Delivering climate services for farmers and pastoralists through interactive radio

Working Paper No. 111

CGIAR Research Program on Climate Change,
Agriculture and Food Security (CCAFS)

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Working Paper

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CCAFS

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Titles in this Working Paper series aim to disseminate interim climate change, agriculture and fooca security research and practices and stimulate feedback from the scientific community.

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The Global Framework for Climate Services (GFCS) is an international partnership seeking to harness scientific advances and improve the availability, accuracy and use of climate information which will help society cope with climate change and hazards such as droughts and floods. It brings together researchers and providers of weather and climate services, as well as a wide range of users from the agriculture, food security, water management, health and disaster management sectors - and many others. The GFCS Adaptation Program in Africa is the first national, multi-sector implementation project under the GFCS. It aims to increase the resilience of people most vulnerable to the impacts of weather and climate-related events through the development, implementation and evaluation of a joint program for the target countries, Tanzania and Malawi.
The program will help build integrated frameworks within countries and will support existing initiatives to improve the provision and use of climate services for food security, nutrition and health as well as disaster risk reduction. The GFCS Adaptation Program in Africa is funded by a grant from the the Norwegian Agency for Development Cooperation (NORAD), and is implemented with technical support from the World Meteorological (WMO).

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Abstract

A scoping study to assess demand, opportunities and potential for the use of interactive radio to deliver climate services at scale for farmers and pastoralists was conducted by CCAFS in partnership with Farm Radio International in Tanzania, and Farm Radio Trust in Malawi in late 2014. Over 1280 individuals were interviewed in an audience research activity, while a desk survey, key informant interviews and knowledge partner engagement activities were undertaken to validate audience research and assess the wider context. The study reveals that for both Malawi and Tanzania, there is clear demand for climate information services via radio and mobile phone. Both radio and mobile phones are in common use, and are rated by farmers and pastoralists to have great potential as effective and trusted channels where they can access various climate information services. Surveyed farmers and pastoralists noted that radio programs, backed up by ICT services, would serve them best. Rainfall patterns, temperature data and forecasting services – both weekly and daily – were mentioned as particular needs. In general, farmers would trust climate information received via their preferred radio stations, and would use it in decision-making on their farms. Women and men differed in time spent listening to radio, in mobile phone airtime purchased, and in Malawi, phone ownership; but larger location differences masked any gender differences in preferences about information content, delivery channels, or expectations about user and benefit. As a response to farmer articulated demand, Farm Radio International and Farm Radio Trust propose working with key institutions and radio station partners to develop interactive programming for rural climate services as part of their implementation of the GFCS Adaptation Programme in Africa. Interactive climate services radio programming would respond to farmers' ongoing climate information needs, and will engage them in program design, broadcast, monitoring and evaluation – together with partner radio stations. Interactive climate services radio programming will consist of short weekly radio programs, with the option of daily forecasts or interpretations, and will be complemented with ICT services via mobile phone. Programs will be continuously monitored and assessed by audiences and project staff to ensure relevance, usefulness, level of use and accuracy.

Keywords

Radio; ICTs; climate services; farmers; Africa

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Contents

Acronyms

CABMACC	Capacity Building for Managing Climate Change
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
DAES	Department of Agricultural Extension Services
DAICO	District Agriculture, Irrigation and Cooperatives
DC	District Commissioners
DCCMS	Department of Climate Change and Meteorological Services
FRI	Farm Radio International
FRT	Farm Radio Trust
GFCS	Global Framework for Climate Services
ICT	Information Communication Technologies
IST	In-station training
LRCD	Department of Land Resources and Conservation
LUANAR	Lilongwe University of Agriculture and Natural Resources
MBC	Malawi Broadcasting Corporation
NGO	Non-Governmental Organization
RGL	Registered Group of Listeners
SARI	Selian Agricultural Research Institute
SMS	Short Message Service
TBC	Tanzania Broadcasting Corporation
TMA	Tanzania Metrological Agency
WFP	World Food Program
ZBS	Zodiak Broadcasting Station

Introduction

With growing recognition that farmers may benefit from climate information services, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), in partnership with Farm Radio International, undertook a comprehensive scoping study in Malawi and Tanzania to assess the potential for using interactive radio to deliver climate services to targeted rural communities. The scoping study was conducted as part of the Global Framework for Climate Services (GFCS) Adaptation Programme in Africa.

The Global Framework for Climate Services (GFCS) is an intergovernmental partnership supported by the United Nations and other international organizations, and coordinated by WMO, that aims to promote operational climate services at the national and regional levels for vulnerable countries and sectors. The Adaptation Program in Africa, which targets Tanzania and Malawi, is the first multi-agency initiative to be implemented under GFCS. It is a 3-year project, funded by the Government of Norway, that aims to strengthen capacity both to develop and use climate services and combines cutting-edge science with traditional knowledge. The Adaptation Program in Africa is a joint effort of WMO, CCAFS, the Centre for International Climate and Environmental Research – Oslo (CICERO); the Chr. Michelsen Institute (CMI); the International Federation of Red Cross and Red Crescent Societies (IFRC) through the Tanzanian and Malawian Red Cross; the World Food Programme (WFP); and the World Health Organization (WHO).

CCAFS-led activities in the GFCS Adaptation Program in Africa include: training agricultural extension staff and other intermediaries to communicate climate services with farming communities; implement research-based assessment of needs, and monitoring and evaluation of improvements in the access and use of climate services by rural communities (farmers, pastoralists), and design scalable mechanisms to communicate climate information through interactive radio and ICT platforms. This working paper presents a summary of findings of a scoping study on climate service delivery through radio, conducted by Farm Radio International on behalf of CCAFS, during the period 1 October - 31 December 31 2014.

Methodology

Audience research

In each of the ten selected regions across Malawi and Tanzania, the aim was to interview at least 50 randomly selected individuals from communities recommended by WFP, approximately 50% female. A total of 655 individuals in Malawi and 625 in Tanzania were interviewed, with a grand total of 1280 interviews making up the audience research (Table 1).

Table 1. Sampling data.

Country	Region	Gender breakdown	Sub-totals	Totals
Malawi	Nsanje	101 female, 106 male	207	655
	Lilongwe	128 female, 108 male	236	
	Zomba	115 female, 97 male	212	
Tanzania	Longido	49 female, 54 male	103	625
	Iramba	25 female, 42 male	67	
	Kiteto	80 female, 75 male	155	
	Kondoa	25 female, 26 male	51	
	Longido	78 female, 81 male	159	
	Mkalama	17 female, 31 male	48	
	Singida	22 female, 20 male	42	
Total respondents				1280

FRI consulted with CCAFS and WFP to select the communities for research. Country teams visited the relevant local authorities (traditional and government), and gained understanding, acceptance and support for the study. FRI used non-paper based survey tools – a combination of mobile phones and web-based software called *Mobenzi*. Enumerators underwent a one-day training on the use of *Mobenzi Researcher* to collect data via mobile phones. This method is quick, cost-effective and reliable. The system was tested, and data was tracked as it came in. Various glitches were resolved, and both teams completed fieldwork by 17 October 2014.

Key Informant interviews and stakeholder analysis

This part of the survey consisted of key informant interviews, small group discussions and workshops with stakeholders to assess current interventions and services related specifically to the use of radio and other ICTs for providing climate services and information.

In Tanzania, this part of the survey was conducted in thirteen communities in the seven regions mentioned in Table 1, and at the same time as the audience research. Respondents included elders in each community, and representatives from: community-based organisations; District Agriculture, Irrigation and Cooperatives (DAICO); Tanzania Meteorological Authority (TMA); District Commissioners (DC); and both local and central government line ministries. One farmer and one district extension officer from each of the six districts (Chemba, Longido, Mkalama, Iramba, Kondoa and Kiteto) attended one-day workshop to discuss climate change and use of radio and ICTs in-depth.

In Malawi, Key Informant Interviews were conducted as part of the scoping study to further develop an understanding and discover broader issues related to climate information services. The scoping study identified ten national level key players to provide overall sectoral information. In addition there were three or four interviews per district to provide general but localised information on climate information services. Roles of the identified national level players in relation to climate information services included: content generation, monitoring and dissemination of climate information, research and training, provision of extension and land management services and provision of relief and disaster risk management services.

Interactive Climate Services Radio Programming

Why interactive radio?

Radio reaches areas other extension services cannot, in familiar languages and at low cost. Radio ownership in Tanzania is around 85%. Mobile phone use is also increasing in Tanzania. Mobile phone subscriptions have grown from 32% of the population in 2008 to 60% (or 26 850,000 people having mobile phone subscription) in 2013 (CRA Quarterly Telecom Statistics, September 2013. https://www.ist-africa.org/home/default.asp?page=doc-by-id&docid=4324). The Malawi Communications Regulatory Authority was conducting a survey in December 2014 to assess access to ICTs.

Participatory, ICT-enhanced interactive radio is different from traditional approaches to rural radio. With training and guidance from FRI, and extensive consultation with communities, local radio stations become an integral partner in the project and more than just the disseminators of information. We ask audiences what they want to hear, discover their current

knowledge levels and practices, and ask them when they want to hear the shows, and on which station. Station broadcasters are supported and trained to produce their own high quality, content-validated and interactive programs. This differs from conventional approaches to using radio, which featured stations being given pre-recorded programs by donors or partners. In the interactive approach developed by FRI, radio broadcasters visit farmers, interview them, listen to their feedback, and incorporate this as content in their radio shows. Technical content is guided by knowledgeable partners, including farmers and subject matter specialists, and linked to cropping seasons. FRI provides continuous monitoring, training and feedback to ensure a high quality standard in the programs that are broadcast and also in the research and implementation processes and outcomes. Programs focus equally on women and men farmers, where particular strategies are used to ensure that women have equal access to participate and contribute to the programs through technology and radio-on-demand strategies. FRI provides many means for the program to become interactive, mostly through the use of various mobile phone services – SMS, Interactive Voice Response and voice services, "beep4" services, voting and surveys by mobile phone. (FRI has developed various services; including "Beep4Weather", agro-input dealers, and program summaries; where listeners can place a missed call, or "beep" to receive a voice or text message with the requested information.) Interaction between the radio station and the audience is valued and promoted, as this is a key factor in the success of the programs and services.

The goal is for radio producers to create exceptionally good and two-way interactive programs that attract a large, loyal audience and result in measurable gains in knowledge and practice of effective innovations. A recent FRI project in Tanzania showed the cost-efficiency of radio as an extension mechanism: extension cost approximately ten US cents per person per hour. The cost to reach a farmer who began to practice an agricultural improvement heard on radio was US$1.35. ICT-enhanced interactive radio is therefore far more cost effective, per farmer reached, than other extension methods - and shows proven results.

Climate services and interactive radio baseline

Tanzania

The Tanzania Meteorological Agency (TMA) is the main agency in Tanzania proving weather forecasts and alerts. Farm Radio International has worked with TMA in developing some pilot weather services in northern Tanzania, delivered by mobile phone.

Discussions with key informants and stakeholders in the study regions in Tanzania reveal a strong perception that the climate has changed over the last ten years. Farmers and pastoralists concluded that rainfall has decreased, while temperatures have increased. Prolonged dry spells lead to food shortages, and poor pastures for livestock in some areas of the study. There are strategies at village and district level to combat climate change impacts, such as use of rain gauges, and the existence of pre-disaster management committees, which follow up on early warnings on localised climate change.

Farmers and pastoralists in Tanzania have an in-depth understanding of the local climate and weather, which they use for coping and adaptation strategies. However, the surveyed villages have no constant supply of information about climatic changes. Farmers have very little access, if any, to information from Tanzania Metrological Agency (TMA).

Farmers currently hear weather forecasts on radio but often they are not localised or detailed enough to be of use. In general while many radio stations broadcast a weather report, this is not accompanied by information that would make it useful to farmers for planning purposes. Participants recommended some climate adaptation technologies that they would like to see addressed through radio programs. They agreed that radio programs are the simplest and most effective media to reach large numbers of farmers in the rural communities.

Malawi

There is a range of climate information services currently being provided by government departments (Department of Climate Change and Meteorological Services (DCCMS)) and civil society in Malawi. These services range from generation of the climate information to related services such as training, research and disaster management that support dissemination, application and use of the climate information. However, most organisations source the weather information from DCCMS and package or disseminate according to need and interest.

The organisations that use information from DCCMS include NGOs working in disaster or risk management, or training and research. A number of constraints regarding the use of climate services were noted, such as quality of data, and limited understanding and assimilation of climate information as it is not trusted. However, a number of opportunities also exist. For example, climate information is a crosscutting issue, high on the international

and national agenda, and district climate information centres have recently been established in 7 districts: Karonga, Kasungu, Salima, Zomba, Mulanje, Nsanje and Chikwawa.

Key Findings from Audience Research: Tanzania

Listenership and broadcasting

In this section we asked general questions on access to radio and listening habits, as well as access to mobile phones and listening clubs.

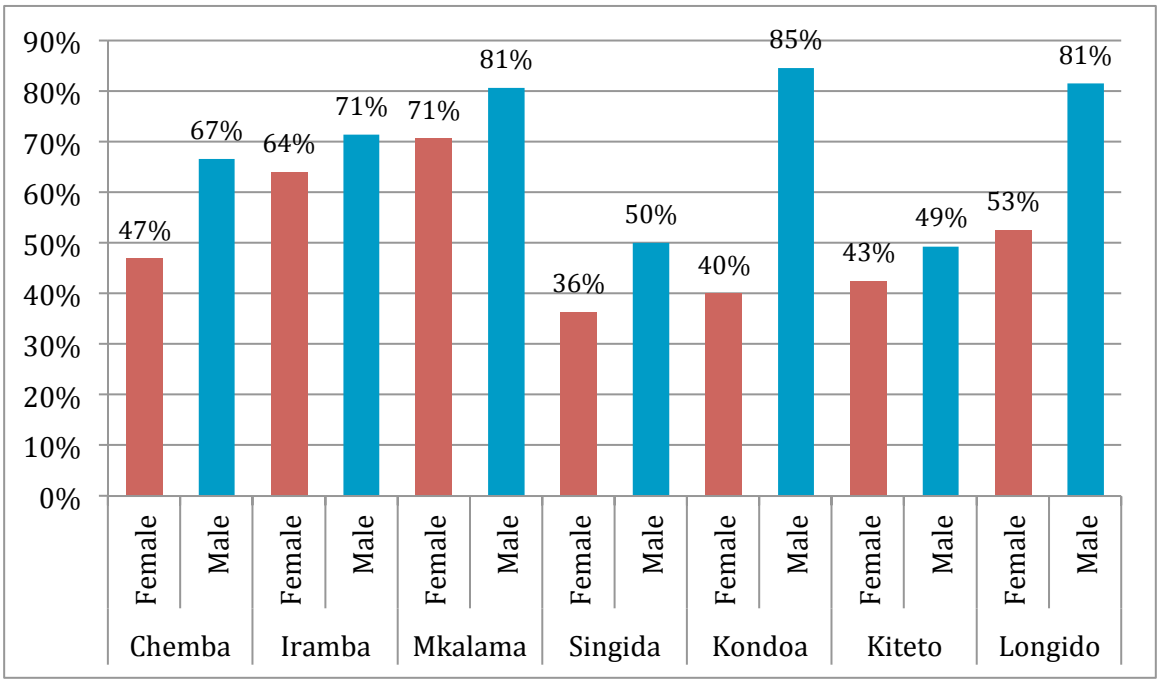
Access to radio

A key issue when planning to use any form of radio broadcast for reaching dispersed populations, is to be aware of how common and accepted radio listening is in the locality. Respondents were asked if they had access to a functioning radio at home. As the chart below shows, 71% responded positively, showing that access to radio is common in these regions. The survey found that respondents claim the radio set is owned "by the whole family" (55%) or by "both husband and wife" (23%).

