster risk management cycle in regions that are vulnerable to disasters. In other words, the Early Warning System doesn't only support the independent operation but also the participation of the local people and key actors as a part of preparedness activities to withstand the disaster impact (David Rogers, 2016).

Early warning is crucial to minimizing the harm to lives and livelihoods. However, there are instances when warnings are given after the fact; these incidents often cause people to lose faith in the Early Warning System as a poorly targeted system that does not reach those who were at risk.

Natural hazards are posing serious damages across the globe due to climate change impacts. Natural hazards such as tropical cyclones, floods, heat waves and dry spells are a threat to human life. Malawi, as a country, has not been spared the effects of climate change. It is almost impossible to go a year without experiencing two to three tropical cyclones during a single rainfall season, not to mention heat waves and dry spells in between. These extreme weather events have and continue to affect a large number of households across the country, affecting the government's economy year after year in terms of loss and damage recovery.

Natural hazards pose the greatest threat to Malawi's property, people, and economy. Since 1980, more than 50 disasters associated with hydro meteorological events, including storms, floods, landslides and droughts, have been reported, affecting millions of people. Over 25 disasters associated with severe rainfall events (floods, landslides and storms) have occurred in the last decade alone and have exhibited an incremental upward trend in terms of the number of people affected (Malawi, 2023).

According to the Malawi 2015 Floods Post-Disaster Needs Assessment Report, the 2015 floods resulted in 278 deaths, 638 affected and physical damages and economic losses of $335 million, while the 2019 floods resulted in 60 deaths, 975,000 affected and damage and losses of $220 million. (Government of Malawi, 2019)

> "The disaster events for 2023 negatively affected people's lives, livelihoods and the country's socioeconomic infrastructures, pushing more people into poverty. In total 16 local authorities were directly affected, and an estimated 2,267,458 were affected, including 659,278 people who were displaced (336,252 females; 323,027 male), 679 killed, over 530 people declared missing by mid-March - 2023." (Malawi, 2023)

Despite the impacts and catastrophe, the hazards are bringing to our communities, early warning systems have a significant role in reducing damages. Early warning systems aim to provide timely action to save and protect people's lives, livelihoods, and property. According to the World Meteorological Organization (WMO), early warning systems say the damages caused by disasters can be reduced by 30% if an early warning is issued within 24 hours, meaning that with an effective early warning system, there are chances of reducing casualties by 30% if warnings are disseminated in time within 24 hours, avoiding $3-16 billion in losses per year globally through early warning systems.

WMO also finds out that from 1970 to 2019 on average of 50 years, a Weather, Climate or water related disasters has occurred every day and the numbers of disasters has increased five-fold over a 50-year period (1970-2019), and 50% of all the disasters recorded the 50-year period were all related to weather, climate and water hazards. But

30% of the global population are not yet covered by early warning systems (World Meteorological Organization, 2025).

1.2 Problem statement

Natural disasters such as floods continue to pose serious threats to human life, infrastructure, and economic activity in our communities. Early warning systems play an important role in reducing and mitigating the effects of these disasters by providing timely and accurate warnings to communities that are expected to experience disasters. However, the effectiveness of these early warning systems is determined not only by technological advancement but also by public awareness, which refers to people's understanding of what those systems are, how they work, their trust in the systems, and how they react to them. These also differ depending on the cultural, economic, and geographical context.

Despite their importance, meaning to say the critical role of public perception in the effectiveness of the early warning systems, there is limited research on how communities perceive the accuracy, how accessible and relevance and inclusivity of early warning systems, especially in rural areas with different educational backgrounds, cultures, income and experiences with disasters. This gap in understanding hinders the development of inclusive and effective early warning systems that align with the needs of people. With such a challenge, it is difficult to have informed decisions in disaster preparedness strategies and mitigation measures.

So this research aims to address this gap by assessing public perception of early warning systems by identifying factors that influence trust and response to the warnings and recommending strategies to improve effective early warning systems for resilient communities.

1.3 Main objective of the study

To assess public perception of early warnings, their response on the basis of a warning.

Specific Objectives:

i. To investigate the actions taken by communities in Chikwawa in response to early warning messages.
ii. To evaluate the effectiveness of early warning systems in disseminating messages to communities in Chikwawa.
iii. To examine the ability of communities in Chikwawa to interpret and act on daily weekly, monthly and seasonal weather forecasts.

1.4 Significance of The Study

Early warning systems are crucial in disaster reduction because they enable individuals, communities and governments to prepare and respond to natural disasters in a timely manner. Here are some of the reasons why early warning matters:

I. Saving lives: early warning provides timely messages of an impending storm, thereby allowing people to evacuate or seek shelter, reducing the risk of injury or loss of life.
II. Reducing economic losses: early warning systems help minimize the damage to infrastructure, properties and agricultural crops, thereby reducing money that could be used to recover things damaged by the disasters.
III. Enhances preparedness: early warning systems enable authorities to mobilize resources, evacuate people and implement emergency measures before disaster strikes.
IV. Supports resilience in the communities: early warning systems empower communities to take proactive steps, fostering a culture of preparedness and resilience.

Rural communities, including those in Chikwawa, are more vulnerable to natural hazards such as floods, storms, cyclones, droughts and dry spells due to

1. Limited infrastructure: rural areas often lack infrastructure and resources to respond to natural disasters.
2. Limited access to information: rural communities may have limited access to information and early warning systems, which can make them more vulnerable to health impacts and natural disasters.

