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PART OF NORWEGIAN  
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# **ENHANCING CLIMATE INFORMATION SERVICES IN MALAWI**

INSIGHTS FROM USERS  
OF CLIMATE INFORMATION  
SERVICES







PART OF NORWEGIAN  
REFUGEE COUNCIL

# ENHANCING CLIMATE INFORMATION SERVICES IN MALAWI

## Insights from Users of Climate Information Services

**APRIL 2025**

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## 1.0 EXECUTIVE SUMMARY

### 1.1 ENHANCING CLIMATE INFORMATION SERVICES IN MALAWI

Malawi's agricultural heartland, its vital fisheries, and its vulnerable communities are increasingly besieged by the intensifying perils of climate change. The escalating frequency and severity of erratic rainfall patterns, devastating cyclones, and prolonged droughts are not merely abstract threats; they are tangible realities that directly undermine food security, erode livelihoods, and destabilize the nation's socio-economic fabric. The Department of Climate Change and Meteorological Services (DCCMS) Malawi conducted a hybrid survey using KoBo Tool-box covering all the three regions of Malawi and in-person interviews across six districts (Lilongwe, Blantyre, Zomba, Rumphi, Phalombe & Mangochi). This mixed-method approach ensured inclusivity for stakeholders without smartphone access, capturing insights on the usability and accessibility of Climate Information Services (CIS) in rural and far flung communities.

The in-person interviews were very useful in providing a real snapshot of the users of the Climate Information Services in Malawi. The objectives of the survey, were as follows:

- o Identify gaps in CIS delivery (e.g., accessibility, accuracy & confidence level) in Malawi
- o Develop tailored CIS formats (e.g., radio broadcasts, SMS) in the country
- o Establish institution website access and smartphone use in Malawi
- o Strengthen the DCCMS communication.

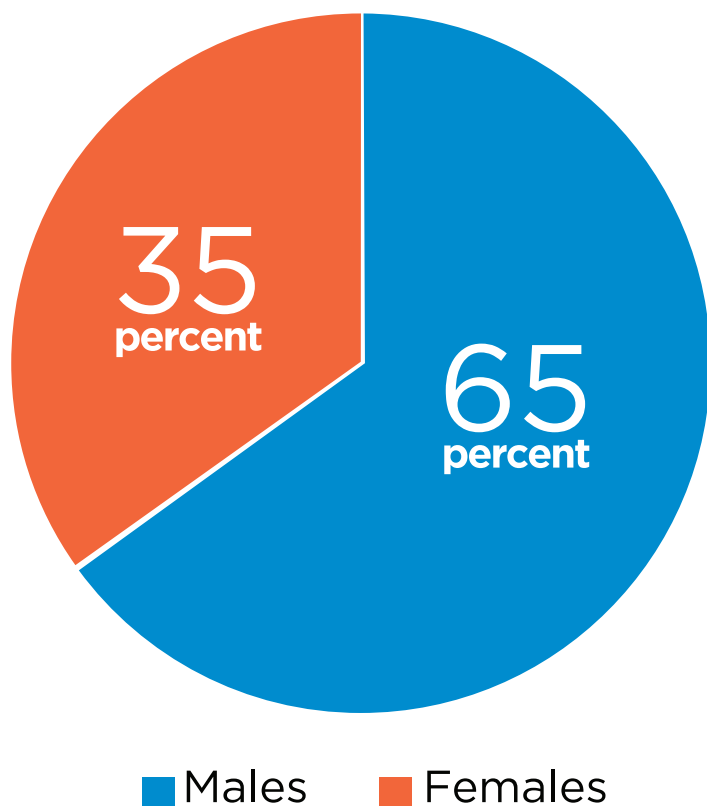
This survey underscores DCCMS's commitment to ensuring that climate information becomes a cornerstone of sustainable development for all Malawians.

This report, grounded in a comprehensive nationwide survey encompassing 400 diverse respondents, illuminates the stark realities of the current landscape. It dissects the critical vulnerabilities within the dissemination and utilization of Climate Information Services (CIS), revealing gaps in accessibility, trust, and effective application. These gaps represent not just logistical challenges, but existential threats that demand immediate and decisive action to safeguard Malawi's future. Below are the key insights and actionable steps to transform CIS provision into a lifeline for resilience.

## KEY FINDINGS AT A GLANCE

### GENDER DISPARITIES

#### GENDER IN %

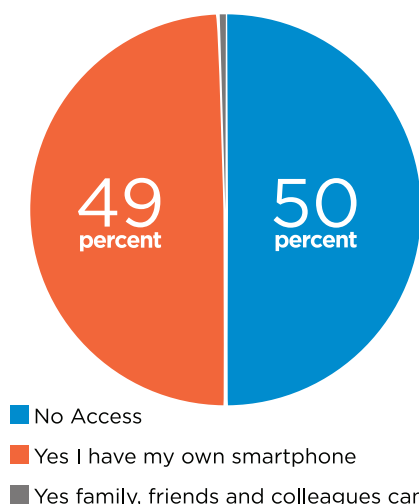


65% of respondents were men and 35% women, reflecting cultural and digital barriers for women. A significant majority of female respondents are profoundly disconnected from digital information streams.

This digital exclusion manifests in limited or non-existent access to smartphones and the internet, forcing reliance on traditional, less immediate sources like radio broadcasts, community gatherings, and direct environmental observation for crucial weather updates. Consequently, these women are effectively barred from leveraging modern platforms such as social media and specialized weather applications, tools that could provide timely and potentially life-saving information. Compounding this challenge, the survey revealed a substantial portion of these women possess only primary education or lack formal schooling altogether.

This educational disparity presents a formidable barrier, potentially impeding their ability to effectively interpret the often-technical language of climate data and to navigate the complexities of digital tools, thus exacerbating their vulnerability to climate variability.

#### ACCESS TO SMARTPHONE IN %



#### DIGITAL DIVIDE

A stark reality emerges, a significant 50% of respondents are excluded from the digital sphere due to a lack of smartphone access. This digital chasm is a direct consequence of entrenched socioeconomic disparities, including pervasive rural poverty and prohibitive device costs, effectively barring a substantial portion of the population from leveraging critical digital climate tools. This exclusion severely limits their ability to access and utilize essential resources such as real-time climate apps and social media alerts, hindering their capacity to proactively respond to climate-related risks.

## Targeted Digital Solutions for Smartphone Users

For the fortunate half of the population equipped with smartphones, the Zanyengo App offers a lifeline, delivering crucial real-time alerts, including timely flood warnings. This targeted digital intervention empowers these individuals with actionable information, enhancing their preparedness and resilience in the face of climate-induced hazards.

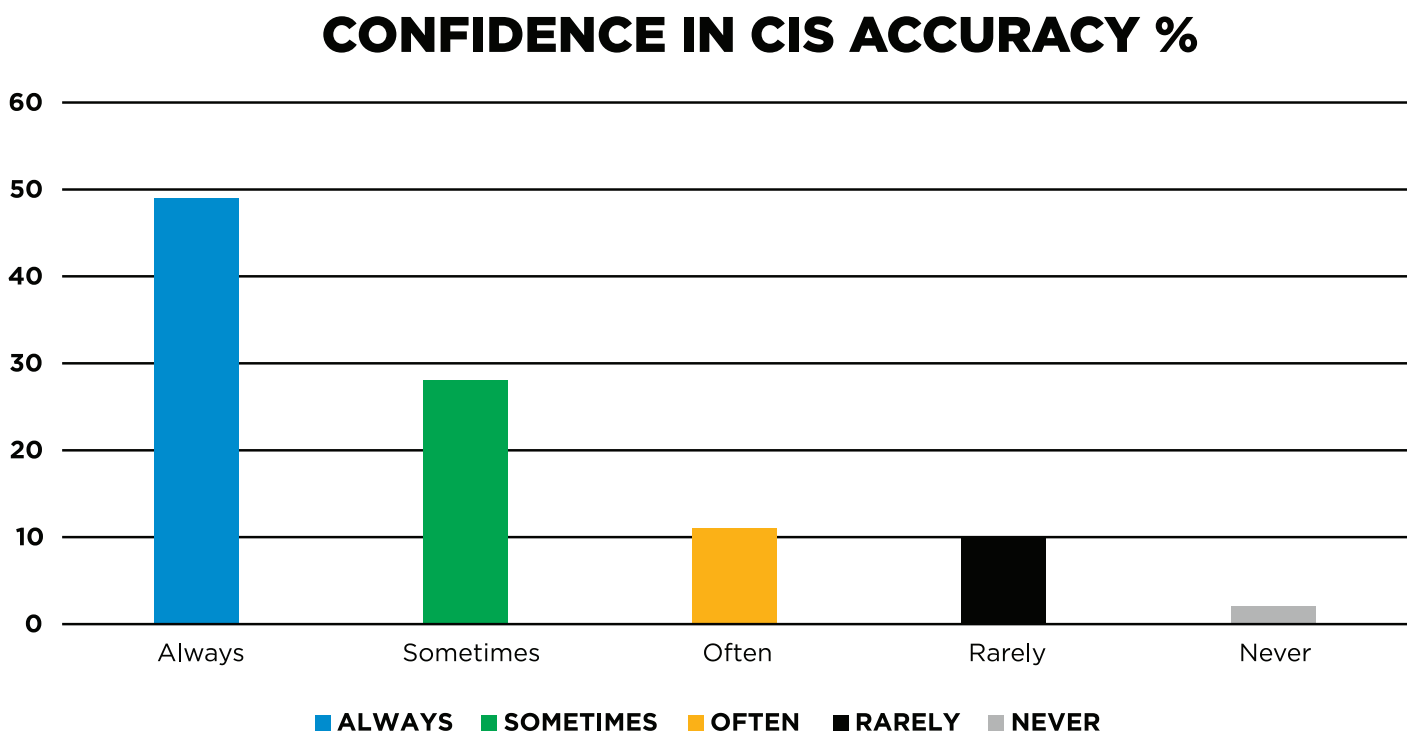
### Bridging the Digital Gap for Non-Smartphone Users

To address the profound digital exclusion faced by the remaining 50%, a multi-pronged approach is imperative. Strengthening traditional communication channels, such as radio broadcasts and community meetings, is essential to disseminate vital climate information. Simultaneously, piloting shared-access hubs, where trusted community leaders (e.g., village elders) are equipped with smartphones, can serve as a crucial bridge, enabling broader access to digital resources.