Frequency and other listening habits

An average of 59% of the entire respondents claimed to have listened to the radio in the last seven days. Listening rates were highest in Mkalama and lowest in Singida. Women listen to radio less often than men in general.

Figure 1. Percent of respondents in three districts that have listened to the radio in the past seven days (n=625).



Similarly, 53% of all respondents claimed to listen to the radio on a daily basis. Again, more Mkalama residents listen daily, and Singida had fewest respondents who listen daily. Conversely, a total of 33% said they listen "rarely".

Respondents were offered a list of choices regarding where they listen to the radio, if they listen outside of the home. The most common response was "at a friend's house", while many replied that they did not listen outside of home. A third of respondents listen in a public place, while 53 listen by mobile phone, a relatively low number.

Mobile phone ownership and use

Mobile phone ownership in the studied regions is high, up to 95%. Ownership is still more common among men than women, but these rates give us confidence that interaction by mobile phone is not constrained by ownership. Respondents who do not own their own phone most commonly borrow a family member's phone (80%) while the remaining 20% use a friend's phone. To assess available budget for phone use, we asked how much respondents spend on airtime per week. The average spent is over 3,500 TShs (one US dollar is approximately 1680 TShs) with male residents of Longido reporting spending 5,000 TShs. Males spend more than females.

Figure 2. Ownership of mobile phone in seven districts (n=625).

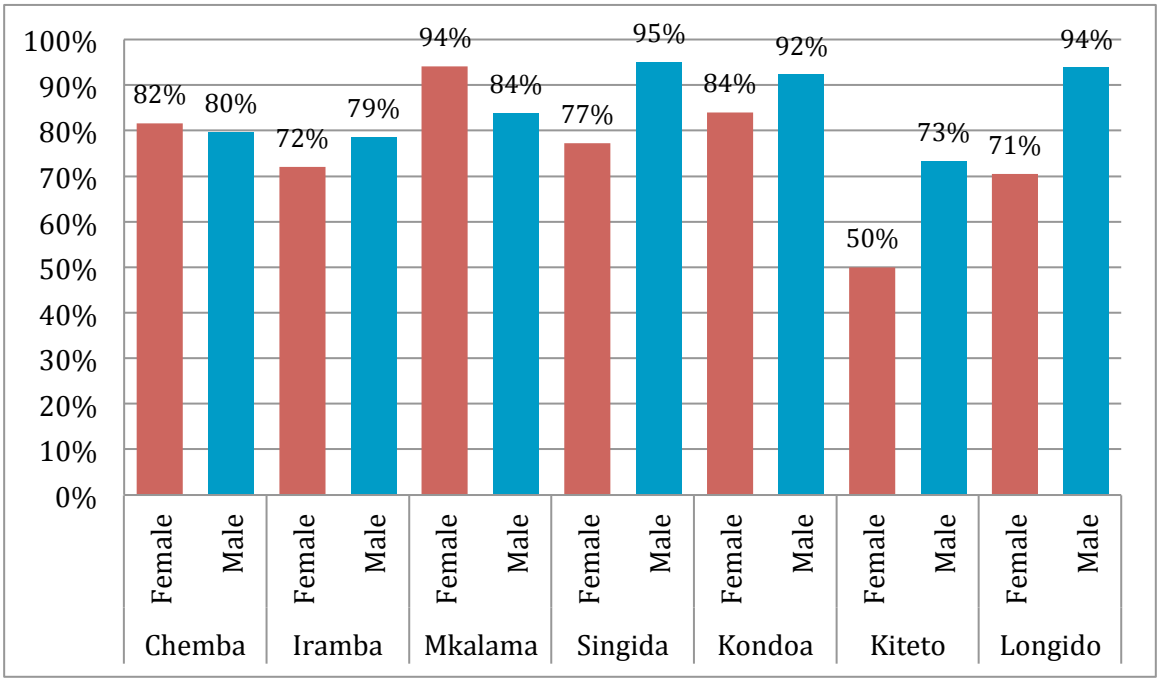
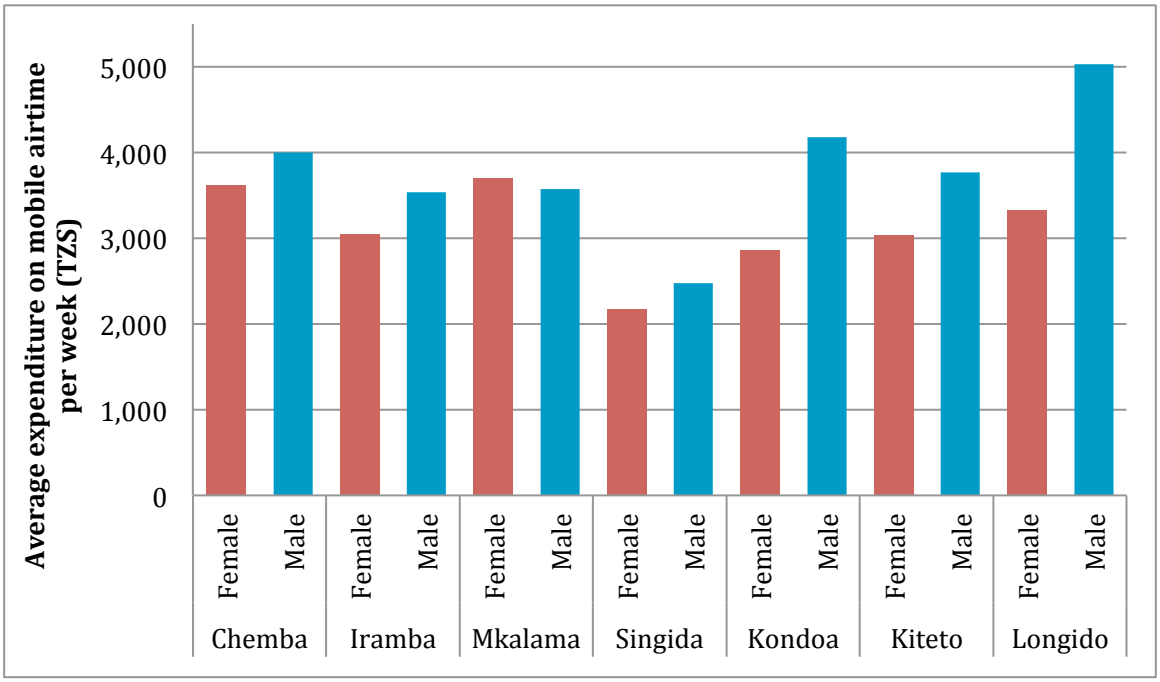


Figure 3. Average weekly expenditure on airtime (TSh) (n=625).



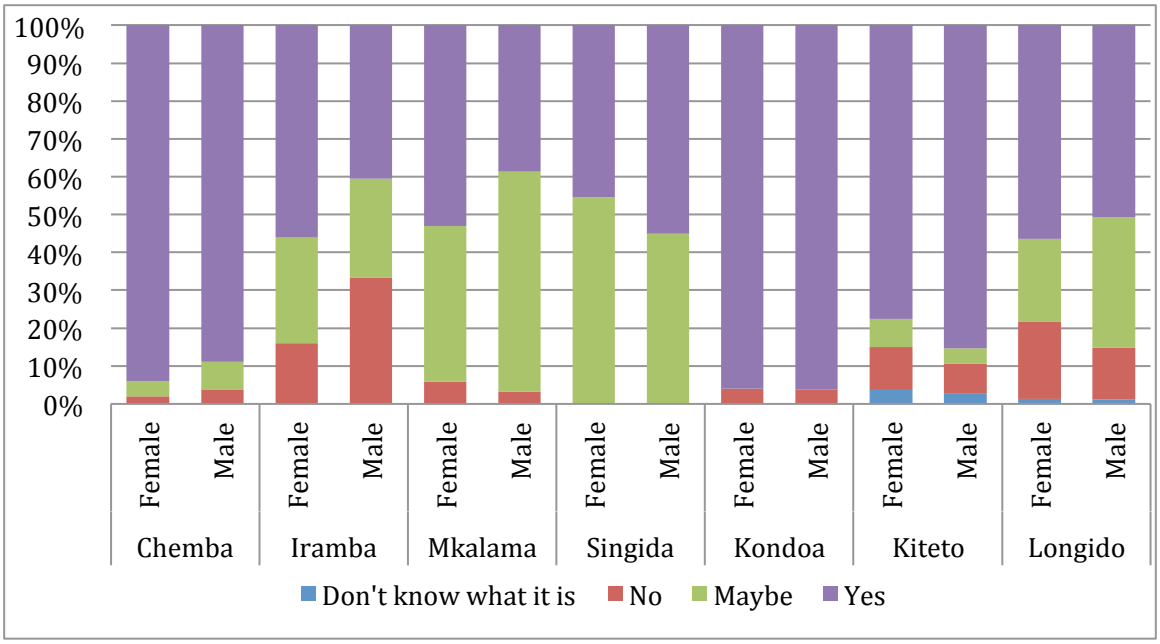
Listening groups

In Farm Radio International's experience, when farmers listen in a group, they learn more and are more likely to act on the information they hear in a radio show. For these reasons we

encourage the formation or use of Community Listening Groups in our radio projects. The first step is to find out which groups exist in a community and how the community members view these, as it is more effective to work with existing groups.

Listening groups are not common, with over 91% of respondents reporting that they do not know of a listening group in their community. When asked if they would like to join a listening group if it existed, responses were mixed, with respondents in some regions, such as Chemba, Kondoa, and Kiteto showing a lot of interest while residents of Mkalama and Singida appeared less keen. When asked a follow-up question about why they would join, two reasons stood out: "I can discuss with my friends," and "I might learn something."

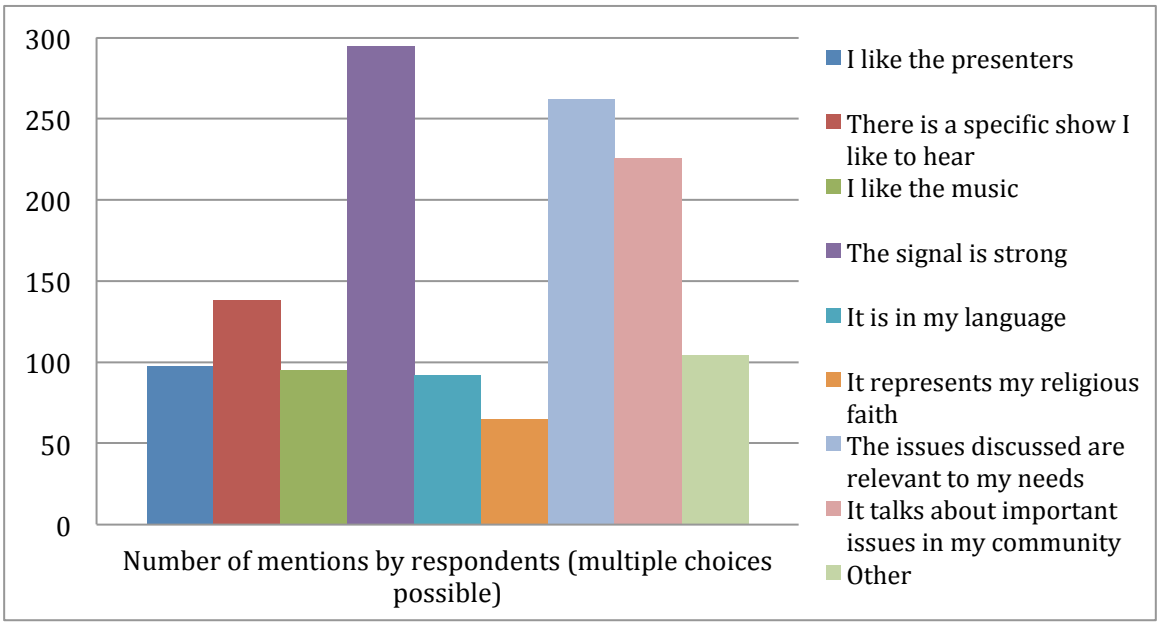
Figure 4. Percent of respondents that expressed interest in joining a radio listening club in their community if it was to exist (n=625).



Trusted radio stations and preferred types of programming

Two radio stations, TBC 1, and Radio Free Africa, stood out as most preferred when respondents were asked to name the radio station they trusted for agricultural information. When probed as to why this station was preferred, two interesting issues came up. One issue is simply that signal is strong. Secondly, listeners want content that is relevant to their needs and talks about issues they face within their community (Fig. 6).

Figure 5. Number of respondents mentioning reasons why they prefer certain radio stations (n=625).



When asked in detail about what kinds of content farmers would like on agricultural shows, the most common answer was "agricultural news" followed very closely by "interviews with farmers" This shows the importance farmers set on hearing from other farmers. Expert's opinions and weather forecasts were also mentioned often as desirable elements of a farm radio show. Evenings are the ideal listening time for both males and females.