Disasters can have devastating impacts on lives, livelihood and local economies, including loss of lives and injuries, causing harm to families and communities and displacement and homelessness, leaving families without access to basic necessities. The purpose of this research proposal is to gauge public perception of the entire weather forecasting process, to see if a more sophisticated system of communication, through which the government could warn people about the impending storm, would be useful in chikwawa sekeni 1 village

2.0 LITERATURE REVIEW

Understanding the effectiveness of early warning systems in disaster risk reduction requires a comprehensive examination of both the technical and social dimensions that underpins these systems. As the frequency and severity of climate-related disasters increases globally and in Malawi, the need for robust, inclusive and trusted EWS become ever more urgent. This chapter discusses key scholarly works relevant to early warning systems with a focus on their application in developing countries and rural contexts such as Malawi.

2.1 Early warning systems

Early warning is the provision of timely and effective information, through identified institutions, that allows individuals exposed to hazard to take action to avoid or reduce their risk and prepare for effective response. Other studies review early warning as information that enables institutions to act against an impending hazard to minimize or prevent losses, and it is the integration of four main elements, according to the United Nations' International Strategy for Disaster Reduction (ISDR). It integrates (UNDP, 2018):

a. Risk Knowledge: Risk assessment provides essential information to set priorities for mitigation and prevention strategies and design early warning systems.
b. Monitoring and Predicting: Systems with monitoring and predicting capabilities provide timely estimates of the potential risk faced by communities, economies and the environment.
c. Disseminating Information: Communication systems are needed for delivering warning messages to the potentially affected locations to alert local and regional governmental agencies. The messages need to be reliable, synthetic and simple to be understood by authorities and the public.
d. Response: Coordination, good governance and appropriate action plans are key points in effective early warning. Likewise, public awareness and education are critical aspects of disaster mitigation. Failure of any part of the system will imply failure of the whole system. For example, accurate warnings will have no impact if the population is not prepared or if the

alerts are received but not disseminated by the agencies receiving the messages.

This research reviews that the earlier and more accurate we are to predict the potential risk associated with the natural and human-induced hazards, the more likely we will be able to manage and mitigate the impacts on communities. According to sustainable development goal 2015-2030, goal 13 on climate action addresses the importance of mitigating climate change and reducing its impacts. More specifically, the goal encourages the spreading of early warning systems to reduce climate change-related hazards through the following targets:

I. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
II. Improve education, awareness-raising and human and institutional capacity on climate change adaptation, impact reduction and early warning.

2.2 Early warning systems in Malawi

Despite recent efforts by various stakeholders to improve existing systems in Malawi, several gaps remain. This research reviews and evaluates the existence of early warning systems in Malawi. Decades ago, communities in Malawi had to rely solely on indigenous early warning systems for both floods and droughts. Nowadays, the existing EWS for floods in Malawi consists of an official Early Warning System at the national level and a series of community-based early warning systems (CB-EWS), in addition to the indigenous Early Warning System. (Chavula, 2015)

"The Ministry of Agriculture, Irrigation and Water Development (MoAIWD) is responsible at the policy level for the national Early Warning System, whereas the Department for Climate Change and Meteorological Services (DCCMS) provides the required forecasts. DCCMS is the Malawian meteorological institute that aims at providing reliable, responsive and high-quality weather and climate services to meet national, regional and international obligations through timely dissemination of accurate and up-to-date data and information for socio-economic development.

> They offer different services to the public on climate and weather, such as aviation, marine, agriculture and livestock management, water resources, etc. They are responsible for issuing weather forecasts and warnings of severe weather to the general public and other specialized users. The Water Resources Department (Surface Water) is in charge of monitoring the river catchments, and they use a flood routing procedure that gives forecasts with relatively low accuracy." (Robert Šakić Trogrlić, 2018)

Although there are now both indigenous early warning systems in the communities that have been helping them for a long time by experienced leaders and elderly people to predict the future climate and weather, with the introduction of scientific, grounded early warning systems, they do not benefit from the scientific national systems, as the systems lack forecasting skill and early warning messages are not received (lack of internet or mobile connection, lack of access to television and radios), not understood (message content being too technical, not localized) and not sufficient means or knowledge to do so.

2 2.3 EARLY WARNING SYSTEM IN CHIKWAWA

Chikwawa for many years have been using Indigenous knowledge as an unconventional and traditional Early warning systems Before the introduction of scientifically grounded early warning systems. The value of indigenous knowledge as traditional and unconventional early warning systems has been widely recognized, particularly for its significance in supporting rural communities. IK has also been identified as a crucial factor in promoting technological and socioeconomic development in vulnerable areas (Chiota, 2016).

Research conducted in Chigaka village, Chikwawa, highlighted the reliance of villagers on indigenous knowledge to adapt to changing local climate conditions, despite receiving official warnings from government extension services (Mkomwa, 2014). However, the effectiveness of the traditional indicators in predicting climate and weather patterns is

decreasing due to climate change and environmental degradation, with some indicators becoming obsolete.

2.4 Early warning systems and Public perception

Perception refers to the organization, identification and interpretation of sensory information in order to represent and understand the environment. The study of these perceptual processes shows that their functioning is affected by three classes of variables—the objectives or events being perceived, the environment in which perception occurs, and the individual doing the perceiving. Studies have shown that people's perception and understanding on early warning systems plays a significant role in their decision-making processes during natural disasters (Sabah Parvaze, 2022).