### Urgent Need for Digital Literacy

Compounding the issue of device access is a critical gap in digital literacy. Alarming, only 29% of respondents utilize weather apps, while a staggering 21% are completely unaware of their existence. This highlights the urgent need for comprehensive digital literacy initiatives, empowering individuals with the skills and knowledge necessary to effectively utilize digital climate tools. These initiatives should prioritize demystifying weather apps, demonstrating their practical applications, and fostering a culture of digital engagement.

## CONFIDENCE IN CIS ACCURACY





Trust in Climate Information Services (CIS) remains a key issue in Malawi. While a considerable 49% of respondents fully trust forecasts provided by the Department of Climate Change and Meteorological Services (DCCMS), 28% remain skeptical due to past inaccuracies, such as unanticipated droughts. Among available sources, radio emerges as the most trusted medium, with 60% of respondents preferring it for its affordability and ability to broadcast in local languages.

Localization of climate information presents a significant challenge. While the majority of users prefer receiving updates in Chichewa, minority languages such as Yao and Tumbuka remain underserved. Additionally, 32% of respondents find CIS content only "moderately relevant," as much of the information provided is too generic and not tailored to specific local needs.

Youth engagement in climate information services is notably low, with individuals aged 18 to 24 making up only 5% of active users. Furthermore, nearly half of the respondents (46%) have only primary or no formal education, making them heavily reliant on oral and visual formats for understanding climate information.

Different sectors also exhibit distinct needs. Farmers express a strong demand for mid-season drought alerts, with 44% stating that such information is lacking. Meanwhile, fishers remain skeptical of wind forecasts, with 40% preferring traditional indicators over meteorological reports. Addressing these sector-specific concerns is crucial for improving the overall effectiveness and adoption of CIS in Malawi.

## **WHAT NEEDS TO BE DONE**

To enhance Climate Information Services (CIS) in Malawi, a multi-pronged approach is required to ensure increased accessibility, relevance, and impact. The following strategic interventions will help bridge existing gaps and improve service delivery.

### **CO-DESIGNING CIS WITH COMMUNITIES**

To make climate information more useful at the grassroots level, it is essential to integrate traditional knowledge with scientific forecasts. Local indicators, such as tree flowering patterns, can complement meteorological predictions, making forecasts more relatable and actionable for communities. Additionally, capacity-building efforts should focus on training community radio journalists to deliver hyper-local weather updates in local languages, ensuring that critical information reaches the most vulnerable populations effectively.

### **BRIDGING THE DIGITAL DIVIDE**

Expanding digital access to climate information requires innovative approaches. The Zanyengo Weather App should be scaled up with offline features, such as voice alerts, to ensure usability even in areas with limited internet connectivity. Collaborating with telecom-

munications companies to provide zero-rated access to the app will further improve reach. Additionally, deploying 100 women climate champions equipped with subsidized smartphones and solar-powered radios can enhance last-mile dissemination of climate information, empowering communities to make informed decisions.

## **Strengthening Multi-Channel Communication**

A diversified communication strategy is key to improving CIS outreach. Strengthening partnerships with community radio stations, such as Rumphi FM, will ensure tailored climate advisories reach rural audiences. On the digital front, platforms like WhatsApp and Facebook can be leveraged for real-time alerts, while AI-driven chatbots can provide instant responses to frequently asked questions, making climate information more interactive and user-friendly.

## **Engaging the Private Sector**

The private sector has a critical role to play in advancing climate information services. Establishing a localized CIS Innovation Fund can support startups in developing specialized tools, such as lake-specific wind forecasting applications for fishing communities. Furthermore, partnerships with agribusinesses can link climate forecasts with market demands, such as promoting drought-tolerant seeds based on predicted rainfall patterns, thereby improving agricultural resilience.

## **Leveraging AI and Policy Reforms**

Harnessing artificial intelligence can enhance the precision of climate forecasts. Machine learning techniques may be used to downscale forecasts to finer spatial resolutions, such as 5km x 5km grids, providing more localized and actionable insights. DCCMS should clearly define the roles of NGOs, businesses, and community organizations in delivering and sustaining improved CIS across the country and involving them. By implementing these transformative measures, DCCMS can strengthen the country's climate resilience, ensuring that climate information is not only available but also accessible, actionable, and impactful for all.

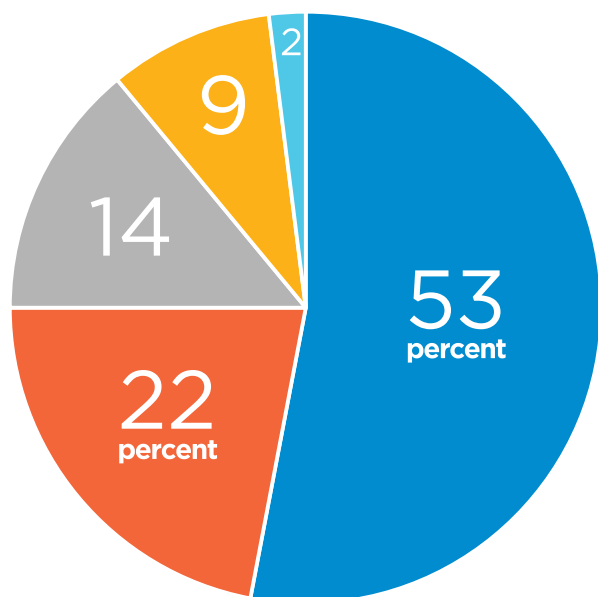
## **Why This Matters**

Malawi's food security and climate resilience depend on equitable, actionable CIS. Without urgent reforms, women, youth, and remote communities will remain vulnerable to worsening climate shocks. By prioritizing local voices, tech inclusivity, and cross-sector collaboration, Malawi can turn climate information into a tool of empowerment—not just data. Next steps, pilot programs in high-risk districts to test hyper-local CIS models and measure impact.

## 2.0 INTRODUCTION

### 2.1 CLIMATE VULNERABILITY IN MALAWI

WEATHER FORECAST FOR DECISION MAKING IN DAILY ACTIVITIES AS A %



■ Always ■ Sometimes  
■ Often ■ Rarely ■ Never

Malawi's economic lifeline, inextricably woven with climate-sensitive sectors, faces an existential threat. Agriculture, the bedrock of the nation, sustaining 80% of the population and fueling 30% of the GDP, is critically exposed. Similarly, the fisheries sector, anchored by the vital Lake Malawi, underpins the livelihoods of an estimated 1.6 million individuals, leaving them acutely vulnerable. The reality of climate shocks has laid bare Malawi's profound fragility.

The catastrophic impact of Cyclone Freddy in 2023, displacing a staggering 500,000 Malawians, and the relentless, debilitating droughts spanning 2022–2023, underscore the urgent need for decisive action.

A key vulnerability lies in the alarmingly inadequate utilization of Climate Information Services within the agricultural sector.

While 53% of respondents currently integrate climate forecasts into their planting decisions, this figure needs to be boosted considerably. To avert further economic devastation and safeguard the livelihoods of millions, a radical acceleration in the dissemination and application of comprehensive Climate Information Services is paramount.

This is not merely a matter of adaptation; it is a critical imperative for building resilience and ensuring the survival of Malawi's core economic sectors in the face of escalating climate variability.

### 2.2 THE ROLE OF CIS

The strategic implementation of robust Climate Information Services (CIS) presents a critical opportunity to mitigate climate-related risks across Malawi's vulnerable sectors. Specifically, effective CIS can serve as a potent tool for:

#### **Proactive Hazard Mitigation**

Delivering timely and accurate early warning systems for extreme events such as floods and droughts, enabling communities to prepare and respond effectively.



## Optimized Agricultural Practices



*A woman farmer with her child at the family farm in Rumphi District*



### Strategic Agricultural Optimization

Empowering Malawian farmers with highly granular and localized climate forecasts, enabling them to make data-driven decisions on optimal crop selection and precise planting windows. This translates to maximized yields and minimized risk in the face of increasingly variable climate patterns, thereby significantly bolstering agricultural productivity and long-term resilience

### Enhanced Fisheries Management

The Climate Information Services survey in Malawi has the potential to revolutionize fisheries management through; Precision-Driven Empowerment Delivering granular, lake-specific weather updates and forecasts, enabling fishers to make informed, real-time decisions.

This translates to maximized catch efficiency and minimized operational risks. Fortifying Livelihood Security Proactively mitigating weather-related hazards, safeguarding fishers' lives and assets, thereby ensuring the long-term sustainability of their livelihoods. Optimizing Resource Utili-

zation: Promoting efficient fishing practices through accurate climate data, fostering responsible resource management and contributing to the ecological balance of Malawi's vital aquatic ecosystems. Building Climate Adaptive Capacity- Equipping fishing communities with the knowledge and tools to navigate the increasing variability of climate patterns, enhancing their resilience to future challenges. Driving Economic Prosperity- By minimizing losses and maximizing yield, climate information services can contribute to a more stable and prosperous fisheries sector, boosting local and national economies.



*Fishers in Mangochi District working on their nets*

### 3.0 STUDY OBJECTIVES & METHODOLOGY

This study was designed to comprehensively assess and enhance the delivery of Climate Information Services (CIS) in Malawi. The following sections outline the specific objectives and the methodological approach employed.