Climate information through radio and ICT

Access to weather forecasts on radio and their current use

An average of 61% of respondents have listened to weather forecasts on the radio in the last six months. Weather forecasts are common. However, when probed, over half of respondents said they heard it simply because it was on while they were listening, rather than tuning in with the intention of hearing a forecast. 25% claimed to use the information to help them decide when to plant. Currently, daily forecasts are the most common weather service on the radio, followed by predictions of the start of the rains, and warning of extreme weather events.

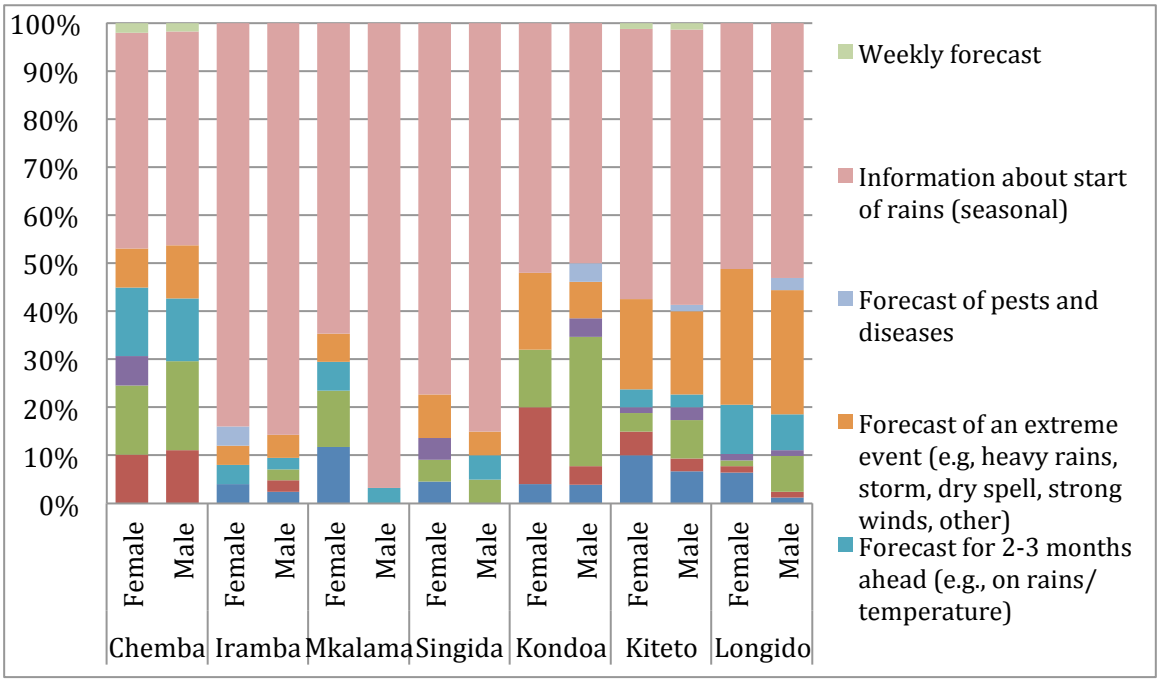
Respondents reported that there is currently little access to weather information by mobile phone, with two thirds of respondents noting that "no" information is available. Some

respondents claimed they can get daily or weekly forecasts, or prediction of the start of the rains.

Type of weather information needed and how often

More than half of respondents said they would want to know when the rains would begin as the key weather information needed. Second most popular response was the forecast of an extreme weather event. However, when asked how often they wanted to receive weather information, more than half said "daily". The second most common response was "before every change of season". These are key issues to be considered in the design and focus of climate information services for Tanzania.

Figure 6. Type of weather information needed in general (n=625).

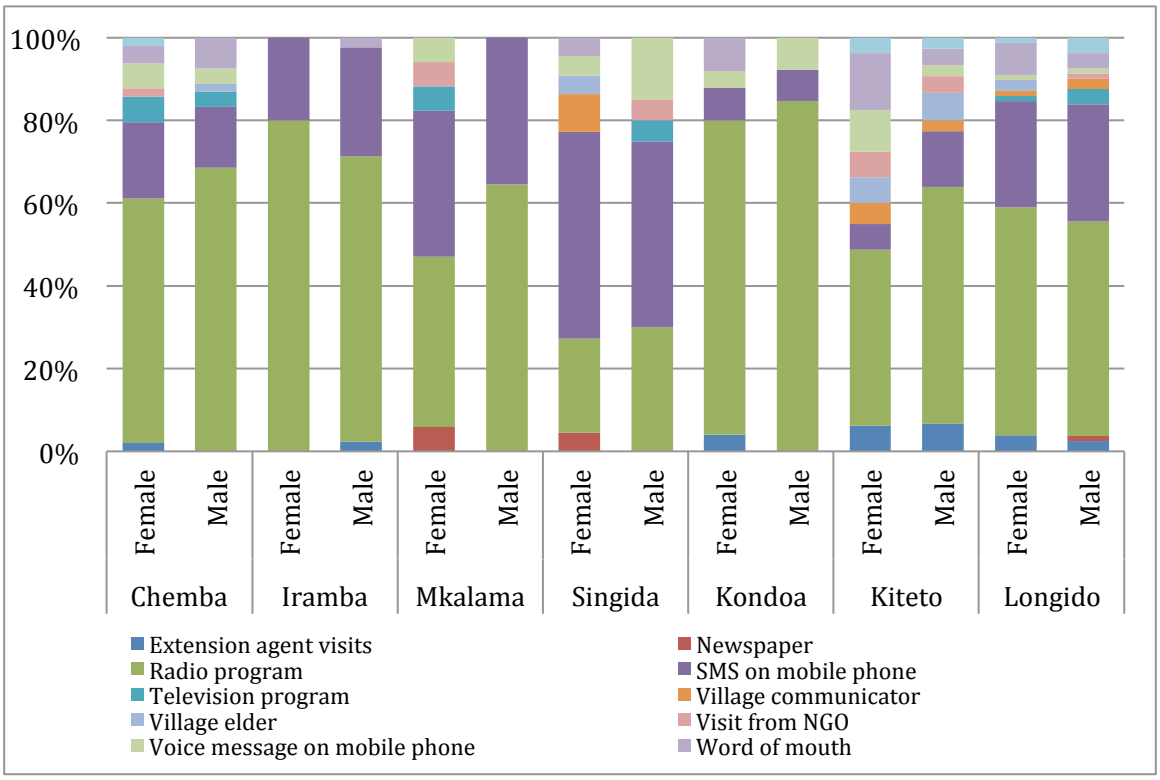


When asked what key information would be useful on a daily basis, the most common response, given by over two thirds of respondents was "if it will rain or not". This is perhaps to be expected in a region dependent on rainfall for cultivation. The answer was the same when asked what information would be needed on a weekly basis. And again, the most common request for information provided on a seasonal basis was regarding the start of the rains.

Preferred information sources and perceived benefits

Over half of respondents said their preferred method for receiving climate information was by radio. Second most preferred method was by SMS on mobile phone. This gives confidence that messaging delivered in either method will be accessible. It is worth noting that SMS messages will cater to a different group of farmers who are relatively more literate than many who rely on radio programming for weather and climate information.

Figure 7. Most important sources of weather and climate information (n=625).



Over 500 respondents claimed that they would use weather information to help them make decisions on the farm. When asked directly "How likely are you to make decisions on your farm based on weather information you have heard on radio?" over one third said definitely. Trust in information received via mobile phone seems to be lower, with a comparable figure of nearly one third saying they were unlikely to make decisions on farm based on information received via phones.

Figure 8. "How likely are you to make decisions on your farm based on weather information you have heard on radio? (scale of 1-5)" (n=625).

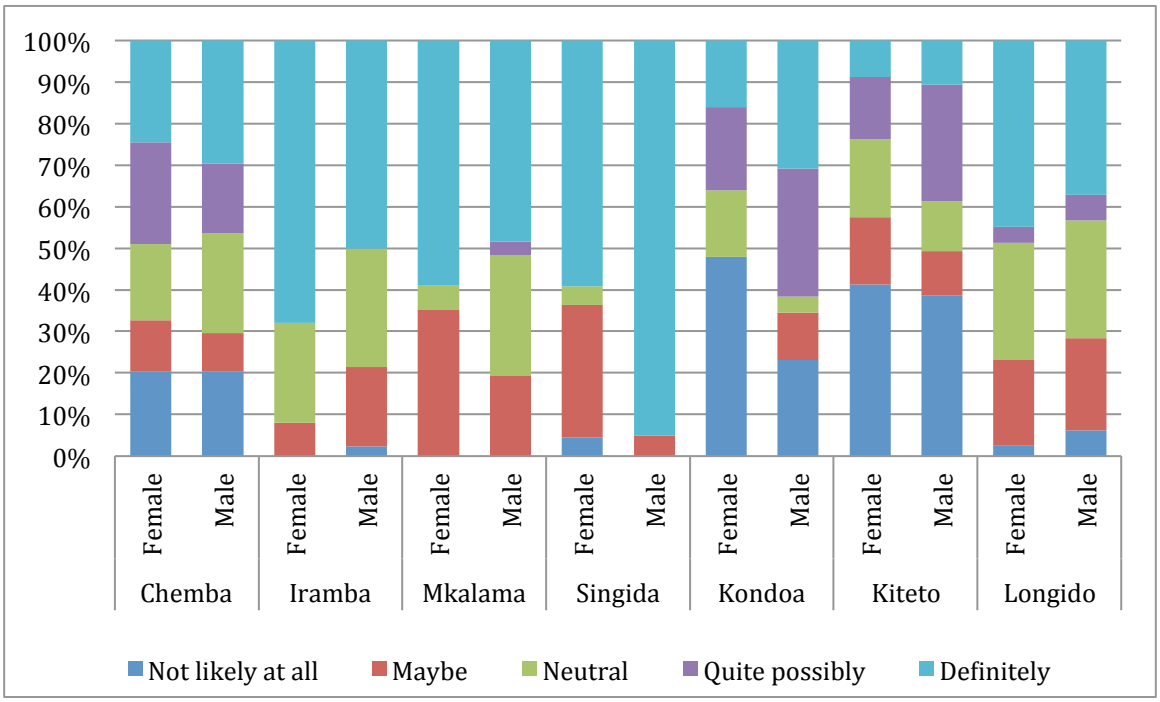
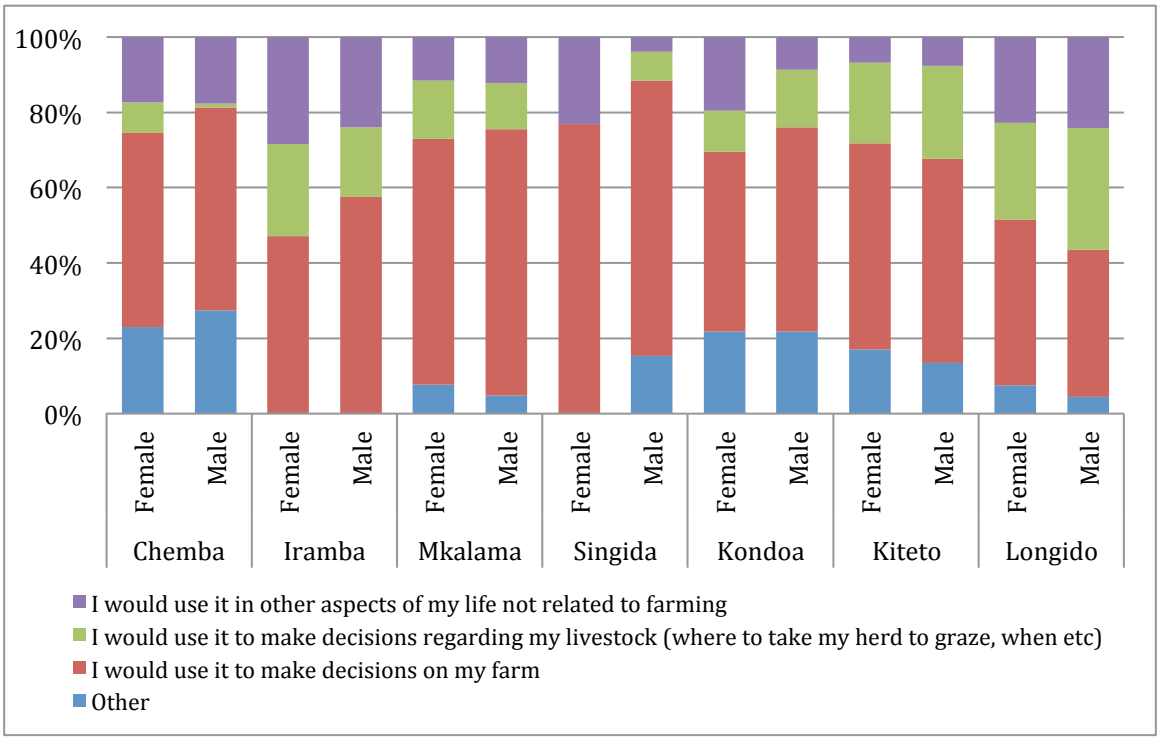


Figure 9. Benefits that respondents would hope to see from using weather and climate information (n=625).



Key Findings from Audience Research: Malawi

Listenership and broadcasting

Access to radio

Respondents were asked if they had access to a functioning radio at home, of which 63% responded positively, while 37% said they did not have access to a radio set at home. This is consistent with national findings -the National Statistics Office puts radio ownership at 64.1%. Most FRT/FRI research in Malawi puts radio ownership around 60-70%, therefore, this data is consistent and backs up previous findings. Broken down by region, it is notable that Zomba has lower rates of radio ownership, at 56%, while 44% do not. When asked "who owns the radio?" the most two most common responses were "husband" at 33% and "whole family" at 39%. Notably, less than 9% of women were reported to own the radio. This may negatively affect their opportunities to listen to their preferred radio programs.