This research reviews the guidelines on the early warning systems that the public perception that the warning message itself does not stimulate an immediate response from individuals. Individuals receiving the warnings will first assess their own personal senses of risk and seek a secondary source of confirmation. The additional information required before they take action depends on the content and clarity of the initial warning and the credibility of the issuing organization. Respect for the warning by the public is essential to ensure prompt and effective responses and measures to foster trust among the public in warnings (WMO, 2023). The perception that individuals have of the process of early warnings issued by the authorities is a crucial part of their success; even the most accurate warning has the potential to be ineffective if the people choose to ignore it or do not trust its message.

Early warning systems are critical tools for mitigating the impacts of natural hazards, particularly in regions like the Chikwawa District, where floods pose significant threats. Floods, often triggered by the overflowing of the Shire River and tropical cyclones such as Idai (2019) and Freddy (2023), have devastated this low-lying area, disrupting livelihoods and infrastructures. The effectiveness of EWS does not only depend on technological capabilities but also on public perception—how communities trust, understand and respond to warnings. This review explores existing research on public perception of EWS

for extreme weather events such as tropical cyclones and floods in Chikwawa, focusing on trust in institutions, communication effectiveness and behavioural responses.

2.4.1 Trust in Early warning systems

Trust in the institutions issuing warnings significantly shapes public perception in general. Chinguwo and Deus (2022) found that while community-based flood EWS, such as flood river gauges along the shire river, are recognized, trust is lost due to delayed or inaccurate alerts. often linked to bureaucratic inefficiencies at the National level; for instance, during cyclone Idai in 2019, upstream flooding overwhelmed local systems, leaving the residents sceptical of official forecast despite their accuracy at a broader scale (Dickson Chinguwo, 2022) Similarly, the 2023 cyclone Freddy post-disaster needs assessment reported that there were widespread frustrations in Chikwawa after late mobile alerts failed to reach rural areas, thereby reinforcing perceptions of unreliability. (Malawi, 2023). Trust in the authorities and organizations issuing the warnings is essential for public compliance; that is to say, if the public does not trust the sources they are less likely to listen to the warnings. These findings show that trust really influences public perception of early warning systems.

2.4.2 Effectiveness of Communication Channels

The way warnings are communicated can significantly impact their effectiveness; the messages must be clear, concise and easily understood by the target audience. The channels that are used to disseminate warnings profoundly affect the perception and response in different areas, including Chikwawa. Trogrlic et al. (2023), Note that floods occur roughly every five years along the Shire River, yet warnings often fail to reach communities due to poor infrastructure and reliance on centralized systems (Daniel Nakapu Hussein, April 2023). According to UNICEF, radio remains a valued medium, with documented positive reception to timely broadcasts during Cyclone Anna, though access to radios varies across

rural households. Mobile alerts were tested post-Anna and low literacy rates (Munthali, 2022). In contrast, indigenous methods, such as observing ants or hippos relocating in response to localized warnings.

2.4.3 Behavioural responses to warnings.

Perception directly influences whether people act on EWS. Chinguwo and Deusus (2022) observed that despite awareness of flood risk, many delay evacuations due to distrust in official timing or underestimation of upstream threats, a pattern exacerbated by Cyclone Idai's rapid onset (Dickson Chinguwo, 2022). The 2023 Freddy aftermath revealed similar hesitancy, with some attributing inaction to unclear instruction or prior false alarms (Malawi, 2023). Trogrlic et al. (2023) suggest that normalization of risk - living with floods— further dulls response, a behavioural trend echoed in global disaster studies (Daniel Nakapu Hussein, April 2023). However, when warning aligns with visible cues.

2.4.4 Cultural and contextual influences.

Cultural factors shape how EWS are perceived and utilized. Ngongondo et al. (2021) highlighted the reliance on indigenous knowledge, such as ecological indicators reflecting a cultural performance for community-driven solutions over top-down systems; this contrasts with urban contexts where technological EWS dominates. The collective of rural Malawian communities also fosters skepticism toward external authorities, especially post-cyclone when aid delivery falters (Malawi, 2023). Limited resources such as lack of phones, electricity and literacy further contextualize perception, distinguishing rural areas from urban areas (Munthali, 2022). These elements suggest that EWS effectiveness hinges on aligning with local norms and capacities.

David Rodgers and Vladimir Tsirkunov, in a report, "Implementing Hazard Early Warning Systems," highlighted key cross-cutting issues for the effectiveness of EWS. Firstly, there is

the involvement of local communities. They reported that people-centred early warning systems rely on the direct participation of those most likely to be exposed to hazard; without the involvement of local authorities at risk, government and institutional interventions, and responses to hazard events are likely to be inadequate. They also said that a local, "bottom-up" approach to EWS with participation of communities enables a multi-dimensional response to problems and needs. In this way, local communities, civic groups and traditional structures can contribute to the reduction of vulnerability and to the strengthening of local capacities. They also looked at the consideration of gender perspectives, cultural diversity and disability. They said It is essential to recognize that different groups have different vulnerabilities according to gender, culture or other characteristics. In their findings they said women and men often play different roles in a society and have different access to information in disaster situations. In addition, the elderly, disabled and economically disadvantaged are often more vulnerable (David Rogers, 2016)

UNDP (2018), in their study highlighted challenges and obstacles that limit the expansion or success of EWS, especially in developing countries, where either the expertise, technology, or budget needed for EWS is lacking; many challenges are encountered during the implementation and maintenance phases. In their review, they found that legal and institutional arrangements, technological infrastructure and forecasting capabilities in developing countries, and human resources and expertise are the main challenges that are hindering the effectiveness of EWS, and these lead to distrust in the issued warnings by different communities, affecting perception of the EWS (UNDP, 2018).