#### 3.1 OBJECTIVES

The core objectives of this research were:

To identify and analyze existing gaps in CIS delivery within Malawi, specifically focusing on accessibility, accuracy, and user confidence levels.

To develop and recommend tailored CIS formats, such as radio broadcasts and SMS messaging, that cater to the diverse needs of the Malawian population.

To evaluate the current state of institutional website access and smartphone usage in Malawi, with a focus on their potential for CIS dissemination.

To strengthen the communication and competency skills of the Department of Climate Change and Meteorological Services (DCCMS) personnel.

#### 3.2 METHODOLOGY

To achieve these objectives, a rigorous and representative methodology was implemented, encompassing the following key elements:

##### **Sample Design**

A stratified sampling approach was utilized to ensure the study's findings accurately reflected the diverse demographics and geographic distribution of Malawi's population. This design aimed to capture variations across, rural and urban populations, smartphone and non-smartphone users. The Geographic regions, covering all three regions of Malawi. The sample size was 400. The regional distribution of the sample was as follows: Southern Region (44%), Central Region (43%), and Northern Region (13%). Specific districts were selected for inclusion in the study, namely Lilongwe, Blantyre, Zomba, Rumphi, Phalombe, and Mangochi.

##### **Tools**

The data collection employed a combination of digital and in-person tools:

Digital: KoBo Toolbox was utilized for conducting surveys with urban and tech-literate respondents, facilitating efficient data collection and analysis.

In-Person Interviews: Direct interviews were conducted with respondents, particularly those from rural areas and low-literacy groups, to ensure their perspectives were captured.

Limitations

**Gender Bias:** The sample exhibited a gender bias, with 65% of respondents being male, primarily due to prevailing sociocultural norms that influenced participation. This limitation should be considered when interpreting the study's findings.



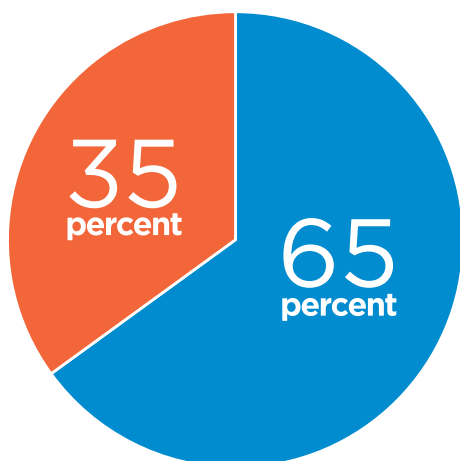
## 4.0 DETAILED FINDINGS

This section presents a detailed analysis of the study's findings, highlighting key demographic disparities, access and trust dynamics in Climate Information Services (CIS), communication channel effectiveness, localization gaps, and sector-specific challenges.

### 4.1 DEMOGRAPHIC DISPARITIES

#### Gender Divide

##### GENDER IN %



■ Males ■ Females

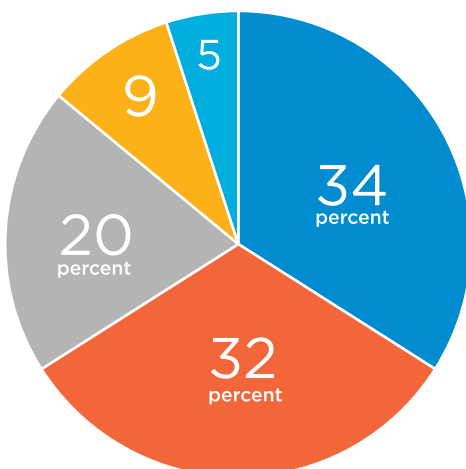
The study revealed a significant gender participation gap, with only 35% of respondents being women.

This substantial underrepresentation directly correlates with sociocultural norms that severely restrict women's mobility, confining them primarily to their farms and homesteads. Consequently, the study highlighted a profound loss: the exclusion of women's invaluable, context-specific insights. These insights, crucial for developing effective climate adaptation strategies, include unique perspectives on extension support during droughts and other extreme weather events. The absence of these perspectives compromises the comprehensiveness and efficacy of CIS delivery. Recognizing the gravity of this inequity, the study, despite operating without a dedicated budget, demonstrated commitment by proactively reaching out to women beyond

traditional farm settings, engaging them directly at their homesteads. This effort underscores the study's focus on inclusivity and the urgent need for targeted interventions to bridge the gender participation gap in CIS, ensuring that climate information services are truly equitable and effective for all stakeholders.

#### Age

##### AGE OF CIS USERS IN %



■ 25-34 ■ 35-44 ■ 45-54  
■ 55 Onwards ■ 18-24

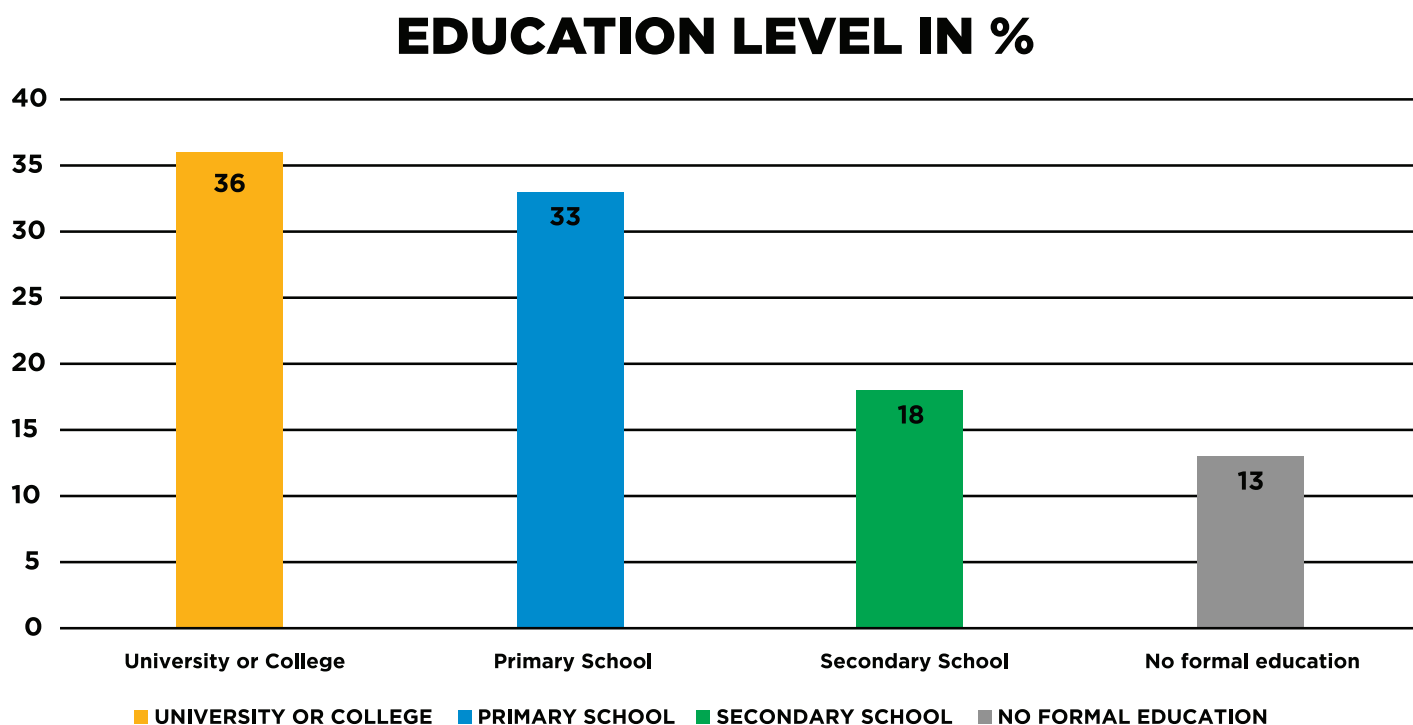
The survey revealed a striking demographic skew within its respondent pool, highlighting critical trends for agricultural engagement. The dominant age bracket, 25–44 years, comprised a substantial 66% of participants, underscoring their pivotal role as the primary drivers of agricultural activity and the most engaged demographic in climate information discourse. This age group's prominence strongly suggests that the critical decision-making window for entering and actively participating in Malawi's agricultural sector occurs within these years.

Conversely, the survey exposed a concerning low representation of youth (18–24 years), accounting for a mere 5%

of respondents. This stark underrepresentation likely stems from multifaceted challenges, including the pursuit of higher education, which delays their entry into farming, and significant barriers to land ownership, hindering their ability to establish agricultural livelihoods. This gap underscores a potential generational disconnect in agricultural practices and climate adaptation strategies.

Furthermore, a noticeable decline in participation was observed among individuals aged 44–55 and beyond. This trend may be attributed to a confluence of factors, including the natural reduction in physical energy associated with aging, potential limitations in the ability to manage physically demanding farm work, and the increasing reliance on hired labor, which may alter their direct engagement with climate information services. This decline highlights the need for tailored support mechanisms to ensure continued engagement of older farmers and facilitate knowledge transfer to younger generations. The survey's findings collectively paint a picture of a sector heavily reliant on a specific age demographic, necessitating targeted interventions to bridge generational gaps and ensure the long-term sustainability and resilience of Malawi's agricultural landscape in the face of climate change.

## Education



An educational divide was also observed, the survey unveiled a stark educational chasm, exposing a critical disparity in access and understanding. A significant 36% of respondents, predominantly urban residents, held university or college degrees, demonstrating a higher level of formal education.