Frequency and other listening habits

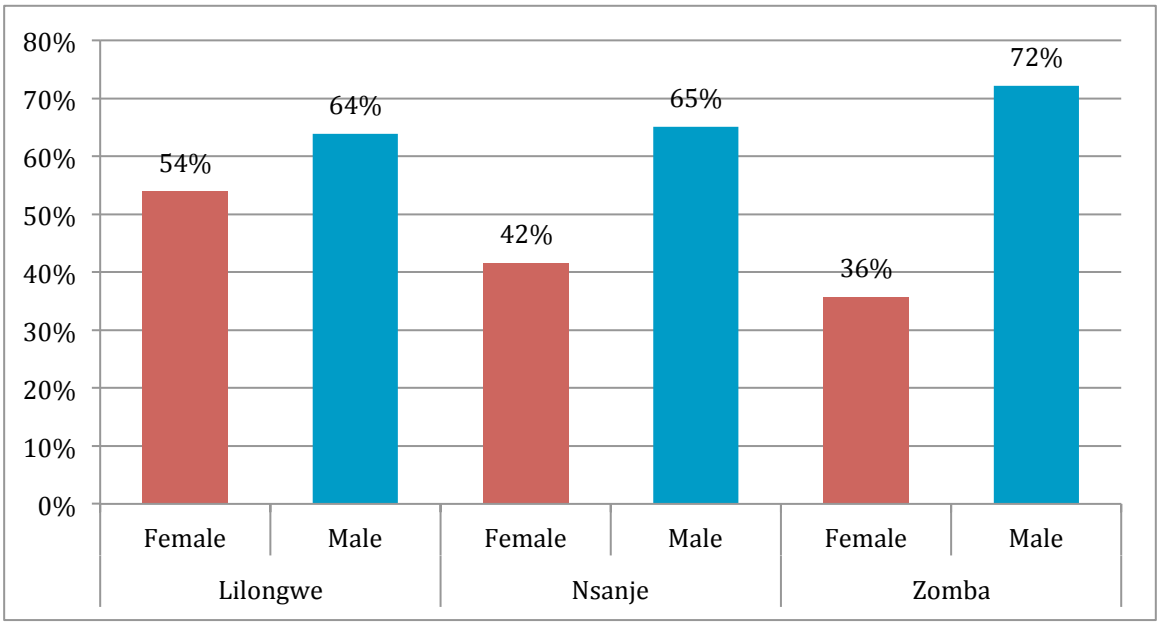
On average, half of all respondents reported listening to the radio on a daily basis. However, the responses differed by region, and by gender. More men than women listened daily in all regions. Lilongwe showed highest daily listening rates, with an average of 61%, while Nsanje has lowest daily listening rates at 42.5% who reported this activity. The responses from Zomba were polarised – 46% report listening daily, while 37% claim to listen "rarely". This can be explained in part by the lower rates of radio ownership in Zomba – where only 56% of respondents report having a radio at home, much lower than Lilongwe, and lower than Nsanje. However with an average of half of respondents listening to radio every day, this is a good indication that radio listening is common and accepted within these regions.

Respondents were offered a list of choices regarding where they listen to the radio, if they listen outside of the home. They could name as many places as relevant. The most common response was "at a friend's house," while many replied that they did not listen outside of home. Forty people claimed to listen by mobile phone, and 26 in a group meeting.

Digging deeper and crosschecking on radio listening habits, we asked if respondents had listened to the radio in the last seven days. The numbers were encouraging, with at least 64% of respondents listening in the last week, correlating with the previous questions about

frequency of listening. Again, it should be noted that in all cases, fewer women are listening regularly.

Figure 10. Percent of respondents in three districts that have listened to the radio in the past seven days (n=655).



Mobile phone ownership and use

Mobile phone ownership is higher in Lilongwe than the other studied districts (Fig. 11). As this region has more urban areas, this is to be expected. In addition, ownership among men is more common than among women. This, along with lower radio listening and access rates among women, is a key aspect to consider when planning to ensure the inclusion of women in radio shows, and ensuring they, and not just their husbands, receive the information they need.

Figure 12 explores how people who do not own a phone can access one. Excluding respondents who own a phone, this shows that while phone ownership among women and in both Nsanje and Zomba is relatively low, the majority of these respondents do have access to mobile phones. Sixty-six percent of respondents use a family member's phone, while 31% use a friend's phone. The rest will pay for the service.

Figure 11. Ownership of mobile phone in three districts (n=655).

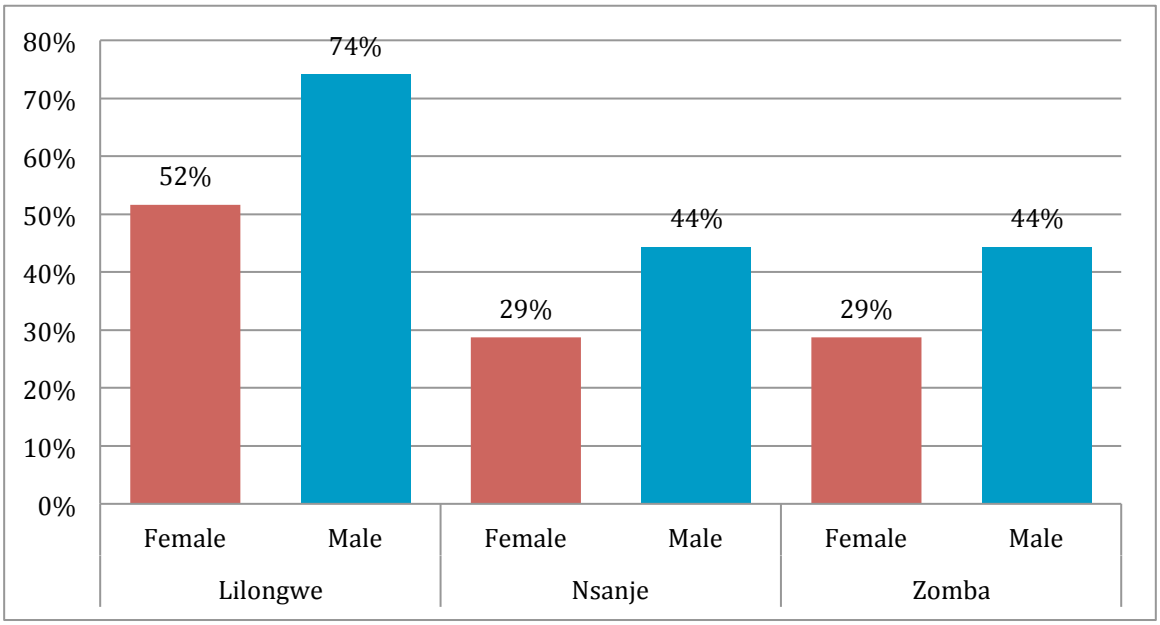
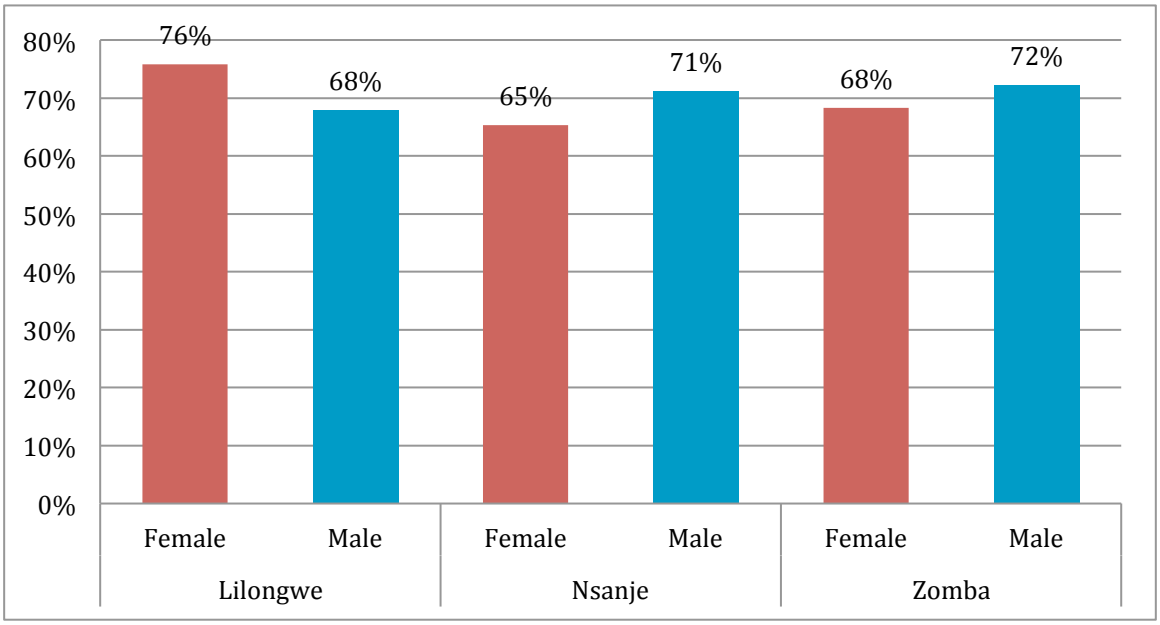


Figure 12. Access to mobile phone by those respondents who do not own one (n=357).

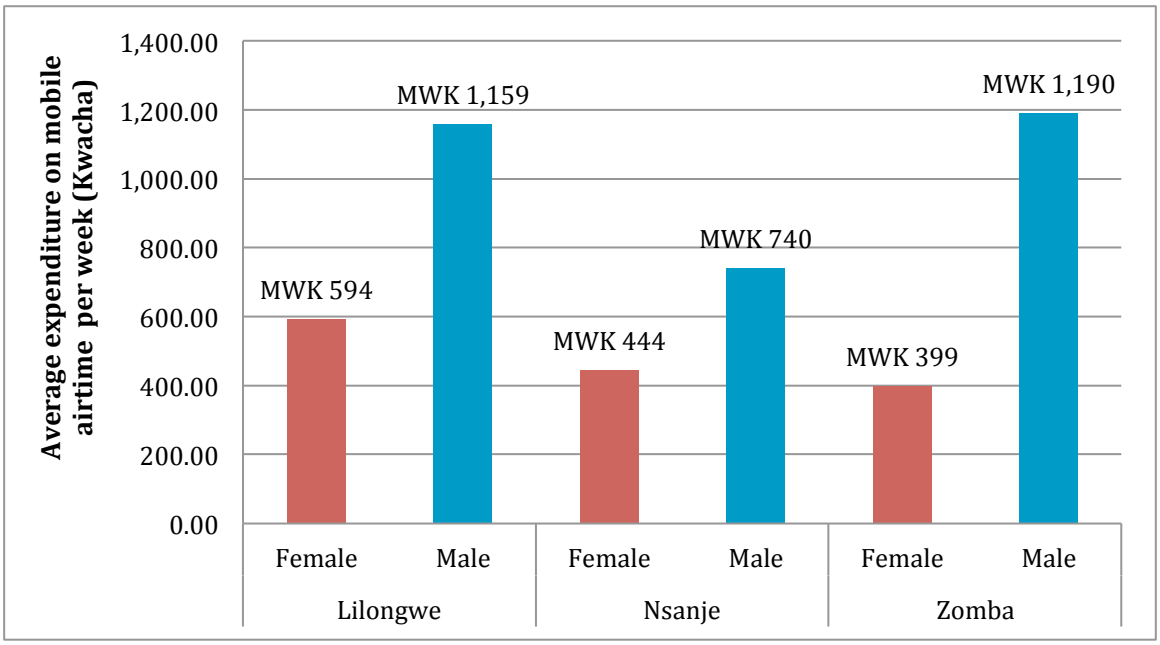


Of those having access to a phone, the most commonly used function, by a long way, was calling, mentioned by 527 respondents. The next most common function was SMS, mentioned by 97 respondents, followed by radio and then flashing or beeping.

To assess the frequency of use, and the available budget for using a phone, we asked respondents how much they spend per week on phone airtime, on average. The result is

presented in Figure 15 below. Men spend more, and inhabitants of Zomba spend a comparable amount to inhabitants of Lilongwe. This may be due to the very rural nature of Zomba. Nsanje residents spend a little less. It is to be expected that Lilongwe has higher expenditures on mobile phones, since the study was conducted in a peri-urban area of the capital city. Nsanje and Zomba are more rural. In Zomba, the terrain of the scoping study sites was difficult, which could explain greater use of mobiles for communications. These findings show that farmers at all sites are able to spend a few dollars week on airtime. At time of writing, MK400 is equal to approximately one US dollar.

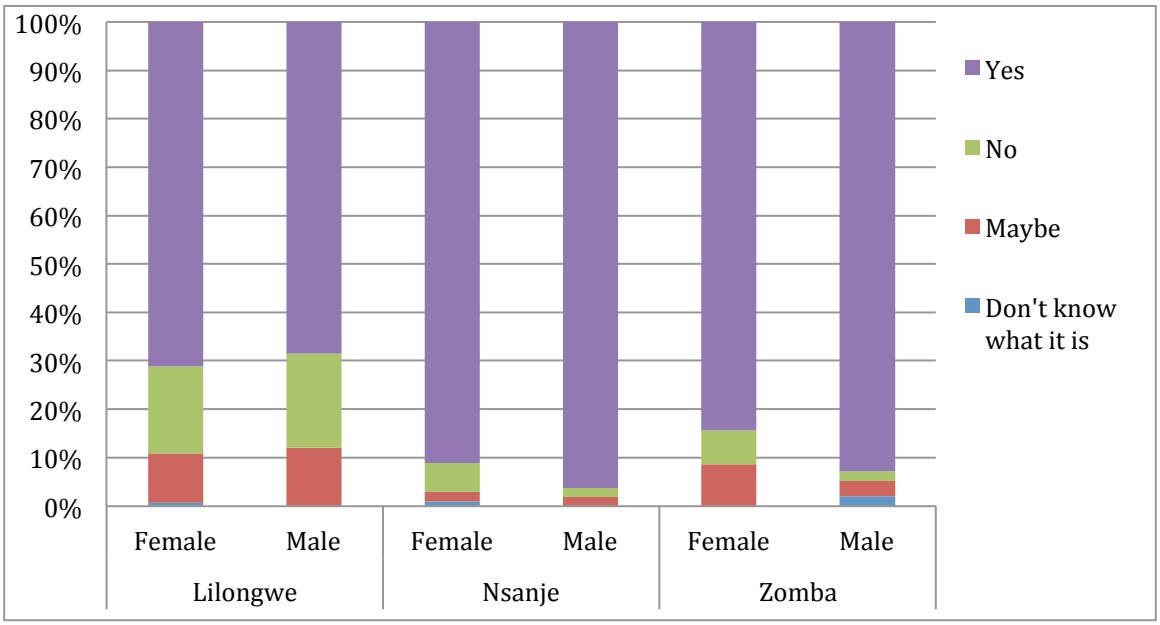
Figure 13. Average weekly expenditure on airtime (MWK) (n=357).