Public perception plays a critical role in the effectiveness of early warning systems. By understanding how the public perceives and responds to warnings and by implementing strategies to improve public response, it is possible to enhance the ability of early warning systems to save lives and minimize damages. This paper is assessing and identifying the most effective ways to communicate warnings, build public trust, and promote community engagement. It is also addressing the socioeconomic factors that influence public perception and response to ensure that all members of the community are protected. Addressing these challenges and capitalizing on the opportunities presented by new

technologies, it is possible to create more effective and equitable early warning systems that can protect communities from the devastating impacts of disaster.

3.0 METHODOLOGY

This chapter discusses how the study was carried out by examining specific methodologies used, research instruments, sample size, sampling methods, and data collection techniques. The chapter also describes where the study was conducted and the qualitative data collection methods used. To assess people's perceptions of early warning systems in Chikwawa, this research is answering the following research question:

How do people in Chikwawa perceive and respond to early warnings, and what factors shape these perceptions over time?

To address this research question, qualitative data collection and analysis methods were used.

3.1 Study Area

This study uses a community in Chikwawa District, Sekeni 1 village, Southern Malawi, as a case study. This study area is a semi-arid area that is prone to floods. The district borders Mozambique and has the lowest elevation in the country, at around 37m above sea level. Chikwawa and neighbouring Nsanje districts are part of the Lower Shire Valley in the Southern Region of Malawi. This area was chosen because it has been affected by the impacts of natural hazards for many years.