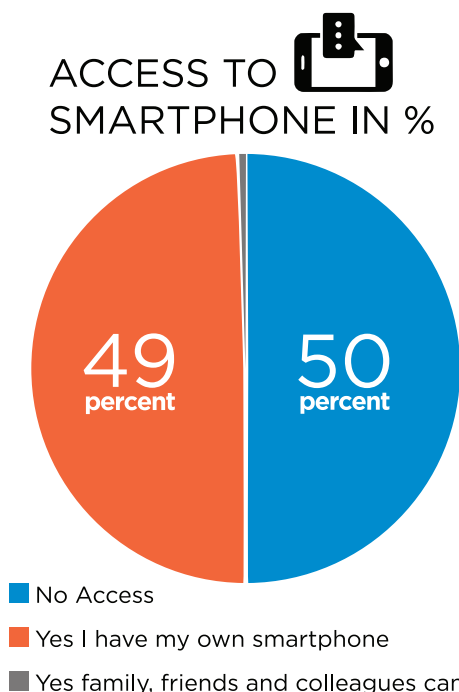
Conversely, a substantial 64% of the surveyed population, representing the clear majority, possessed secondary, primary, or no formal education. This demographic, comprising nearly two-thirds of participants, demonstrably relies on oral and visual CIS formats, underscoring the urgent need for tailored communication strategies.

While the use of the Kobo Toolbox, a digital data collection tool, may have skewed the initial perception towards a higher representation of university/college graduates, a more nuanced analysis reveals the true picture: a dominant 64% of respondents are, in fact, non-university/college graduates.

This finding reinforces the necessity of prioritizing accessible, non-textual information dissemination to effectively reach the majority of the population and ensure equitable access to vital climate information

## 4.2 ACCESS TO SMARTPHONES & INTERNET ACCESS FOR CIS

### Digital Divide

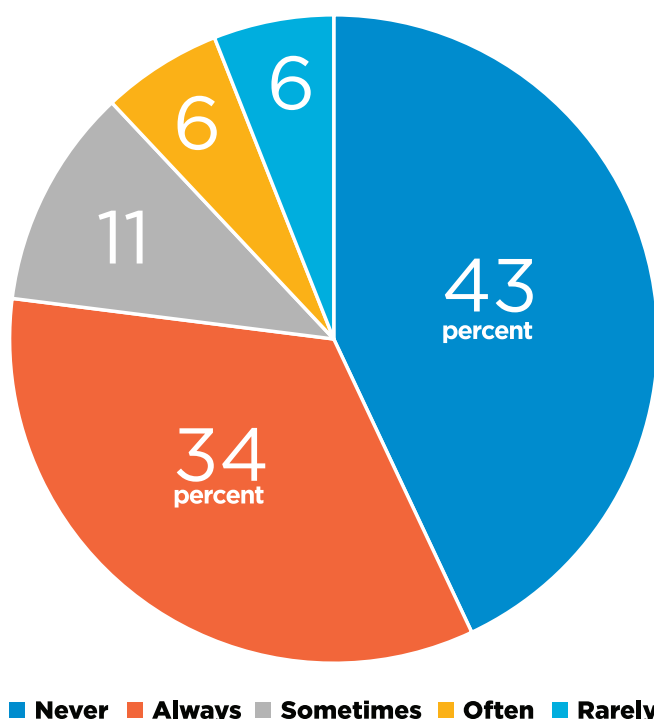


The Climate Information Services (CIS) survey in Malawi revealed a plain digital divide, significantly impacting access to crucial climate data. While smartphone ownership reached 49% among respondents, this ownership was heavily concentrated in urban areas, leaving rural communities largely underserved. A critical barrier to digital CIS access was internet connectivity, with nearly half of all respondents reporting a complete lack of internet access. This deficiency reflects Malawi's deep-rooted rural-urban digital gap, compounded by limited infrastructure and affordability challenges, effectively preventing a large portion of the population from utilizing online climate tools like apps and websites.

On the contrary, approximately one-third of respondents enjoyed consistent internet access, likely those residing in urban or peri-urban areas, or belonging to more affluent segments of society. This group benefits

from real-time access to digital climate services, including updates from the Department of Climate Change and Meteorological Services (DCCMS) and various weather applications. This disparity underscores the urgent need to bridge the digital divide to ensure equitable access to vital climate information for all Malawians, particularly those in vulnerable rural communities.

# INTERNET ACCESS FOR CLIMATE INFORMATION AS A%



The survey unveiled a blunt connectivity divide, with a significant 43% of respondents reporting they never access the internet. This figure underscores the persistent digital gap between rural and urban areas in Malawi, exacerbated by limited infra structure and affordability barriers. Consequently, a substantial portion of the population is excluded from utilizing online climate information tools, such as applications and websites. On the other hand, a minority, specifically 34% of respondents, indicated consistent internet access. This group, likely comprising urban or peri-urban residents and more affluent individuals, benefits from real-time access to digital climate services, including updates from the Department of Climate Change and Meteorological Services (DCCMS) and weather applications.

The remaining 23% experienced intermittent internet access, reporting usage that ranged from 'sometimes' to 'often' or 'rarely.' This sporadic connectivity suggests a reliance on mobile data, which is often cost-prohibitive, or shared connectivity resources like community hubs. This inconsistent access compromises the reliability of climate information, particularly for time-sensitive decision-making.

## Trust Dynamics

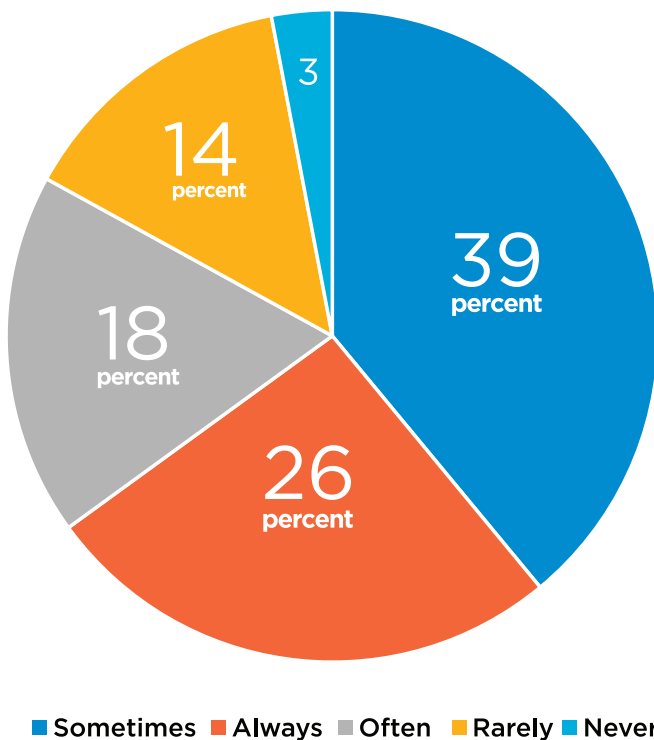
Radio emerged as the most trusted CIS source, with 60% of respondents relying on radio forecasts due to their consistency and use of local languages. Radio dominates due to its ubiquity, affordability, and accessibility in rural Malawi, where electricity and digital infra-structure are limited. It reflects the possible success of initiatives like DCCMS and radio partnerships for localized broadcasts.

Local stations like Rumphi Community Radio (1%) and Mzimba Community Radio (0.25%) are rarely used despite their potential for hyper-localized content, suggesting gaps in awareness, funding, or technical capacity to deliver tailored climate advisories. In contrast, digital tools faced skepticism, with only 29% using weather apps and 21% being unaware of their existence. Furthermore, to some respondents, distrust was driven by past forecast inaccuracies, such as unanticipated dry spells in 2022, and overly technical language in SMS alerts.

### 4.3 ACCURACY OF FORECAST FOR SEASONAL PLANNING & CATERING TO PRIVATE SECTOR NEEDS

#### Accuracy of seasonal forecasts for planning

ACCURACY OF FORECAST FOR SEASONAL PLANNING AS A %



The CIS survey showed a nuanced perception of seasonal forecast reliability among stake holders. While a promising 26% reported "Always" perceiving alignment between forecasts and actual weather, a significant 39% expressed a more cautious "Sometimes" alignment. This dominant sentiment underscores the perceived utility of forecasts, tempered by concerns regarding their consistent reliability. This likely stems from Malawi's inherently variable climate and the inherent challenges in accurately downscaling national-level predictions to specific local contexts.

Furthermore, the study illuminated the crucial role of community media, specifically local radio stations, in disseminating vital weather updates. However, the effective percolation of this information is impeded by capacity constraints at the radio station level, limiting the

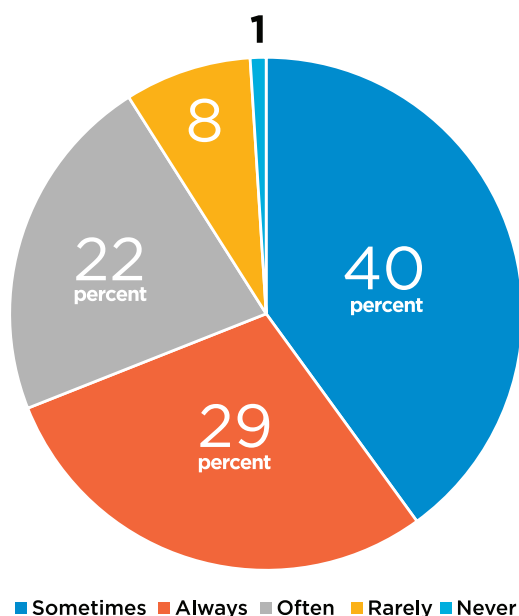
timely and widespread reach of critical climate information. The "Often" alignment, reported by 18% of stakeholders, indicates a foundation of partial success, highlighting the potential for significant improvement. This underscores the opportunity to build upon existing systems by strategically integrating local ecological knowledge and incorporating user feedback mechanisms. Such collaborative approaches could refine forecast accuracy and enhance contextual relevance, ultimately bolstering the reliability and effectiveness of CIS for communities across Malawi.