Listening groups

Around 80% of respondents said there is no Community Listening Group (CLG) in their community. However, as shown in the graph below, the vast majority of respondents (minimum value 68%) said they would be interested in joining a club if it were possible. Similarly to Tanzania, when asked about why they would join, two reasons stood out: (a) "I can discuss with my friends;" and "I might learn something." This finding will be useful when planning implementation.

Figure 14. Percent of respondents that expressed interest in joining a radio listening club in their community if it was to exist (n=655).



Trusted radio stations and preferred types of programming

When asked to name the station most trusted for agricultural information, two stations stood out among the 16 options. These were ZBS and MBC Radio 1. As a follow up and to understand the reasons for this, and what farmers value in an agricultural radio show, we asked why this station was preferred (Fig. 15). The reason mentioned most often was "The issues discussed are relevant to my needs". While to be expected somewhat, it is a key reminder that any programming, to be successful and useful, must respond directly to farmers' needs, which in turn shows the value of pre-broadcast audience research, such as this study.

Looking more in-depth at the type of content on agricultural shows that farmers would find useful and relevant, it is interesting to note from the chart below, that "Interviews with farmers" was the most mentioned program element. This shows the value placed by farmers on listening to and learning from their peers, and is a key consideration when planning radio program content and formats. Following this, respondents valued hearing experts' opinions and also agricultural news. In this question, weather forecasts were mentioned only 61 times as preferred content for agricultural radio shows. This can be triangulated with questions in the following section.

Figure 15. Number of respondents mentioning reasons why they prefer certain radio stations (n=655).

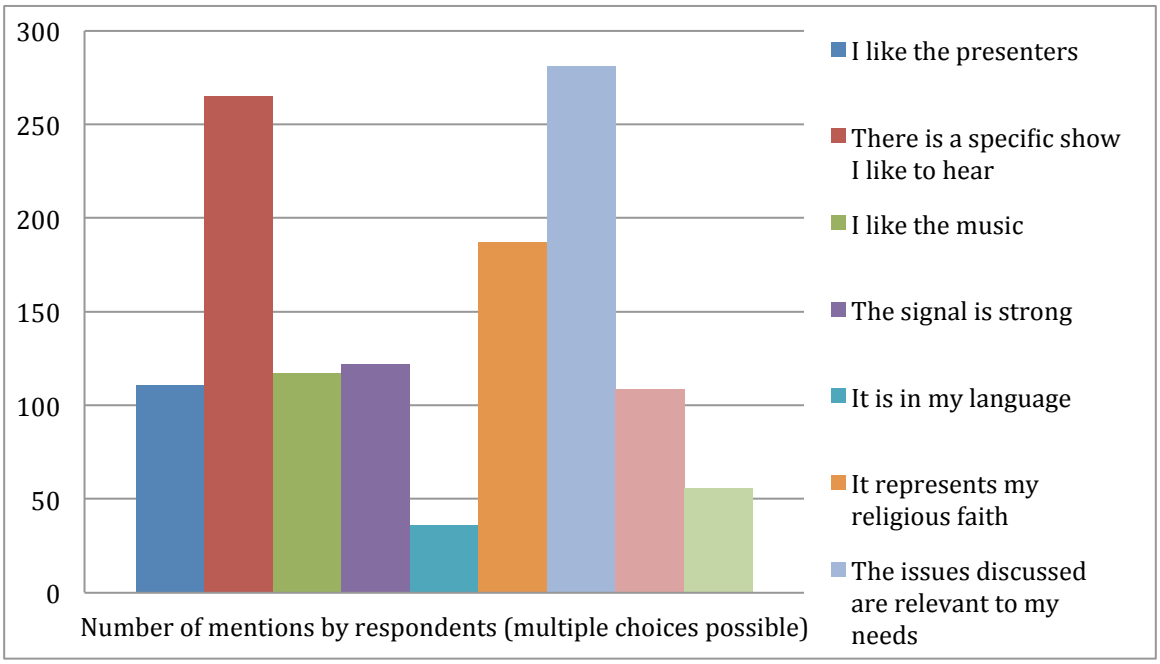
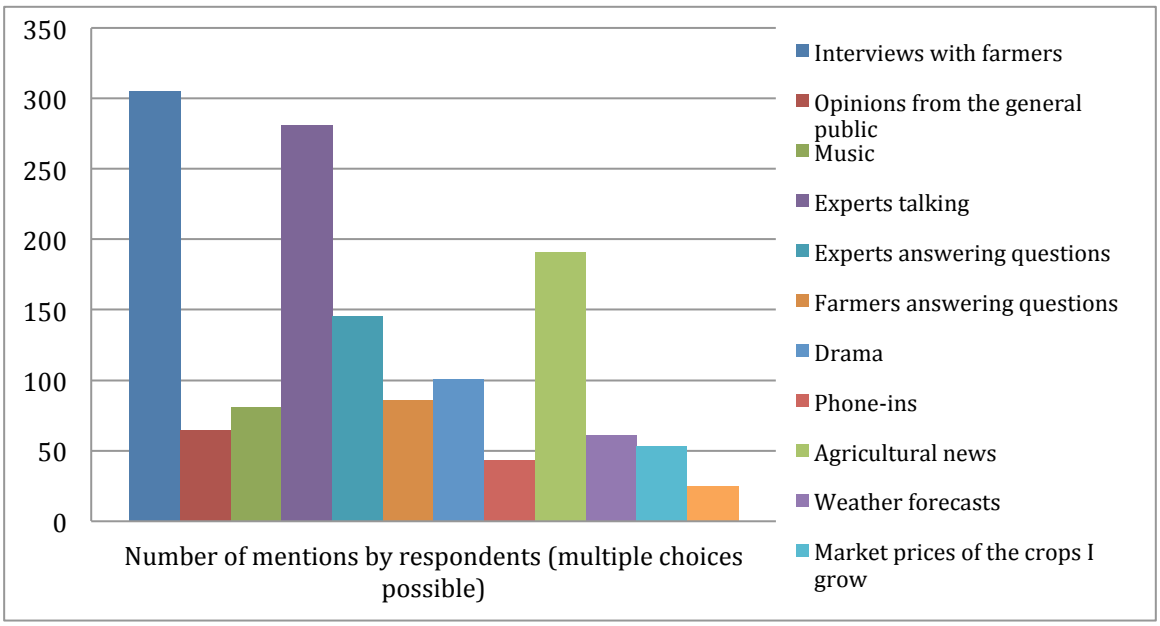


Figure 16. Number of respondents mentioning types of content that they like on agricultural radio programs (n=655).

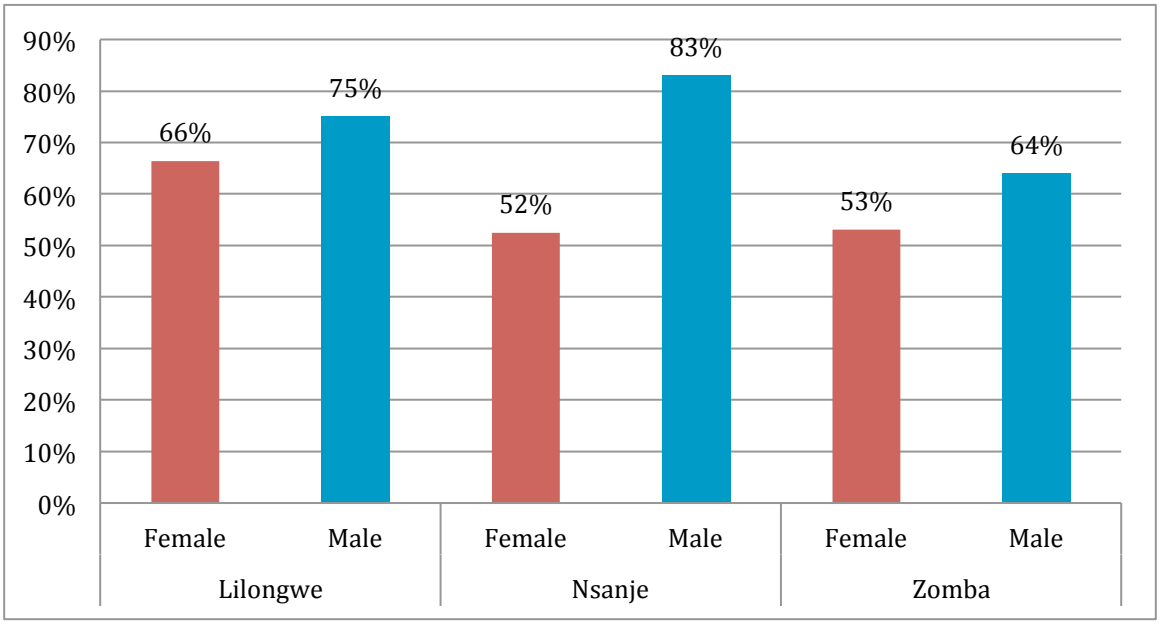


Climate information through radio and ICT

Access to weather forecasts on radio and their current use

An average of 65% of respondents have listened to weather forecasts on the radio in recent months, with slightly fewer listeners in Zomba. This is a solid base from which to build, as the population in these regions are familiar with hearing weather information on the radio.

Figure 17. Percent of respondents that have listened to weather forecasts on the radio in the past six months (n=655).



However, the following graph shows that the express intent to listen, or tune in for weather forecasts may be low, as many respondents report they heard the forecast "just because it was on". The second highest number of respondents mentioned that they listened because they need to know when it will rain. The importance of the rain is a trend we see repeated in the following results. Currently, the weather information most often heard on the radio is daily forecasts (Fig. 19), although weekly and seasonal forecasts are also mentioned.

Figure 18. Reason why respondents listened to weather forecasts on the radio (n=430).

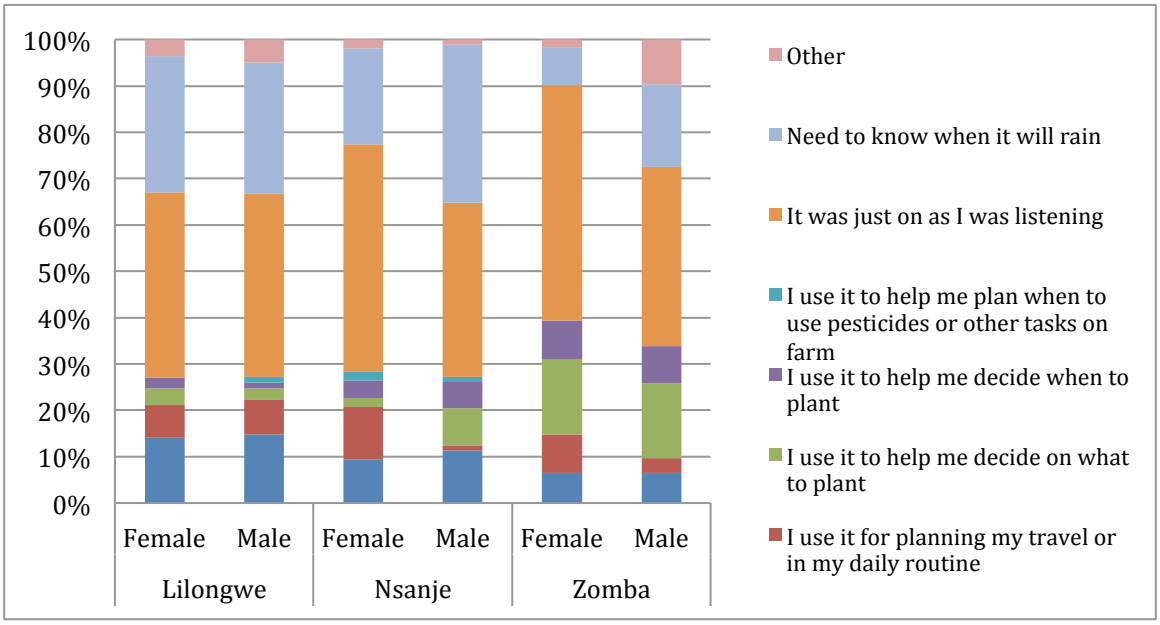
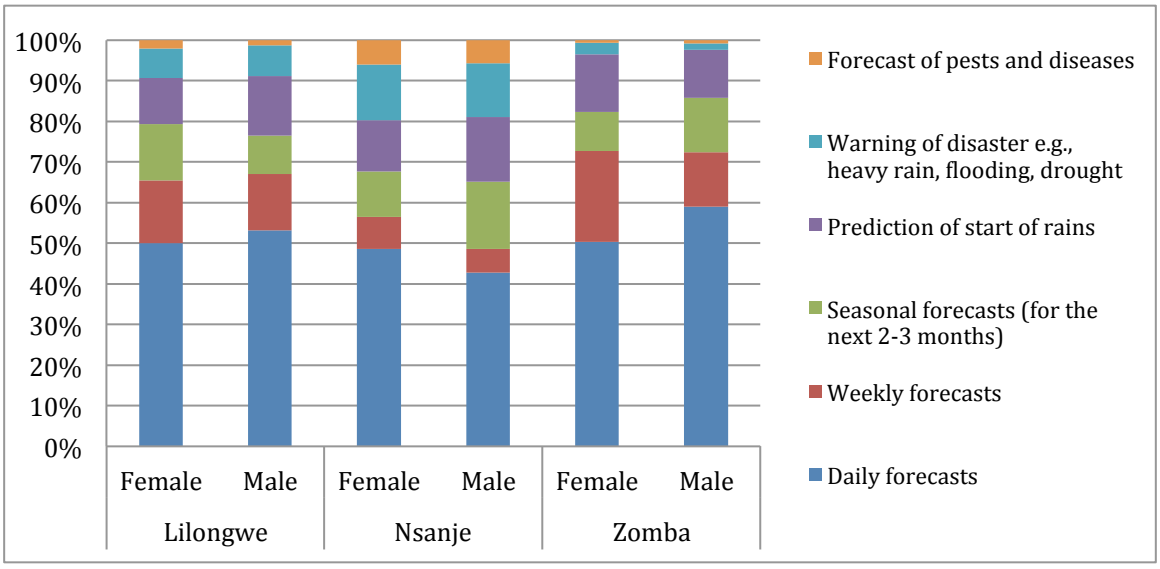