Map Showing Chikwawa District, Sekeni Village

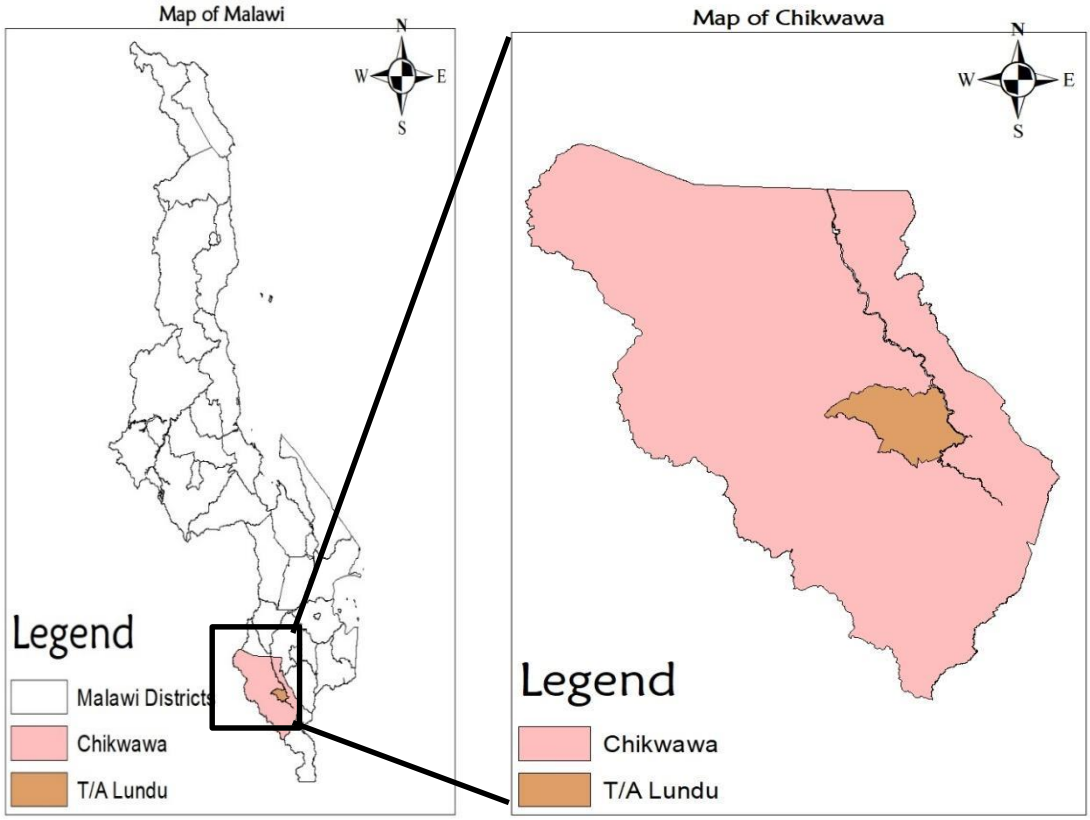


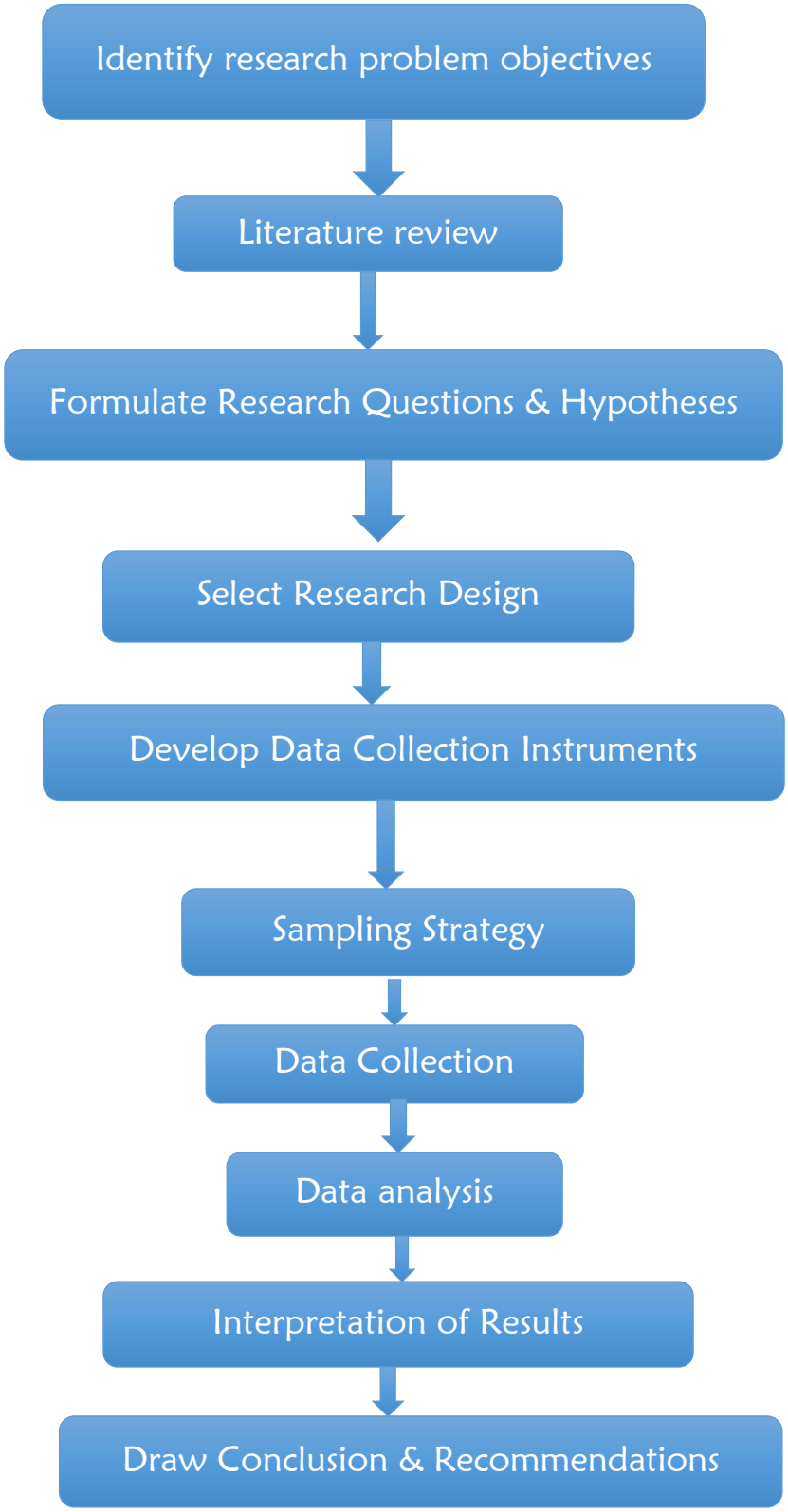
Figure 1: Map of study area

3.2 Research design

This study used a qualitative research design approach to explore and gain a deeper understanding of people's perceptions and experiences with early warning systems in Chikwawa. This design addresses the literature gap, demographic variation and trust evaluation.

.

Below is a flow chart of this research design



3.3 Research approach

This used an interpretive approach and it is the kind of approach that focuses on understanding people, meanings and interpretations of participants' experiences and perceptions.

3.4 Research method

This research is discussed by focusing on both qualitative and quantitative research. It provides an overview of the sampling methods, population, sample size and data collection techniques used during the study. It also describes how data was managed and analysed. The quantitative research method was used to collect numerical data from households by administering questionnaires created specifically for this study. The study gathered quantitative data on people's perceptions of early warning systems, which were then entered and analysed using Google Sheets and Excel formulas to generate percentages, charts, frequencies, and tables to explain the descriptive statistics.

3.5 Sampling Method

The sampling strategy for this sample was purposive, which was used whereby Participants were selected based on their experience and knowledge of early warning systems in their community and Maximum variation was designed to ensure diversity in age, gender, and the level of their education. Participants were chosen based on their familiarity with EWS, such as receiving alerts or participating in the community drills, to ensure that their responses were in relation to the study's objectives. The maximum variation was incorporated by deliberately including individuals from different age groups (e.g. under 18, 18-30, 31-45, 46-60, and over 60), genders (male and female) and education levels (no formal education, primary school, secondary school, college/university) to capture a broad overview of perspectives and experiences. This approach mitigated the potential biases, accounted for cultural and social contexts, and facilitated a comprehensive understanding of public perception, thereby aligning with the study's objectives.

3.6 Data collection

The household survey in this study was conducted using a structured, close-ended questionnaire with optional responses that respondents had to check off. Face-to-face interviews were used to administer the questionnaire and collect data. During the face-to-face interviews, the household survey questionnaire was translated into the local language to ensure that everyone understood the questions. Then I filled out the English questionnaire because the translation was only done to help them clarify certain questions with the respondent.