#### Accuracy of forecasts for fishers

While stakeholders, particularly fishers, recognize the inherent value of climate forecasts, a critical chasm exists between perceived accuracy and the nuanced realities of their daily lives. This disparity is starkly illuminated by the observed preference for traditional ecological knowledge, such as wind patterns and fish behavior cues, over formal forecasts. A significant portion of respondents, approximately 40%, indicated that forecasts 'Sometimes' align with their experiences, suggesting a crucial need for enhanced contextual relevance. This limited trust likely stems from forecasts that are not sufficiently tailored to the microclimates of Lake Malawi, or a lack of real-time updates regarding sudden, impactful



## ACCURACY OF FORECASTS FOR FISHERS AS A %

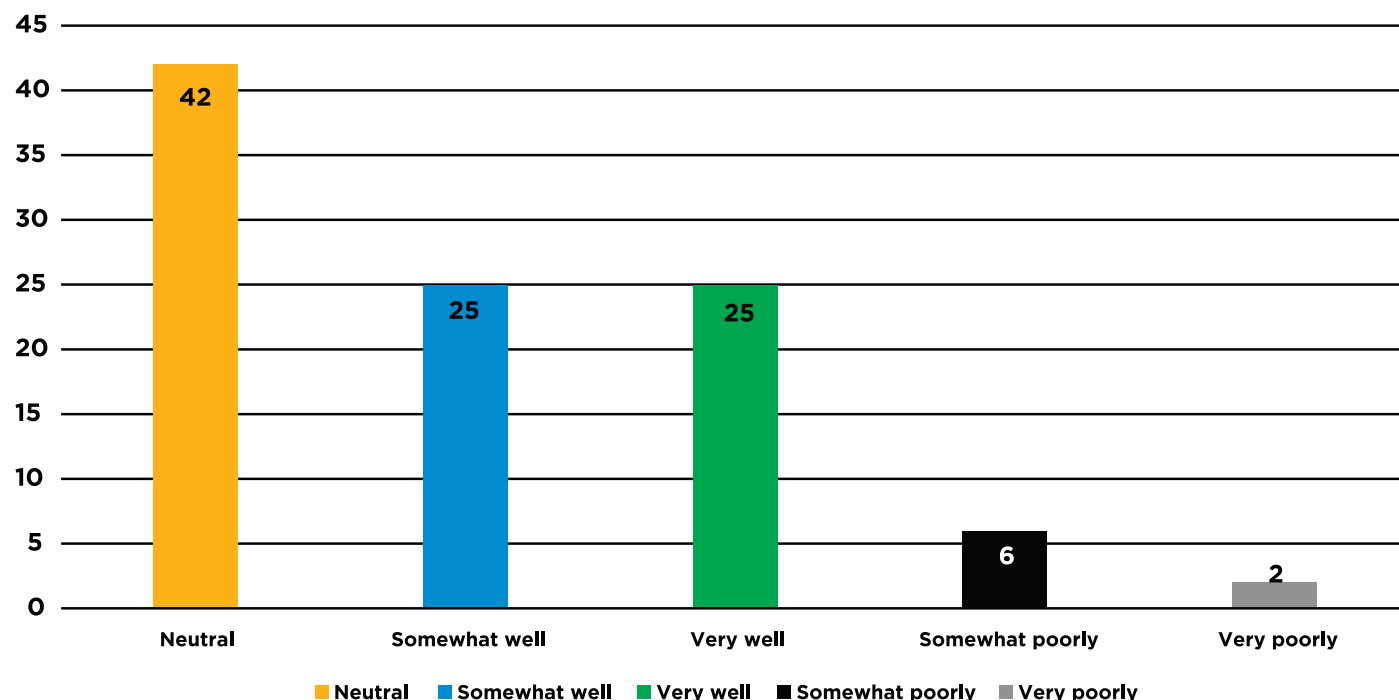


storms—factors that directly threaten fishing safety and livelihoods.

Despite these challenges, the low prevalence of 'Rarely' (8%) and 'Never' (1%) responses indicates that the majority of fishers and farmers acknowledge at least partial effectiveness in the District Climate Change Management System (DCCMS) forecasts, particularly for extreme weather safety planning. This suggests a foundation upon which to build. However, to truly optimize the utility of these forecasts, a strategic integration with indigenous knowledge is paramount. This integration could significantly enhance predictive capabilities, particularly for complex phenomena such as fish migration and breeding cycles, thereby bridging the existing gap and fostering greater trust and reliance on CIS.

## Forecasts Catering to Private Sector needs

### FORECASTS CATERING TO PRIVATE SECTOR NEEDS %

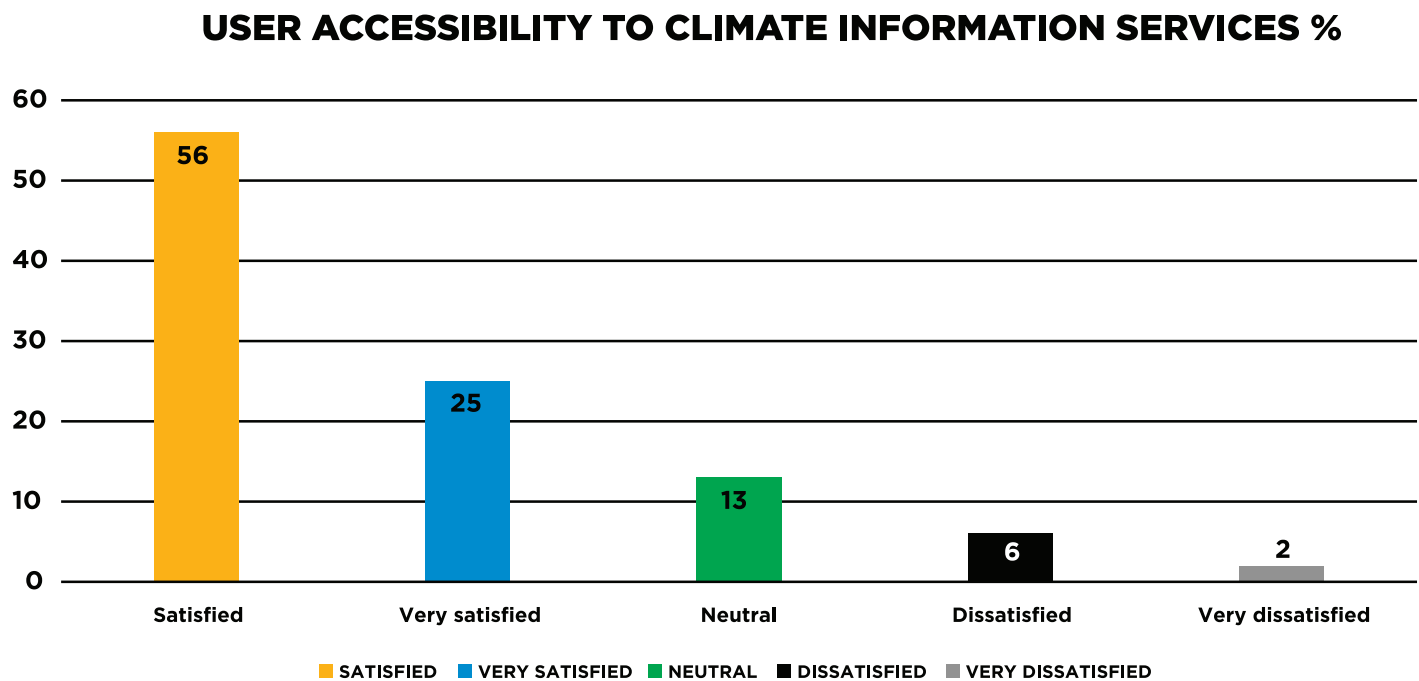


The survey unveiled a critical gap in Climate Information Services (CIS) tailored to the private sector in Malawi. A significant 42% of respondents expressed a "Neutral" stance, strongly indicating a disconnect between existing CIS offerings and the specific requirements of private-sector stakeholders, such as agro-dealers and manufacturers. This neutral response likely stems from a lack of direct engagement with these actors, resulting in limit-

ed understanding and visibility into their unique CIS needs. Consequently, the perception exists that CIS services are not intentionally designed or effectively communicated to businesses, hindering their potential utilization.

Furthermore, the even distribution of responses between "Somewhat well" and "Very well" (25% each) suggests that while certain niche sectors, like agro-input suppliers dependent on seasonal demand, may derive some benefit from current CIS, a substantial portion of the private sector remains underserved. Industries such as tourism and logistics, which demand granular, real-time weather data for operational efficiency and strategic planning, are likely lacking access to tailored CIS tools. This highlights the urgent need to expand and refine CIS offerings to cater to the diverse needs of Malawi's private sector, fostering resilience and sustainable economic growth."