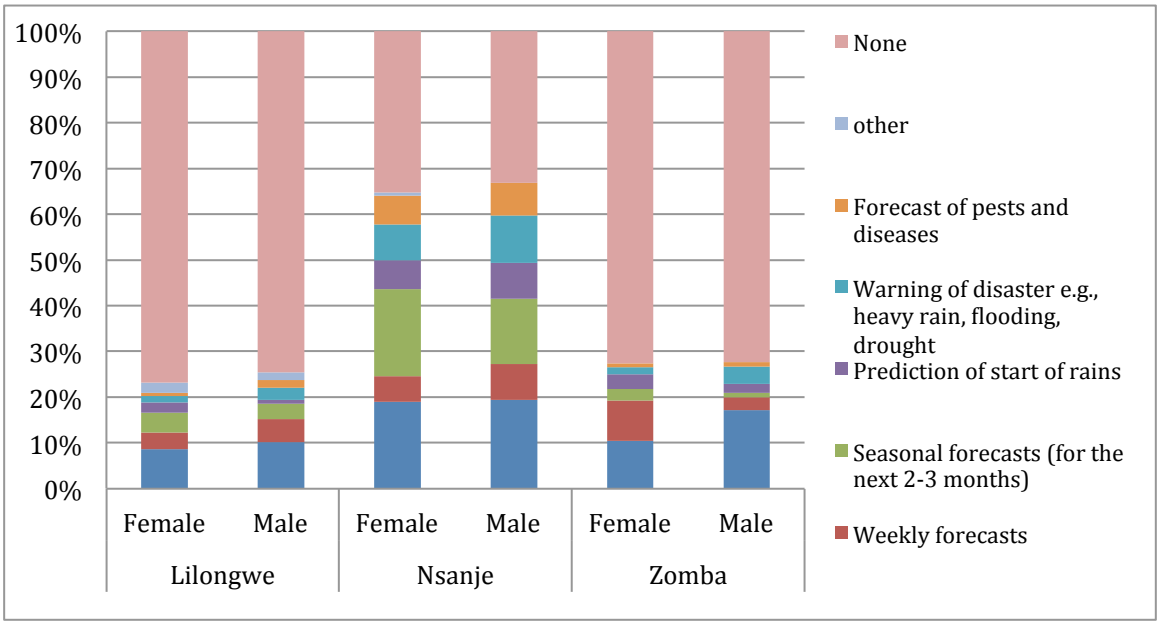
Figure 19. Kinds of weather information currently available to respondents on the radio (n=655).



In Lilongwe and Zomba, very little weather information is available by mobile phone, as shown in the graph below. With significant ownership and access to mobile phones, this is an opportunity and a gap that could be filled. The results are slightly different for Nsanje which may be partially explained due to the presence of the Enhancing Climate Change Resilience Program, funded by DFID and implemented by Christian Aid. They are concentrating on

early warning systems, since Nsanje is a flood prone area. This project will be included in our stakeholder review and will be reported on in the full report.

Figure 20. Kinds of weather information currently available to respondents on mobile phone (n=655).



Type of weather information needed and how often

When asked what kind of general weather information was needed, approximately half of all respondents said they wanted to know when the rains would begin. Second most selected response was to receive warning of an extreme event such as heavy rain or high wind. These are key issues that can be considered in the design and focus of climate information services for Malawi.

When asked, "How often do you need weather/climate information?" the most common response was "daily", given by over two-thirds of respondents, and broken down by region and gender (Fig. 22).

Figure 21. Type of weather information needed in general (n=655).

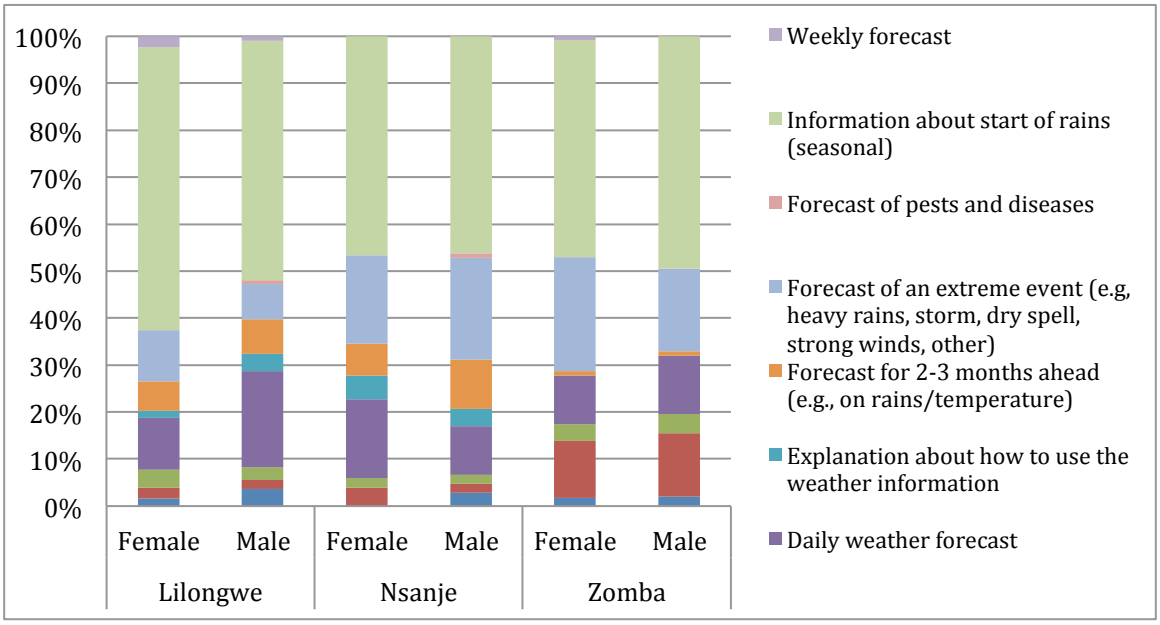
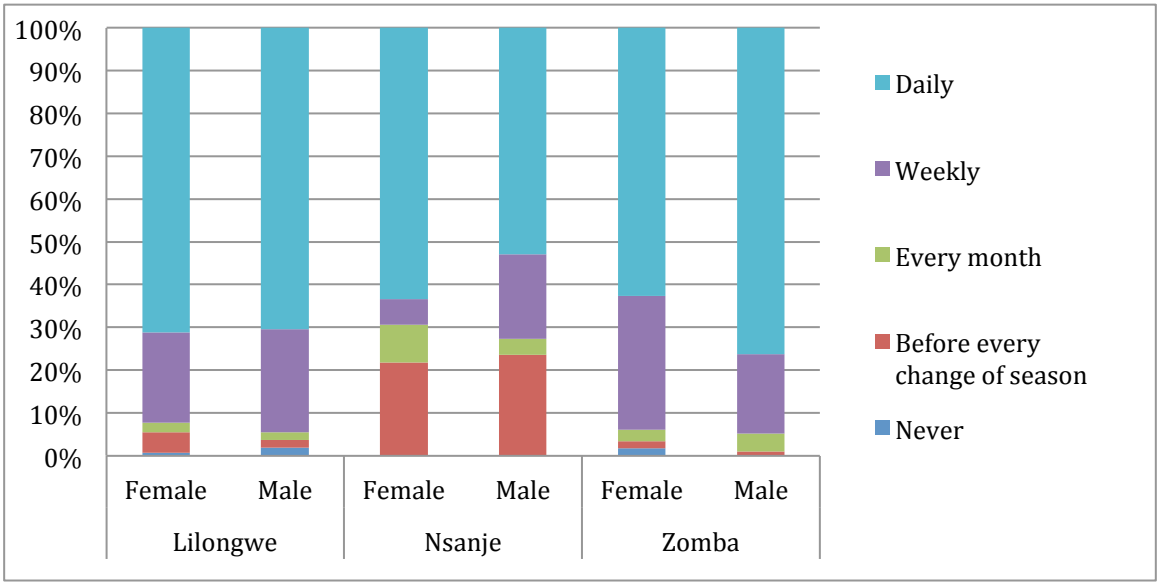
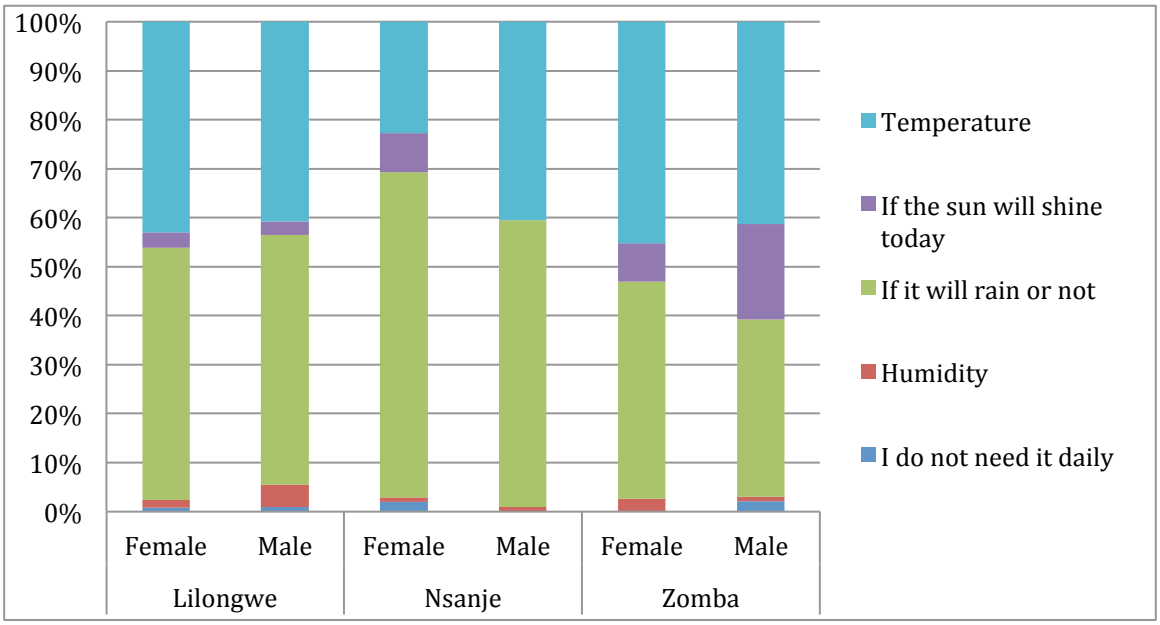


Figure 22. Frequency needed for weather and climate information (n=655).



When asked for more detail on what kind of information is needed on a daily basis, the issue of rain was mentioned by over half of the respondents, followed by the temperature, mentioned by approximately one third. When asked the similar question of what information is needed on a weekly basis, the result is similar – people want to know "Will it rain this week?" and "How hot will it be?"

Figure 23. Weather information needed daily (n=655).



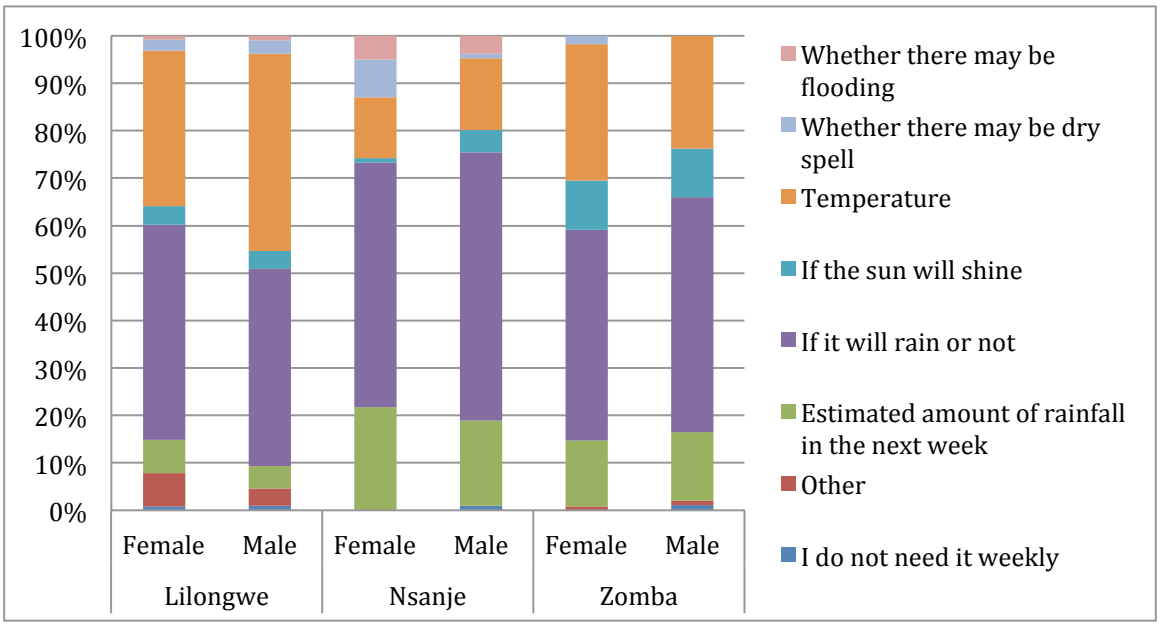
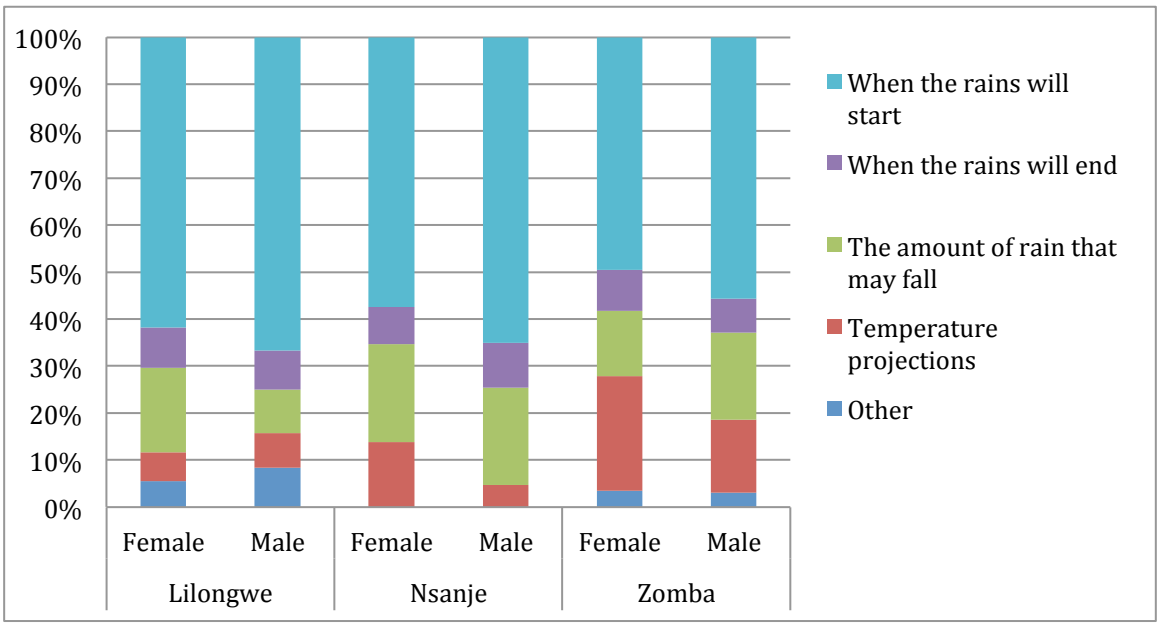


Figure 24. Weather information needed weekly (n=655).