3.7 Data analysis

Data analysis entails organizing, accounting for, and explaining data in order to make sense of it in terms of what participants define as situations. To make sense of the participants' definitions in this study, data from completed household questionnaires was analysed using Google Sheets and Excel formulas. During data collection, the research team ensured that all data collected on each household was complete and accurate. This contributed to a reduction in the number of nullified questionnaires during the data analysis. The data was analysed using descriptive statistics, and the results were presented as means, frequencies, and percentages in tables and graphs.

3.8 Data quality and integrity

Member checking entails reviewing participant transcripts for accuracy and validation, peer briefing, which includes regular discussions with colleagues to ensure objectivity and credibility, and data triangulation, which combines multiple data sources (interviews, focus groups, observations) to improve validity.

3.9 Ethical considerations

This study ensured that participants participated voluntarily, without being forced to complete questionnaires or discussions. Their participation was based on their informed consent, which was obtained after they were briefed on the study's objectives and purpose. Participants were assured that their participation was completely confidential and that the information gathered would only be used for academic purposes. Participants were also

informed about the significance of the study and how it would help inform future sustainable development programs in their community. All participants were treated with dignity and integrity, regardless of gender, tribe, or age.

4 RESULTS AND DISCUSSION

4.1 introduction

This chapter presents the research findings and discussions. The chapter outlines all the results of the study from the analysed data and present a discussion based on the findings of all the tools described in this study. The research data from the household survey was analysed using Google Sheets and Excel formulas, and the results have been presented in the form of graphs, pie charts and tables.

The first part of the findings presents the demographic data, which includes the gender, age and education level of the respondents. The actual research findings have been presented based on the research questions and objectives with a thorough discussion.

4.2 Demographic information

4.2.1 Gender representation of the research participants

Table 1: Sex of respondents

	Frequency	Percent
Male	54	36.99%
Female	92	63.01%
Total	146	100.0%

Table 1 shows that there were more female participants, about 63.01%, who participated in the survey than there were male participants, with 36.99% of the total sample of the study. This can be explained by the fact that women are generally expected to care for the household and are more likely to be at home than men. It is also beneficial to the study because women are more affected by these disasters, and their influence in the study helped in focusing the discussion on the actual responses.

4.2.2 Age group of respondent

Table 2: Age group of respondents

	Frequency	Percentage
Under 18	23	15.75%
18-30	48	32.88%
31-45	38	26.03%
46-60	23	15.75%
Above 60	14	9.59%
Total	146	100%

The results show that the study included the diverse group of people to understand the perceptions from different groups. The findings show a high percentage of youth. Younger generations are more educated than older generations, and they rely more on modern, scientific early warning information, whereas older generations frequently trust indigenous knowledge and traditional indicators passed down through generations. On the other hand, the elderly have prior experience with accurate and timely warnings, which influences trust and perception across age groups.

4.2.3 Educational Background of Respondents

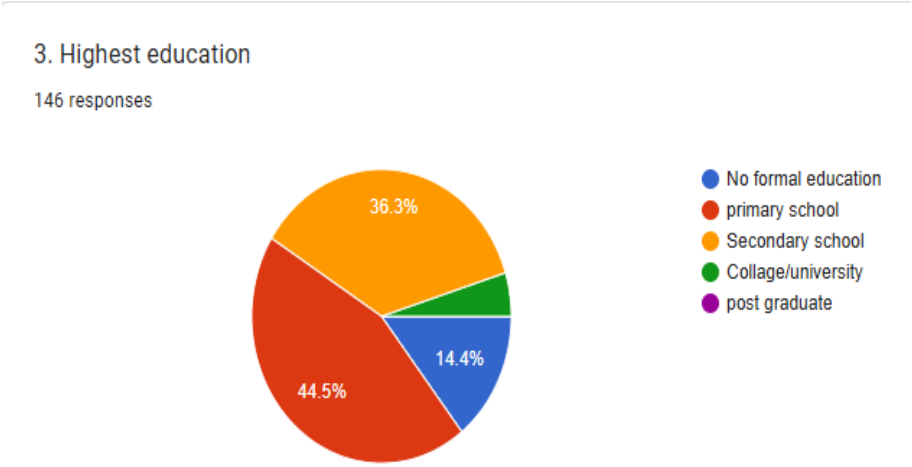


Figure 2 showing education level of respondents

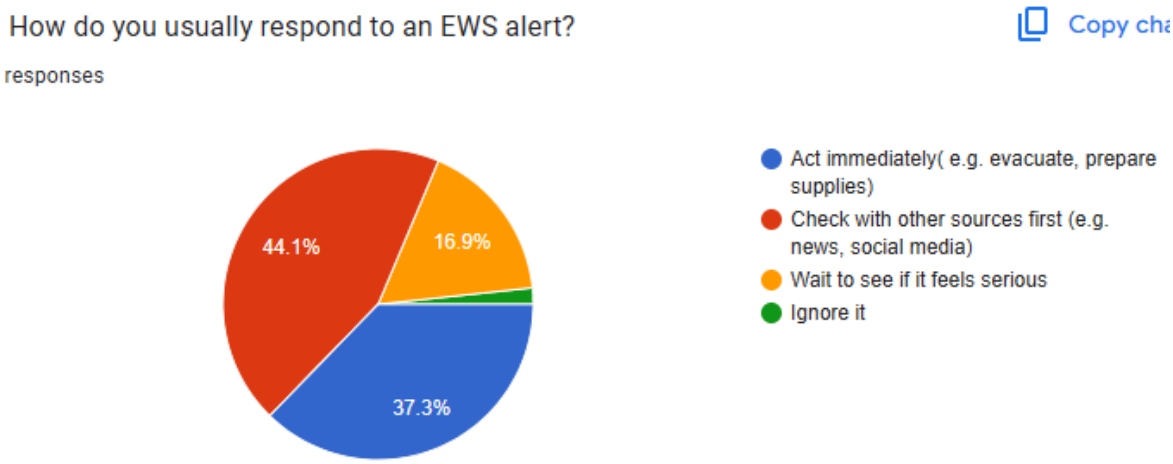
The pie chart in figure 2 shows 44.52% with primary education, 36.3% with secondary education, 14.38% without formal education, and 4.79% with college education. This distribution demonstrates that the majority of residents have a basic education, necessitating tailored communication strategies that use simple language and visual aids to maximize impact.