4.4 USER ACCESSIBILITY TO CLIMATE INFORMATION SERVICES & MEETING DRR EFFORTS



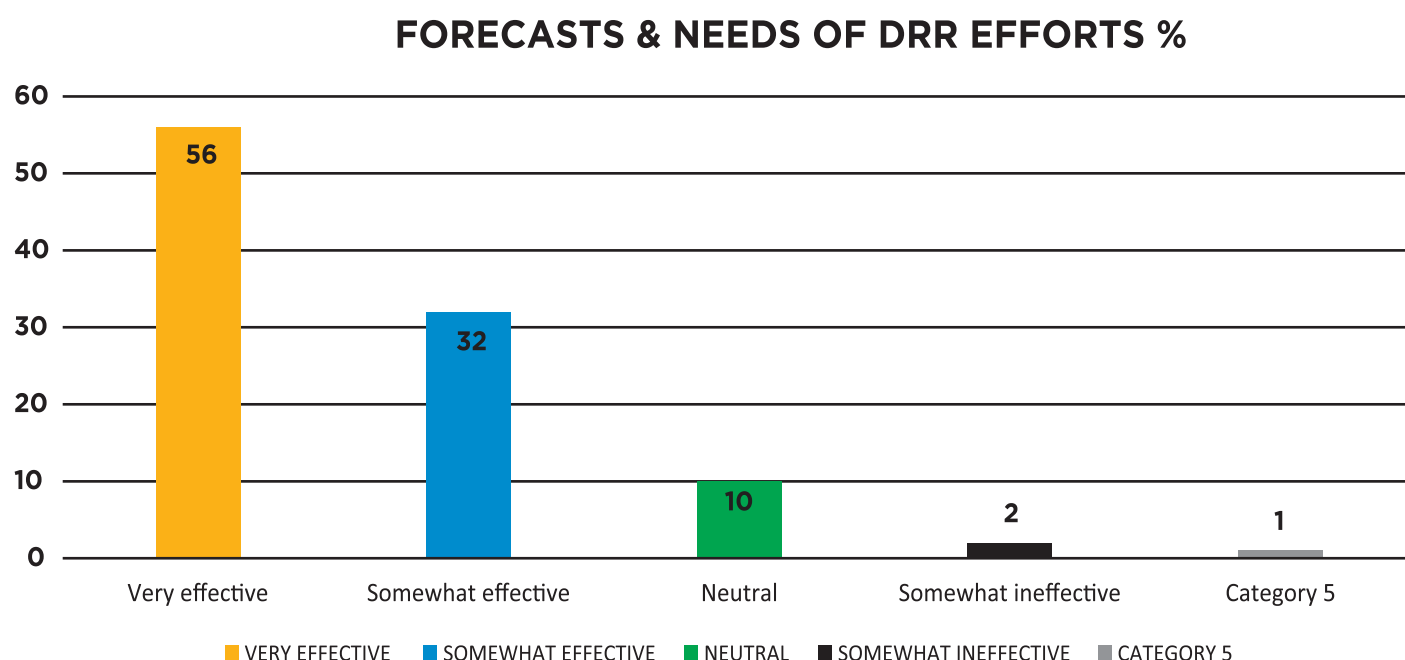
The Climate Information Services (CIS) survey in Malawi revealed a robust and encouraging level of satisfaction, with a commanding 81% of respondents expressing being "Very satisfied" or "satisfied" with the availability of CIS.

This strong endorsement likely stems from the strategic expansion of dissemination channels, including the widespread reach of radio broadcasts, the growing accessibility of mobile applications, and the vital role of community networks. These multifaceted approaches are particularly crucial in Malawi's predominantly rural, agriculture-dependent regions, where timely and accurate climate information directly impacts livelihoods and food security.

However, the 13% of respondents who remained "Neutral" warrants further exploration. This neutrality may point to a segment of users who, while passively receiving CIS, lack the necessary incentives or training to actively engage with and critically evaluate its utility. Alternatively, it could reflect the perspectives of urban stakeholders whose reliance on real-time weather data is less immediate compared to farmers and fishers, who are directly exposed to the climate's vagaries.

This nuanced finding underscores the need for targeted interventions that not only expand CIS access but also enhance user engagement and understanding, ensuring that climate information translates into actionable insights across diverse demographics.

## Forecasts Meeting the Needs of Disaster Risk Reduction (DRR) Efforts



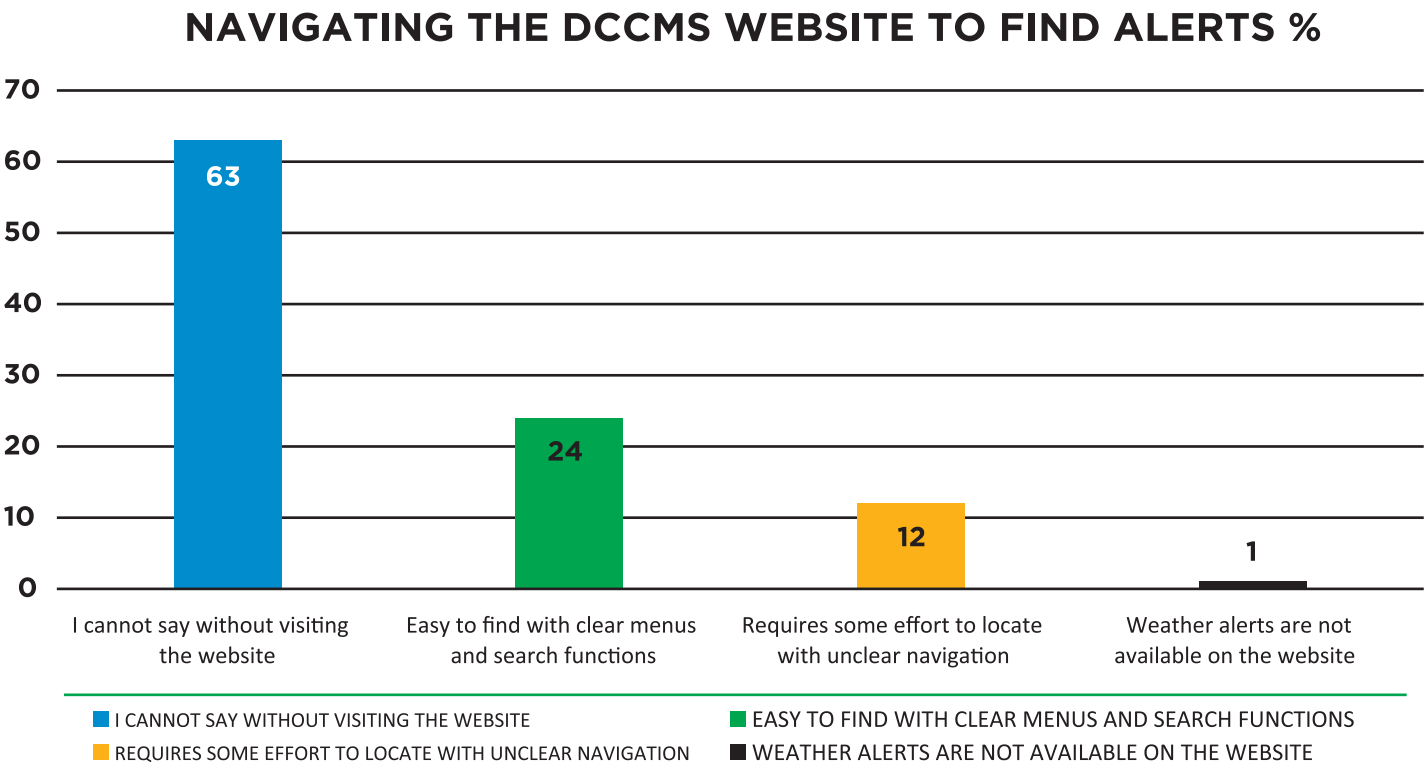
The Climate Information Services (CIS) survey in Malawi revealed a testament to the efficacy of collaborative partnerships. A striking 88% of respondents, comprised of 56% indicating "Very effective" and 32% "Somewhat effective," affirmed the positive impact of the integrated climate data initiatives spearheaded by the Department of Climate Change and Meteorological Services (DCCMS), the Department of Disaster Management Affairs (DoDMA), and the Malawi Red Cross Society (MRCS). This overwhelming endorsement underscores the pivotal role of these partnerships in seamlessly weaving climate data into the fabric of disaster preparedness and response strategies.

The DCCMS's provision of centralized, authoritative data appears to be a cornerstone of this success, ensuring consistency and reliability in early warning systems and risk reduction efforts. This consistency, in turn, cultivates stakeholder confidence and facilitates informed decision-making across various levels.

However, a nuanced understanding necessitates acknowledging the 10% of respondents who remained "Neutral." This neutrality likely stems from a variety of factors, including limited direct exposure to disaster response systems, particularly among communities that have not yet experienced recent climate-related disasters. Furthermore, the perceived lack of contextually relevant information, such as localized flood or drought alerts, may diminish the perceived utility of CIS for some users. This highlights the ongoing need for targeted communication strategies and hyperlocal data dissemination to ensure that all communities, regardless of their recent experiences, can effectively leverage climate information for resilience building.

4.5 DCCMS WEBSITE AND SOCIAL MEDIA ACCESS & USE

DCCMS Website require more promotion



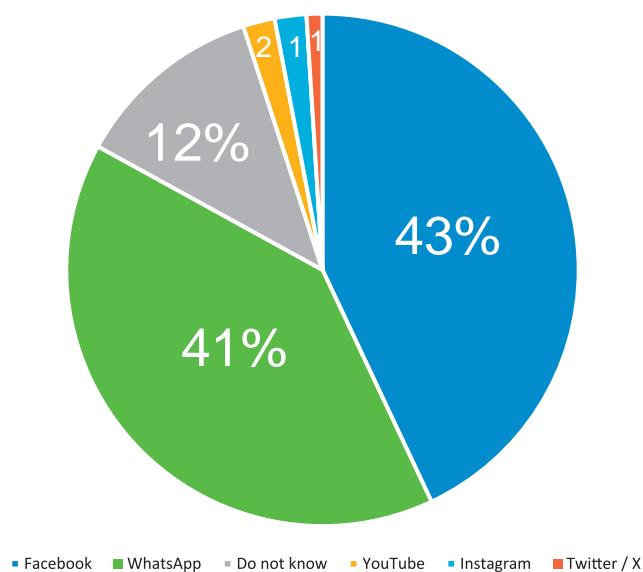
A significant majority, a resounding 63%, expressed an inability to assess the website's usability without a direct visit, signifying a profound lack of familiarity and interaction. This points to a clear preference, particularly within rural communities grappling with limited internet connectivity and digital literacy, for alternative CIS delivery channels such as radio broadcasts, SMS alerts, and trusted community networks.