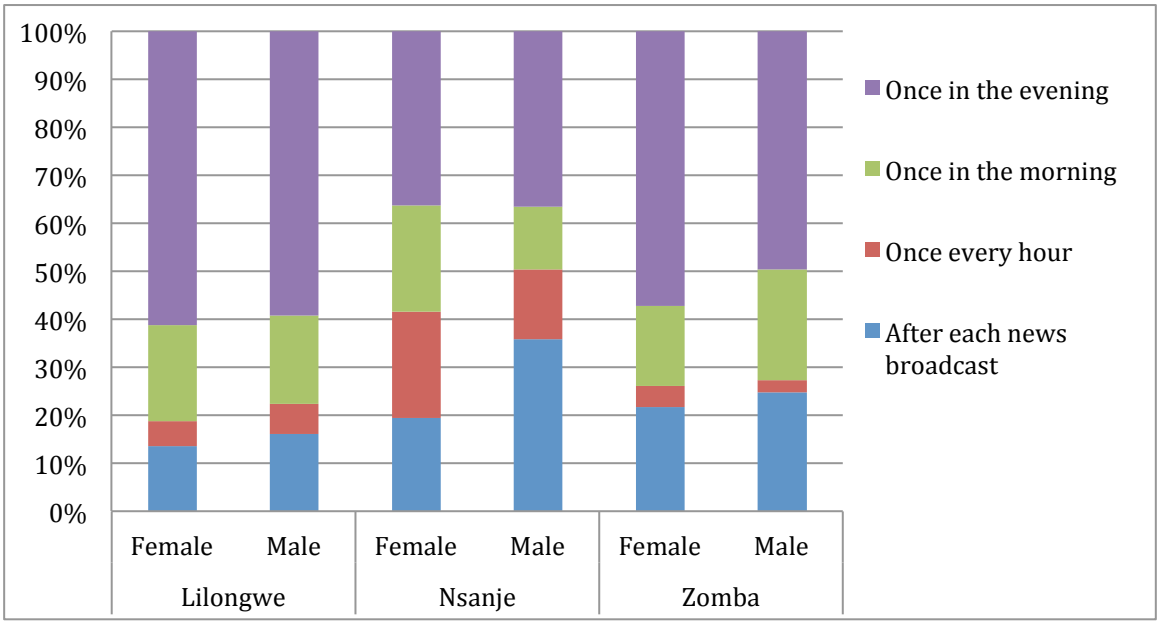
Looking at seasonal forecasts, approximately two thirds of respondents repeated a similar request – to know when the rains will begin, as the most important information needed seasonally.

Figure 25. Climate information needed seasonally (2-3 months ahead, especially at the start of the season) (n=655).



In addition we asked respondents what time of day they prefer to receive weather information. Results varied (Fig. 26), but the most common response was "Once in the evening".

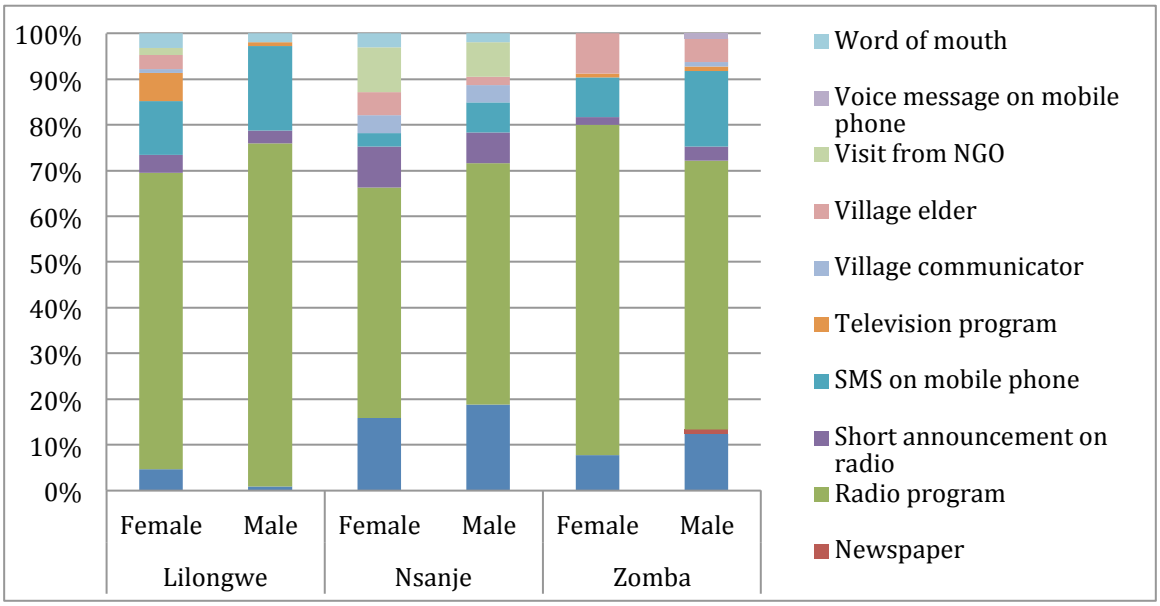
Figure 26. Preferred time for respondents to receive weather forecasts or information (n=655).



Preferred delivery channels, and potential use and benefits

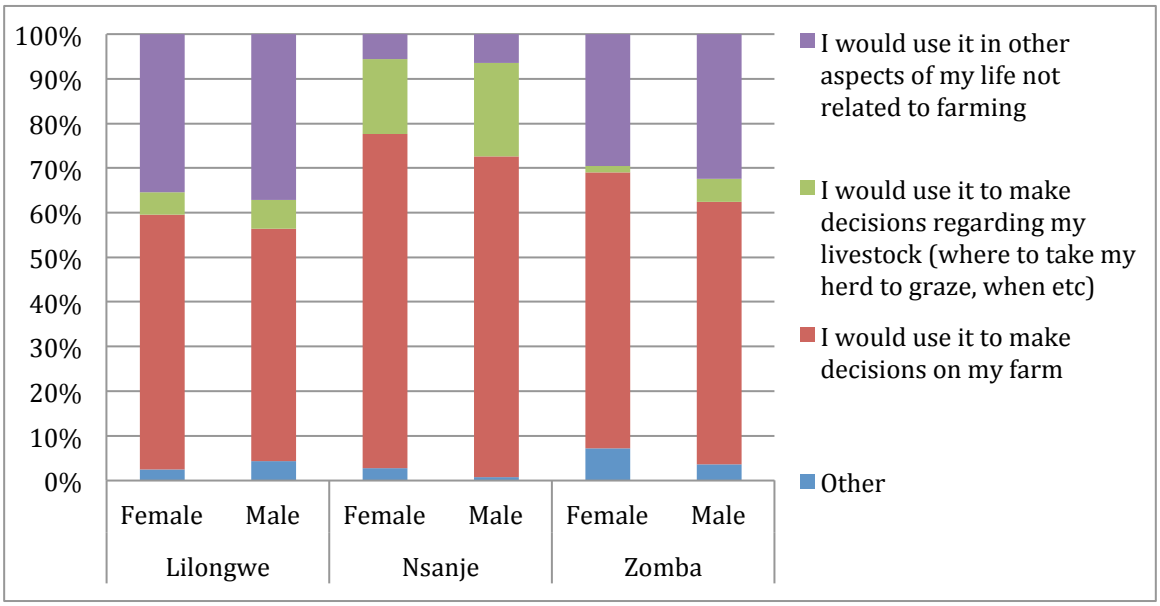
When asked "How would you prefer to receive weather and climate information?" over two thirds of respondents answered "radio programs" as their first preference. A much lower number stated "short announcement on radio", by comparison. One third of respondents mentioned radio programs as their second preference for receiving climate information. While this is very encouraging, we must acknowledge that there may be some bias present here as the respondent is aware that the survey is conducted by an organisation working with radio, and is planning to implement radio strategies on climate information services. That said, the number is enough to give us confidence that radio will be accepted as an effective and accessible medium for providing climate information services. In addition, this finding is backed up by all other surveys FRT/FRI have done in the past , either independently or with other independent organizations, which have consistently showed that radio remains the major source of information to smallholder farmers in Malawi.

Figure 27. Most important channels for accessing weather and climate information (n=655).



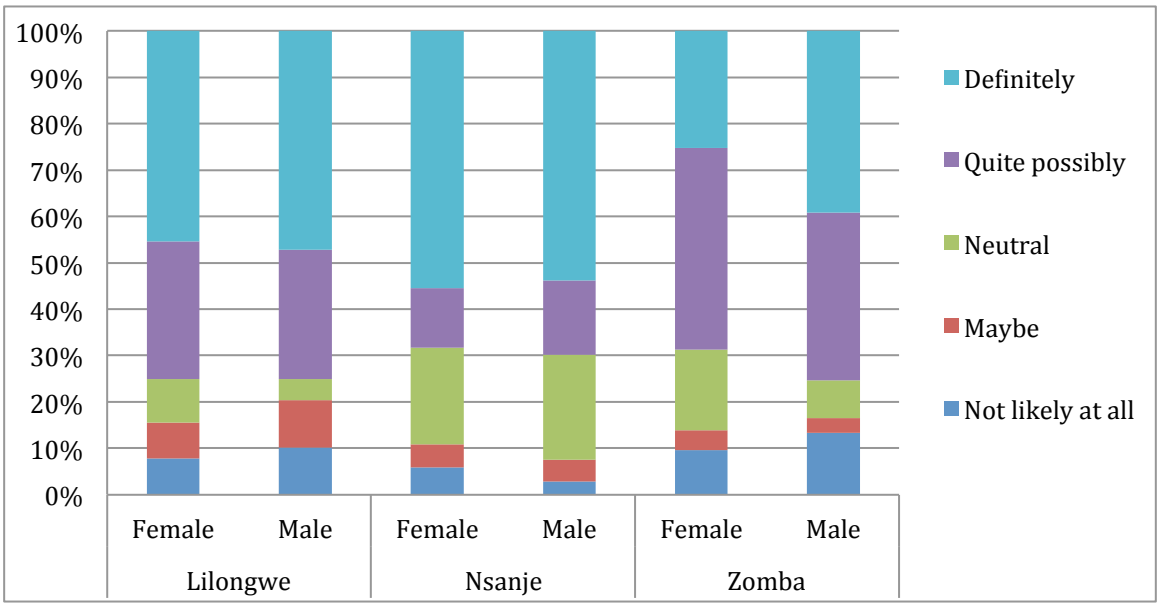
When questioned as to the potential benefits and uses farmers and pastoralists would expect, the most common response was that farmers would use the information to make decisions on their farms. The lower number who mentioned livestock reflects the fact that there are no pastoralists included in the sample in Malawi, but rather a small number of farmers who raise animals.

Figure 28. Benefits that respondents would hope to see from using weather and climate information (n=655).



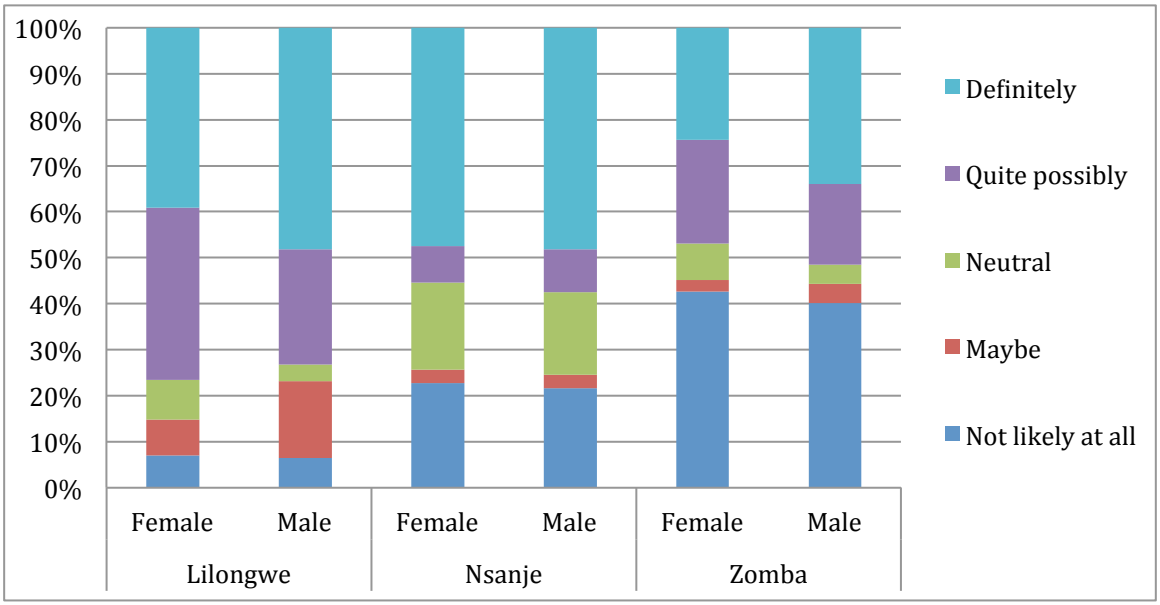
The previous question was substantiated by the response to the question asking about the likelihood of respondents using weather information from the radio to help in decision-making on farm. 72% of respondents replied "definitely" or "quite possibly", which indicates that farmers would trust the radio and use the information heard.

Figure 29. "How likely are you to make decisions on your farm based on weather information you have heard on radio? (scale of 1-5)" (n=655).