4.3 Research Analysis, Results, and Discussion

In this section, the research findings are presented, analysed, and discussed in relation to the study objectives. The study focuses on the public's perception of early warning systems, their knowledge of EWS, how they respond to warnings (specifically, the actions taken), and the effectiveness of EWS.

4.3.1 Community Actions in Response to EWS

Figure 3 shows how people respond to EWS.



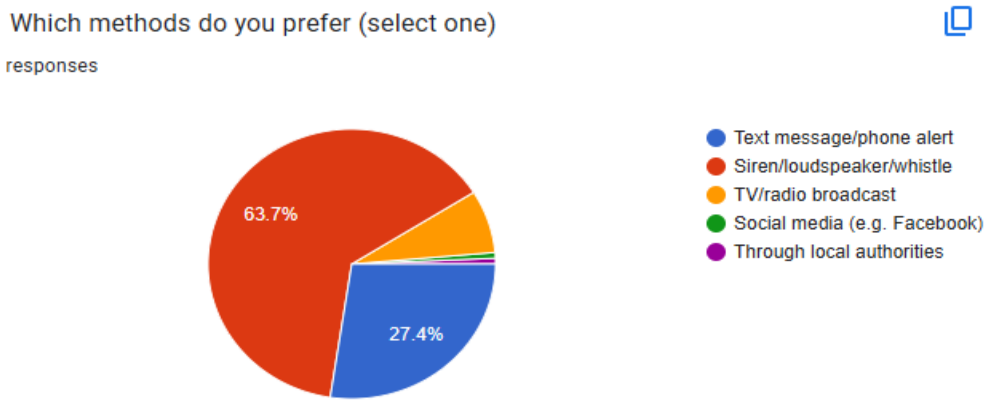
The pie chart in Figure 3 shows how people react to early warnings: 44.1% confirm with others, 37.3% act right away, and 16.9% wait to see if it is true. This means that they were able to express their opinions on the response to early warning systems. This explains the study's objectives. This implies that their responses were grounded in a practical understanding of early warnings.

The study found that while most community members are aware of early warning systems, there is a variation in how individuals respond to warnings. Many respondents indicated that they take recommended actions such as moving to safer places or securing properties when they receive credible warnings, especially from trusted sources like local leaders and radio broadcasts. However, a significant number of people delay or not act on warnings at all. The main reason for this inaction includes scepticism about accuracy of warnings, previous experience with false alarms, and lack of resources to evacuate or take preventive measures.

These findings are consistent with a research by Paul et al. (2021), who observed that trust in the warning source and perceived reliability are crucial for motivating community responses. Social influences also play a role, as decisions are often shaped by neighbours and family members. This suggest that increasing community trust in early warning systems and involving respected local figures in dissemination can improve response rate (Dutt, 2010).

Figure 4: Evaluating the factors facilitating the effectiveness of EWS dissemination.

A



B

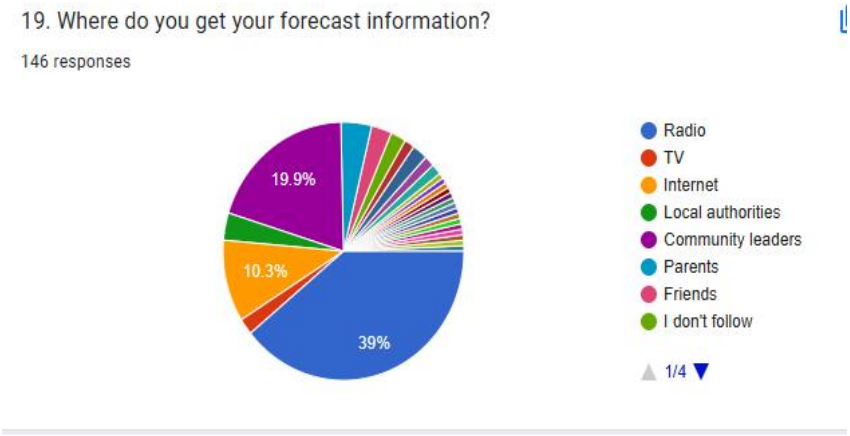


Figure 4: Evaluating the factors facilitating the effectiveness of EWS dissemination.

The pie chart in figure 4A shows a significant majority, 63.7%, prefer sirens, loudspeakers, or whistle alerts for receiving warnings, indicating a preference for immediate, audible notifications that do not require personal devices. Text messages or phone messages are the next most preferred, chosen by 27.4%. In contrast, TV broadcasts and social media are rarely preferred. Suggesting limitations in limitations technology access. And in figure 4B also it is shown that the most common source of information is the radio, with 39%, followed by information given by community leaders. This distribution highlights radio's importance as a reliable and accessible medium in rural areas.