While a quarter of respondents (24%) reported a positive experience with the website's navigation, this likely reflects the perspective of urban-based or tech-savvy stakeholders. Conversely, a concerning 12% encountered difficulties due to unclear navigation, underscoring critical design flaws that impede broader accessibility. These issues, potentially

stemming from complex menu structures or the absence of localized language options, present a significant barrier to effective information dissemination. The data suggests that a focused promotional strategy is necessary for the DCCMS website, combined with improved website usability, in order to increase the number of Malawians that are able to benefit from its resources.

## Users Point to Facebook and WhatsApp

SOCIAL MEDIA CHANNEL USERS AS A %



The Climate Information Services (CIS) survey revealed the dominance of Facebook and WhatsApp as critical communication channels.

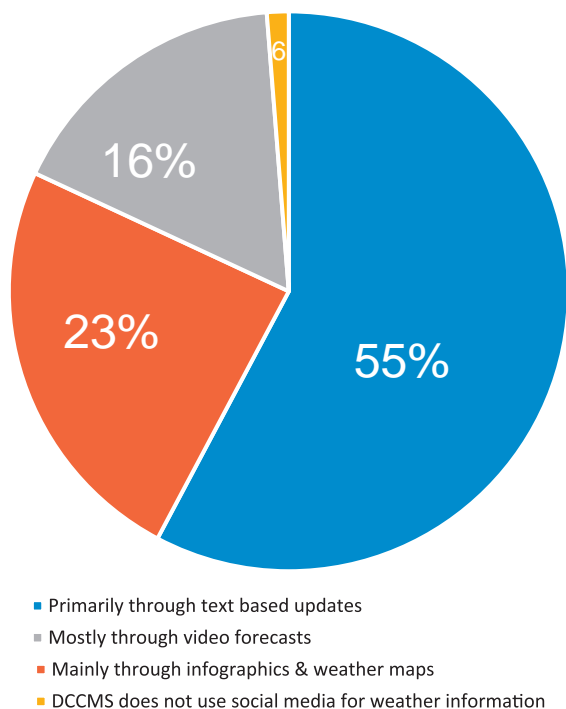
A striking 43% of respondents favored Facebook, while 41% preferred WhatsApp, highlighting their unparalleled reach and accessibility across both rural and urban landscapes. This overwhelming preference stems from their established familiarity, cost-effective data usage, and robust multimedia capabilities, enabling the seamless sharing of vital weather alerts through maps, voice notes, and other accessible formats, crucial for diverse audiences.

In stark contrast, platforms like YouTube (2%), Instagram (1%), and Twitter (1%) demonstrated minimal traction, revealing their limited penetration and predominantly urban-centric user bases within Malawi. This underscores their inadequacy for inclusive disaster communication, particularly among farmers and fishers who rely on simple, real-time updates for their livelihoods. The data illustrates the need to prioritize established, widely accessible platforms like Facebook and WhatsApp to ensure effective and equitable dissemination of critical climate information.



## User Perception on Text Based Updates

### WEATHER INFORMATION ON SOCIAL MEDIA PLATFORMS



The dominant mode of communication from the Department of Climate Change and Meteorological Services (DCCMS), as perceived by respondents, leans heavily towards text-based updates, with a significant 55% reporting this format as the primary delivery mechanism. While text offers the advantages of rapid production and accessibility in data-constrained environments, its efficacy in engaging diverse audiences is questionable. This format risks alienating individuals who require visual or simplified explanations, particularly within Malawi's multilingual and low-literacy contexts.

A critical gap is revealed in the limited utilization of visual aids, with only 23% of respondents noting the use of infographics or maps. This underutilization represents a substantial, unrealized opportunity to enhance comprehension of complex weather patterns. Visual storytelling, through the use of maps

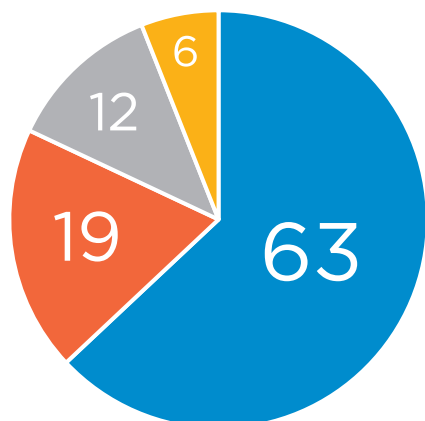
depicting storm trajectories and infographics illustrating rainfall projections, holds immense potential to translate intricate scientific data into actionable insights. This is particularly crucial for farmers and fishers, whose livelihoods are intrinsically linked to spatial climate information. By strategically incorporating visual elements, DCCMS can significantly improve the accessibility and impact of its climate information services, ensuring that critical data reaches and benefits those most vulnerable to climate variability.

## User views on updates on DCCMS Social Media Platform

A majority (52%) acknowledge daily updates, reflecting DCCMS's efforts to maintain timely social media engagement. However, 30% ("I cannot say") indicate limited awareness or interaction with these platforms, suggesting updates may not reach all target users, especially those reliant on non-digital channels (e.g., radio). The 10% associating updates with "significant weather events" highlights DCCMS's focus on crisis messaging (e.g., cyclones, floods), which risks neglecting routine agricultural or fisheries planning needs requiring consistent data.

## Promoting User Engagement

### PROMOTING USER ENGAGEMENT AS A %



- Comment section on posts to allow for questions and discussions
- Disabling comments to avoid disinformation
- Private messaging for individual weather enquiries
- DCCMS must not use social media for user engagement

The survey results demonstrate a strong desire for interactive communication among stakeholders, with a commanding 63% favoring comment sections. This overwhelming preference signals a clear demand for two-way dialogue, enabling users to actively participate in the interpretation and application of climate information. This engagement is crucial for users to seek clarifications, share valuable localized observations, and collaboratively interpret forecasts, highlighting a critical need for the Department of Climate Change and Meteorological Services (DCCMS) to evolve from a model of top-down dissemination to one of participatory engagement.

Furthermore, the significant 19% preference for private messaging reveals a distinct demand for personalized, tailored advice. This likely reflects specific needs, such as farmers seeking crop-specific guidance, emphasizing the necessity for individualized support. However, scaling this level of personalized service presents a significant challenge, potentially straining DCCMS's existing capacity. To address this, the integration of AI-powered tools or the allocation of dedicated staff becomes imperative, enabling the agency to effectively manage and respond to the demand for tailored information without compromising service quality or overburdening resources. This strategic investment in interactive platforms and personalized communication channels is crucial for maximizing the impact and utility of climate information services in Malawi.

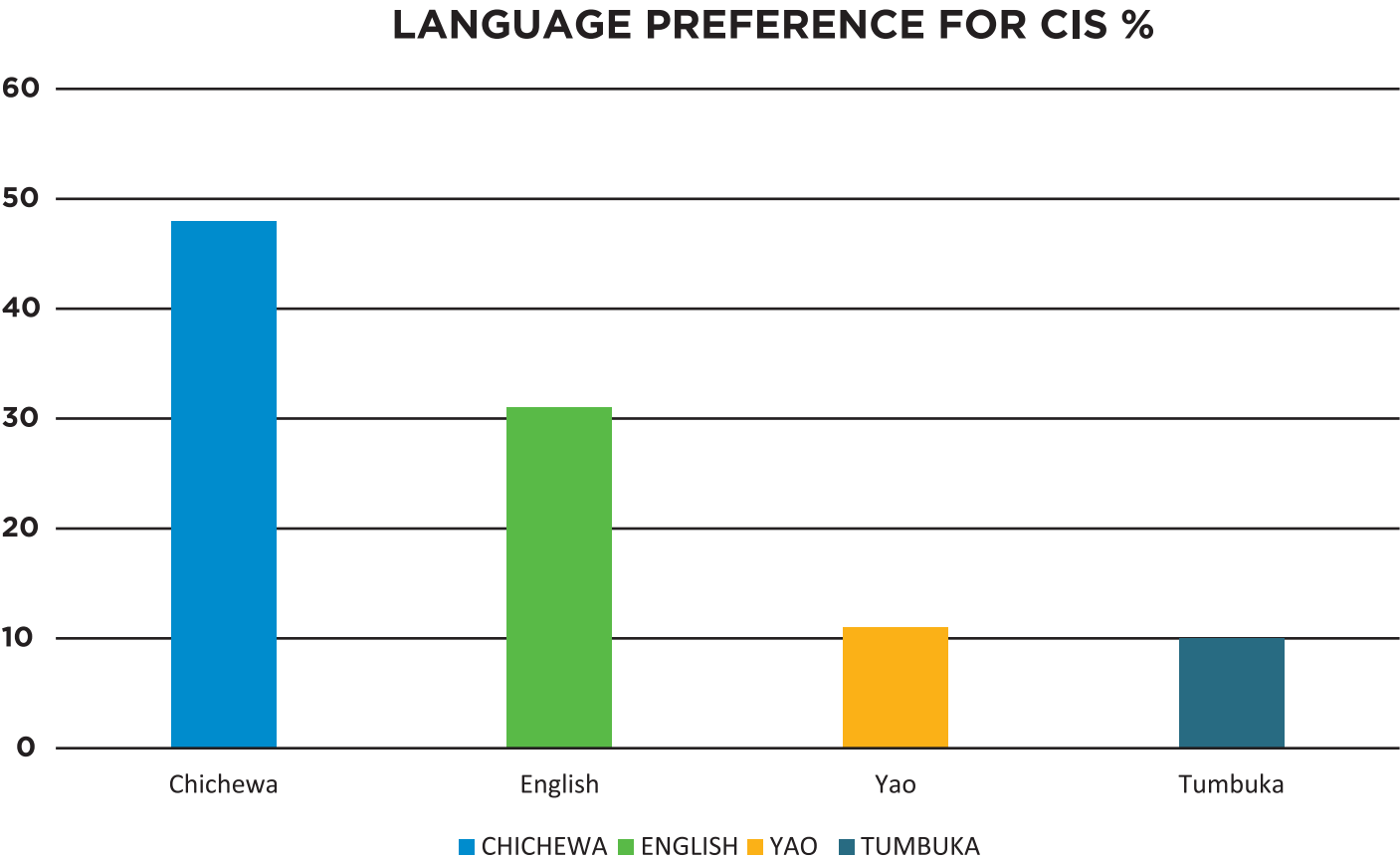
## 4.6 COMMUNICATION CHANNELS & LOCALIZATION

### Channel Preferences

In Malawi, radio stands as the dominant conduit for Climate Information Services (CIS), reaching a significant 60% of survey respondents. Among the national broadcasters, Malawi Broadcasting Corporation (MBC) Radio 1 (33%) and Zodiac Broadcasting Station (26%) emerged as clear leaders, leveraging their extensive nationwide coverage, established credibility, and strategic integration of weather forecasts into widely consumed programs, particularly those focused on agriculture. This underscores the power of integrating vital CIS into existing, popular platforms to ensure widespread dissemination and uptake. Equally, community radio stations, despite their inherent potential for delivering hyper-local and context-specific CIS, remain significantly underutilized, with stations like Rumphi FM registering only 1% usage. This highlights a critical gap in leveraging the localized reach of these platforms, potentially due to challenges in accessing, translating, and effectively utilizing complex CIS data for their specific audiences.

The study further revealed a clear urban-rural divide in digital CIS preferences. Urban residents demonstrated a marked preference for interactive platforms like WhatsApp and Facebook, facilitating real-time information sharing and discussion. In contrast, farmers, often residing in rural areas, favored the simplicity and directness of SMS messaging, reflecting a pragmatic approach to accessing essential weather updates in environments with potentially limited internet connectivity. This nuanced understanding of channel preferences is crucial for developing targeted and effective CIS dissemination strategies.

Localization Gaps



While Chichewa, the national language, naturally resonated with the majority of respondents, facilitating comprehension and practical application of climate advisories within agriculture-dependent communities, the needs of Yao and Tumbuka-speaking populations were demonstrably neglected, highlighting a stark lack of tailored content. This linguistic exclusion risks leaving vulnerable communities uninformed and unprepared for climate-related challenges.

Furthermore, the study revealed a concerning disconnect between generalized CIS and the hyper-local realities of Malawian communities. A substantial 32% of respondents found the information only "moderately relevant," and a further 12% reported outright mismatches with their specific microclimates. This underscores the limitations of a one-size-fits-all approach and emphasizes the urgent need for granular, location-specific CIS that accurately reflects the diverse agroecological zones within Malawi.

The reliance on Chichewa, while essential for broad reach, must be complemented by efforts to bridge the linguistic gaps and address the hyper-local needs of all communities. This will ensure that vital climate information translates into actionable insights, empowering all Malawians to build resilience in the face of a changing climate.

## 4.7 SECTOR-SPECIFIC CHALLENGES



Hastings Nkhosera, Sankhani Club,  
Kategha, Mzimba North

### Agriculture

Critical information gaps in the agricultural sector centered on the absence of timely mid-season drought alerts and insufficient dissemination of actionable guidance on adopting climate-resilient crops, particularly drought-tolerant maize varieties.



Fishers in Mangochi District

### Fisheries

Fishers operating on Lake Malawi encountered persistent challenges, with 40% reporting no access to modern wind forecasts, forcing continued reliance on traditional weather indicators. Compounding risks, real-time storm alert systems—essential for navigating sudden weather shifts—remained sparse or inaccessible.

### Private Sector

Private sector participation in climate initiatives was strikingly limited, with businesses comprising only 0.5% of surveyed stakeholders. Agro-dealers highlighted a significant, unmet demand for market-linked climate information services (CIS), including predictive alerts for pest outbreaks to mitigate crop losses.

## 5.0 RECOMMENDATIONS

### 5.1 CO-DESIGN HYPER-LOCAL CIS

#### PICSA Promotion

Implement PICSA (Participatory Integrated Climate Services for Agriculture) workshops across 10 priority districts to co-develop localized advisories with farming and fishing communities, ensuring alignment with seasonal needs and livelihood contexts.

## **Traditional Knowledge Integration**

Systematically document indigenous climate indicators—including Msuku tree flowering patterns—and cross-reference findings with DCCMS meteorological data to create hybrid forecasting tools grounded in local and scientific knowledge.

## **5.2 STRENGTHEN MULTI-CHANNEL DISSEMINATION**

### **Radio-Based Outreach**

- Train national community radio journalists in climate-sensitive reporting methodologies (2025–2026).
- Introduce daily localized broadcasts in Yao, Tumbuka, and other languages to enhance accessibility for rural populations.
- Train and incentivize frequent sharers ("Always" 49%) as local ambassadors to bridge gaps for hesitant groups, using trusted platforms like community radios or farmer cooperatives.

### **Digital Expansion**

- Upgrade the Zanyengo App with offline-enabled hazard maps and voice-navigated weather alerts.
- Negotiate zero-data policies with TNM and Airtel to enable free access to climate information service (CIS) portals for users.

## **5.3 ADDRESS GENDER & DIGITAL DIVIDES**

### **Women-Led CIS Networks**

- Deploy trained women “climate champions” across high-risk rural districts by 2026 to lead community resilience efforts.

## **5.4 BOOST PRIVATE-SECTOR ENGAGEMENT**

### **Agribusiness Partnerships**

Collaborate with seed companies and agro-input suppliers to co-design CIS tools that synchronize weather forecasts with region-specific planting windows and crop calendars.

## **5.5 LEVERAGE AI & COMMUNITY DATA**

### **AI-Driven Localization**

Apply machine learning models to refine national weather forecasts into hyper-localized 5km x 5km resolution grids, improving relevance for smallholder farmers.

### **Citizen Science Integration**

Track any distributed low-cost rain gauges to farming cooperatives and feed real-time data into DCCMS prediction systems, enhancing model accuracy.



## 5.6 POLICY & INSTITUTIONAL REFORMS

### Capacity Building

Certify 50 DCCMS staff in participatory communication techniques and AI-based forecasting tools through a dedicated training program (2025–2026). Design a DCCMS AI Policy for Climate Information Services.

## 6.0 LITERATURE REVIEW

### 6.1 DIGITAL INCLUSION & HYBRID MODELS

Ragasa et al. (2021) investigated the impact of interactive radio programming on agricultural technology adoption and crop diversification in Malawi. Their findings suggest that while radio programming significantly increased technology awareness, its effect on actual adoption was limited. The study recommends exposure to multiple information sources that combine virtual environments and interactive techniques to enhance learning and knowledge retention.

Regarding the challenges of mobile data affordability and accessibility in rural areas, a 2023 National ICT Survey in Malawi reported that approximately 80.5% of individuals cited the high cost as the main reason for not owning a mobile phone. This financial barrier disproportionately affects rural populations, limiting their access to mobile-based services.

### 6.2 TRADITIONAL KNOWLEDGE INTEGRATION

Mweta, Noel & Juma, Patrick. (2022). The International Journal of Climate Change: Impacts and Responses Indigenous Knowledge as a Mitigation Factor to Disaster Risk Reduction in Malawi A Case Study of Nsanje District. The study in Nsanje District highlighted that residents utilize indigenous knowledge to predict weather conditions by observing natural phenomena such as flora, fauna, celestial bodies, and meteorological patterns. This traditional knowledge serves as an early warning system, enabling communities to prepare for potential flash floods and other climatic events. The study emphasizes that integrating such indigenous knowledge with scientific forecasting can enhance disaster risk reduction strategies in the area

### 6.3 GENDER-RESPONSIVE CIS

Gender disparities in CIS access and agency remain a critical challenge. A 2023 UN Women report revealed that Malawian women, despite being primary agricultural decision-makers, are systematically excluded from CIS design processes. The study positions women as “knowledge custodians” in climate adaptation, advocating for mandatory gender quotas in advisory committees and women-led dissemination networks.

## 6.4 PRIVATE SECTOR POTENTIAL

Emerging research underscores untapped opportunities for private-sector-driven CIS innovation. It is important to note that agro-dealers in Malawi play a significant role in promoting climate-smart agriculture. A study by Kagabo et al. (2024) discusses how bundling climate information services with agricultural inputs, like drought-tolerant seeds, can lead to positive outcomes. The findings suggest that aligning climate services with business incentives—such as predictive pest alerts for input suppliers—could unlock sustainable financing models while expanding user reach.

## 7.0 CONCLUSION

Malawi's CIS systems stand at a crossroads. By prioritizing hyper-local co-design, gender equity, and AI-driven innovation, DCCMS can transform climate information into a catalyst for resilience. It would be vital to undertake studies on women and CIS and also private sector and CIS in Malawi over the next few quarters.

## 8.0 REFERENCES

Ragasa, C., Mzungu, D., Kalagho, K., & Kazembe, C. (2021). Impact of interactive radio programming on agricultural technology adoption and crop diversification in Malawi. *Journal of Development Effectiveness*, 13(2), 204-223.

National Statistical Office of Malawi. (2023). *National ICT Survey 2023*. Zomba, Malawi: National Statistical Office.

Mweta, N., & Juma, P. (2022). Indigenous knowledge as a mitigation factor to disaster risk reduction in Malawi: A case study of Nsanje District. *International Journal of Climate Change: Impacts and Responses*, 14(1), 45-60.

UN Women. (2023). *Gender and Climate Information Services in Malawi: Bridging the Gap*. Lilongwe, Malawi: UN Women Malawi Country Office.

Kagabo, D. M., Byandaga, L., Gatsinzi, P., Mvuyibwami, P., Munyangeri, Y. U., Ntwari, N., & Ouedraogo, M. (2024). Scaling climate information services and climate smart agriculture through bundled business models. *Climate Services*, 37, 100526.