The results show that radios and local leader are the most effective and trusted channels for disseminating early warnings in sekeni I village. However, there are notable barriers to effective communication: limited accesses to radios or mobile phones, language and literacy challenges and occasional delays in receiving messages. Some members reported receiving warnings too late to take action, others struggled to understand technical language or unfamiliar terms used in official forecasts.

Figure 5: Assessing ability to interpret and act on forecasts.

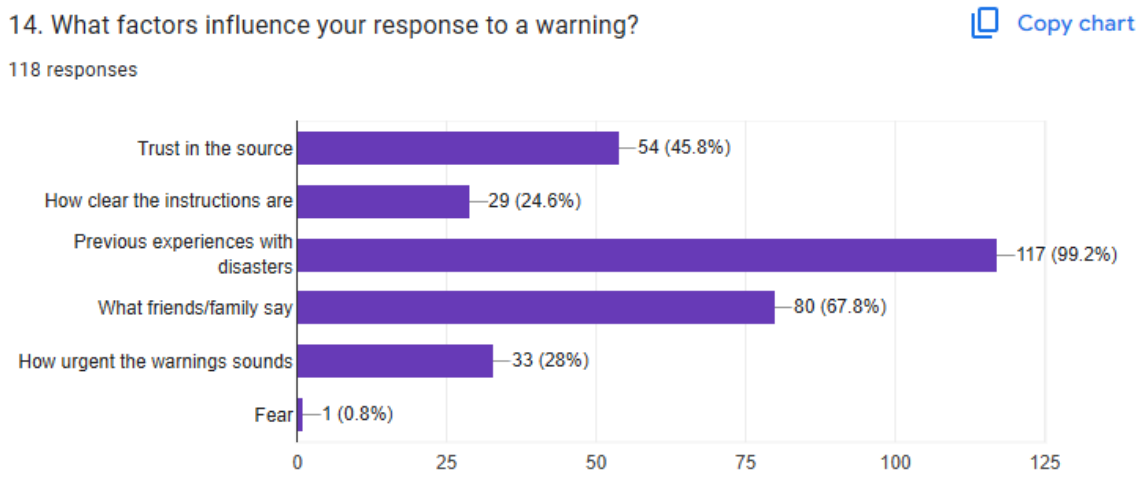


Figure 5: Assessing ability to interpret and act on forecasts.

This graph in figure 5 shows some of the factors that influence response to warnings. This study identified previous experiences with disasters as the most influential factor, with the highest percentage suggesting that personal history shapes warning perception. What family and friends say also influences the response, highlighting the role of social networks in decision-making. The other percentage shows that people trust the sources where the information is. This suggests that social and experiential factors outweigh message characteristics.

The findings show that radio and community leaders are reliable sources, highlighting the importance of local, accessible communication channels. The preference for sirens and loudspeaker alerts suggests that immediate, community-based warning methods are the most effective, owing to their reach and urgency. Trust, experience, and social influence (family and friends) all heavily influence responses, emphasizing the importance of social networks in disaster preparedness. While there is a tendency to check with other sources first, this highlights the need for clearer and more reliable warnings. The educational profile suggests tailoring messages to audiences with primary basic education by using straightforward and actionable language.

This chapter presented the study's findings and discussions, focusing on demographic information, community understanding of early warning systems, how they perceive warnings, and factors influencing their actions in response to warnings.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction.

The study examined the community's perception of early warning systems in Sekeni I village, Chikwawa District. The study's objectives were to assess public perception of early warnings and their response to warnings, to investigate the actions taken by the Chikwawa community in response to early warning messages, to evaluate the effectiveness of early warning systems in disseminating messages to Chikwawa communities, and to assess the ability to interpret and act on daily, weekly, monthly, and seasonal weather forecasts.

5.2 Conclusion.

Public perception plays a critical role in the effectiveness of early warning systems. In the case of Sekeni I Village, the study demonstrates both strengths in community awareness and gaps in communication and resources. Addressing the identified challenges can improve disaster resilience and reduce flood impacts in Sekeni I village in Chikwawa. The study also contributes valuable insights for policymakers and disaster management practices in Malawi.

Effective early warning systems play an important role in adaptation and mitigation of the impacts of natural disasters and environmental hazards. However, the effectiveness of these systems and warnings depends on the public's understanding, awareness and responses. This research aimed to assess public perception of early warning systems, identifying areas where improvement on strategies can be done to enhance preparedness and responses. The study can help in reducing the effects that come due to natural disasters since the findings will inform policy and practices, thereby reducing the impacts and promoting community resilience.

5.3 Recommendations

Following these findings, possible recommendations are made to various organizations, government workers in the Department of Climate Change and Meteorological Services, the Department of Disaster Management Affairs and district councils, with the following recommendations to guide future research:

i. Increase community engagement and ownership of EWS by conducting regular training and drills.
ii. Improve communication infrastructure, such as mobile networks, community radios, and megaphones, through sustained funding.
iii. Improve coordination among various stakeholders and neighbouring communities to ensure smooth information flow.
iv. Provide financial and technical assistance to vulnerable households to facilitate effective evacuation and early intervention.
v. Further research could look into how people perceive EWS in urban areas, as well as the impact of new technologies

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