Asked the same question but with regard to mobile phones, around two-thirds said "definitely" or "quite possibly". Trust in information by mobile phone therefore appears to be slightly lower but still accepted. FRT in Malawi has noted similar findings in previous surveys, and has found it is mostly because information on mobile phones is not detailed compared to that which comes via radio programming strategies.

Figure 30. "If you receive weather information by mobile phone, how likely are you to make decisions on your farm based on this information? (scale of 1-5)" (n=655).



Stakeholder Analysis: The Wider Picture

Key Informant Interviews were conducted as part of the scoping study to further develop an understanding and discover broader issues related to climate information services in Malawi. Both countries also conducted one-day workshops to validate findings and gain a deeper understanding of the wider context, constraints and opportunities for climate information services in each country. Highlights are presented here.

Current access to climate information

Tanzania

The key informants told us that farmers and pastoralists can access weather information through radio, and sometimes via televisions. In Longido district, key informants mentioned

accessing climatic information from local forecasters and village general meetings. A minority seek weather information from other sources, such as calling extension workers for updates, or through NGOs like Naadutaro, an NGO dealing with climate change in Kiteto. Monitoring of rainfall and other agro-climatic measurements is usually at the District level, and then delivered to farmers via extension officers. Respondents had no knowledge of any SMS services on climate or agriculture from any of the mobile phone companies.

Malawi

In Malawi, generation of climate information is done through observation, recording and monitoring of weather parameters by the DCCMS which is then interpreted and disseminated to different users through the radio, television, emails, website, bulletins, and newspapers and recently to the district climate information centres. Department of Climate Change and Meteorological Services (DCCMS) is the sole and mandated office responsible for generating, monitoring and disseminating weather and climate information, and while weather forecasts are available to farmers, they still lack the specificity, context and interpretation needed to make them really useful for planning and decision making on-farm.

Other organizations working on climate

In Tanzania, only three other institutions were found to be working in the study region on climate issues. NAADUTARO, Kiteto, provides education on the effects of the climate changes in farming activities and the way to reduce the climate change effect. KINNAPA, Kiteto, addresses the issue of proper land use. Red Cross Tanzania has a new project to addressing the effects of the climate change in Kiteto communities. In Iramba and Mkalama districts, no organizations were found working directly on climate change. However, Sokoine University of Agriculture conducts research on climatic changes in the areas.

In Malawi, a number of organisations nationwide are working on climate issues (Table 2).

Role of traditional weather forecasters

Local forecasters are present in some of the study region villages in Tanzania. They use cloud patterns, temperature variations and named stars to predict rainfall and disease outbreak. For example, when the *Kirimira* star appears early in the sky, it means that rains are around the corner and farmers will start to prepare their farms. When another star called *Alakera*

waibandari (in Maasai language) is seen, it indicates the outbreak of diseases that kill a lot of livestock.

Table 2. Organizations working on climate issues in Malawi.

Category of Climate Information Service	Players	Specific Services
Generation, monitoring and dissemination of climate data and information	Department of Climate change and Meteorological Services (DCCMS)	Daily weather forecasts; 5 day weather forecasts; 10 day weather and agrometeorological bulletins; Seasonal forecasts; Raw data on all-weather parameters (temperature, wind speed, cloud amount, solar radiation, ground temperature, soil temperature); Advisories for the aviation industry
Disaster risk management	Red Cross; WFP; Goal Malawi; World Vision; Action Aid; District Councils; Department of Agricultural Extension Services (DAES); Department of Land Resources and Conservation (LRCD)	Responding to disasters and providing relief services to the affected people; Reducing disaster risk through early warning systems; Implementing Enhancing Community Resilience Program activities
Interpretation of seasonal forecasts for farmers	DCCMS; DAES; LRCD	Design extension messages on what the seasonal forecast means for farmers; Advise farmers have to do to maximise their yields / production (for example use of early maturing crop varieties; Advise farmers on land resources management and conservation according to the issued seasonal forecasts
Training	Lilongwe University of Agriculture and Natural Resources (LUANAR); Capacity Building for Managing Climate Change (CABMACC)	Provide undergraduate degree courses in Environmental Sciences and Natural Resources Management (Land and Water, Wildlife and ecotourism) and postgraduate degrees in Environment and Climate Change; Provide short courses related to climate change issues in the case of CABMACC
Research	LUANAR; CABMACC	Conduct a variety of research to understand and unravel environmental problems that Malawi faces such as on water and soil. Conduct research on climate related issues such as adaptation, mitigation, policy and climate change science.
Outreach	LUANAR; CABMACC	Field trials and projects in conservation of soil and soil erosion for example climate smart agriculture and Lilongwe catchment rehabilitation for water board
Weather insurance	DCCMS; LRCD; Insurance Companies	Provision of macro and micro- weather insurance programmes

The communities also have traditional knowledge regarding weather, using the appearance of certain kind of birds, stars, time of sunset, some tree flowers, as indicators of specific weather events. They noted that farmers and pastoralists will respond to both scientific and local climatic predictions – for example by migrating with livestock to other areas.

In Malawi, in as much as indigenous knowledge related to climate information exists, and some community people trust and utilise it to plan their farming activities, its integration into scientific knowledge is limited. DCCMS indicated that it does not integrate indigenous knowledge in generating and disseminating its climate information services, rather relies on the scientific methods only.

On the other hand research and training institutions and civil societies and other government departments acknowledge its importance, and the need to integrate indigenous and scientific knowledge in climate information services. Research and training institutions try to integrate indigenous knowledge to generate local theories and understand local environment.

Current initiatives, opportunities and constraints

Tanzania

Mr. George Sayula, a researcher and climate change specialist at Selian Agricultural Research Institute (SARI), Arusha, facilitated a one day stakeholder's workshop in Dodoma, attended by farmers and extension officers from the six study districts. Participants split into two working groups, one for farmers and one for representatives from predominantly pastoral regions. Firstly, the groups noted current initiatives to reduce effect of climate change, including: control of livestock parturition during the dry season; purchase of supplementary feed like maize bran for livestock to be feed during the shortage of food; soil and water conservation measures; planting of multipurpose tree; use of improved breeds; and supporting affected community with livestock as startup capital. Rainwater harvesting technologies (e.g. roof, side road, pans, ponds) are being applied in different environments. Land use planning maps have been developed and implemented in some areas of the study. All participants agreed that further information by radio on these topics would be of great value, as the details of these approaches are not fully communicated to, or understood by all communities. Secondly, the groups suggested and prioritised other initiatives with potential to reduce the effects of climate change.

The farmers group noted that their first priority would be to access weather information from TMA to help them plan their farm activities each season. Other priorities noted included: (a) use of improved drought-tolerant crop varieties, (b) spatial soil fertility information and its impact to environment, (c) training and information on the most important diseases and pests for crops (maize, sunflower, pigeonpea, beans), (d) major livestock pests and their control, improved crop varieties and animal breeds, and (e) appropriate use of inorganic fertilizers. The group of pastoralists suggested the following, in order of importance: market and marketing information for crop and livestock, (b) good management practices for crops and livestock, (c) conservation agriculture, (d) establishment of forage and pasture, (e) management of water including rainwater harvesting, (f) training on impacts of climate-related hazards, and (g) formation of farmer and pastoralist networks for information-sharing.

Malawi

The stakeholder workshop validated many findings from the audience survey and key informant interviews. The workshop was attended by representatives from relevant government departments and NGOs working on climate. They confirmed that farmers are looking to access daily weather services, as well as weekly and seasonally, rain and temperature updates. Respondents would also welcome warning about extreme events. Radio programs were the most preferred method for receiving weather information.

Many attendees also confirmed their support and interest in supporting climate services. DAES is the mouthpiece, has a network of extension workers across the country, and can synthesise the climate information and create messages for farmers plus documentation of experiences. Red Cross would scale out its early warning system with such type of programming. LRCD would provide raw data from specific EPA and ADD stations that can be further analysed to inform climate services. DAES, Land Resources would prepare recommended messages to be disseminated to farmers. DCCMS would provide climate information, to the station level. DCCMS also intends to do a user needs assessment under the early warning project. Participants noted the importance of reconciling contradicting findings and information, validating climate information and research findings, and packaging of the information ready for dissemination. The wider institutional context in Malawi is therefore conducive to implementing climate services. A number of constraints were identified at the workshop, but these are balanced by various opportunities (Table 3).

Table 3. Key constraints and opportunities identified in the Malawi stakeholder workshop.

Constraints	Opportunities
Limited understanding and assimilation to climate information hence people do not trust in climate information as they expect the predictions happen exactly the way they were forecasted. Issued forecasts are mainly national scale and generic, hence not specific to locality. Translation and interpretation of climate information done by only specialized people since the information is scientific and technical. Quality of messages: weather forecasts lack the information as to what that particular forecast means to the local farmer. Frequency of collaboration between sector departments/ ministries with DCCMS to discuss the forecasts and interpret it for farmers. Limited resources (finance, human resources, internet) to implement research and training activities. Coverage of weather stations limited to cover requirements of the nation. Data quality challenges with subsidiary stations manned by non-DCCMS staff (due to transfers and staff turn overs). Training of meteorology experts but also on job training for staff and volunteers is limited at country level – outside the country and costly).	Increased number of broadcasting houses e.g. radio stations (especially community stations) and television. Usage of SMS to disseminate very specific and localized climate information and warnings. Climate information service is a crosscutting issue, international and national agenda (hence funding opportunities) but also related to many other sectors and organizations of the country be it agriculture, health and disaster management. Recently established district climate information centers in 7 districts Karonga, Kasungu, Salima, Zomba, Mulanje, Nsanje and Chikwawa. Ability to downscale climate information to district / station levels (since the national generic information is reached at from the station observations). Automated weather stations that can provide and store data for further analysis and use. The existence of the national GFCS steering committee for content validation and monitoring.

Developing Climate Services through Interactive Radio

The findings of both parts of the scoping study indicate that there is considerable need and potential for interactive radio programs to help small-scale farmers make use of weather forecasts and related advisory services to adapt to and mitigate the impact of climate change. High – and growing – levels of radio listening, mobile phone ownership and use, together with the trust many farmers have in the information they hear on the radio, make this a very promising strategy.

FRI's inclusive radio program design, production and broadcasting strategy engages a diversity of information providers across various sectors. Part of the radio design process will involve a series of trainings for radio broadcasters that will elicit expertise from the nutrition, water and sanitation, agriculture and climate areas, and provide important opportunities for

aligning and consolidating key messages with the information needs of farmers. In Malawi and Tanzania, FRI will establish an advisory group consisting of content specialists, district-level leaders, government representatives and media specialists to help support the development and monitoring of the radio strategies. In our experience, the establishment of these groups creates stronger networks across the different sectors.

Government extension services will be engaged at the district level throughout the project, and FRI will work with individual extension workers, as is our normal procedure. All FRI's current radio programs in Tanzania and Malawi benefit from the intensive involvement of extension officers, who guide program content, appear on programs and support Community Listener Groups. We will replicate this approach, which includes providing short trainings to extension workers on the key content needs around health and nutrition challenges in emergencies, and include them in developing radio program content.

Strategy

Vision for success

By 2020, a large majority of small-scale farmers in Malawi and Tanzania would have access to interactive climate and weather information and advisory services through radio and other channels, and use them regularly to make more climate smart decisions about their farming practices. To make this vision for success a reality, we propose a two-stage process. The first stage, which will be completed in two years, will develop and pilot test the service with one or two stations in each country. An evaluation will be conducted after one full year of providing the service. The results will be used to improve radio programming in support of climate services. It will then be offered to up to five more radio stations in each country, so that interactive climate services radio programming is benefitting all or nearly all of the farmers in both countries.

Most communication-for-development strategies see a very limited role for radio stations: they are expected only to make airtime available for the broadcast of content developed by a third party. The integrated climate services radio programming strategy will be different: radio stations will be integral partners in planning, developing, producing and operating the interactive service as a core part of their offering to listeners. Partner stations will "own it" and proudly broadcast it, making it a sustainable service for farmers. Content accuracy will be

assured through partnerships with trusted meteorological agencies. This approach requires an investment in the capacity of radio partners to produce and broadcast interactive climate services programming. Training, modest investment in equipment, ongoing monitoring and feedback, and participatory program evaluations will build within radio stations that capacity and will to deliver interactive climate services programming as an ongoing, regular service.

Pilot Phase

Implementation of the pilot phase will focus in key regions of each country as informed by CCAFS and WFP. Using key information from the scoping study, we envisage that interactive climate services radio activities in Malawi and Tanzania will develop as follows:

Develop capacity of selected radio station partners

In Malawi, we propose to invite both ZBS and MBC Radio 1 to submit Expressions of Interest to FRT. These will be assessed against our well-established set of criteria for radio station partners, to help us carefully choose existing radio stations that are willing and able to actively participate in all aspects of program design, implementation and assessment. We will also assess whether these stations will effectively serve the regions selected, given the wide coverage areas of both. In Tanzania, a similar process will be followed wherein we will approach TBC 1, Radio Free Africa (a current partner) and Orkonerei Radio Station to submit Expressions of Interest. TBC 1 is a national broadcaster, and we foresee difficulty managing effective climate services for the whole country through one station. Radio Free Africa covers a wide area but is popular in five of the seven regions in Tanzania. In the pastoralist, Maasai regions of Kiteto and Longido, Orkonerei Radio Station is a popular choice, followed by TBC 1.

Once a contract has been developed with the most appropriate station(s), a one-month In-station Training (IST) program will be delivered that will focus on developing within the production team the skills and experience needed to deliver interactive climate information services. In Station Training is preceded by a comprehensive needs assessment and the development of a detailed training plan that meets the needs of the team that will be responsible for producing interactive climate services radio programming. IST involves placing a qualified trainer within a station for a period of four weeks. During this time, the trainer offers workshops, one-on-one instruction, and over-the shoulder coaching as the production team puts new skills to work.

Producing and airing participatory, interactive radio programs requires the installation of inexpensive but highly effective Information Communication Technologies (ICTs). A trained ICT officer will install needed ICTs and provide training to radio station staff.

Planning and production

In Malawi, FRT will work with the Faculty of Environmental Studies at Lilongwe University of Agriculture and Natural Resources (LUANAR), and the Department of Climate Change and Meteorological Services as key knowledge partners. In Tanzania, FRI will work with the Tanzania Meteorological Agency and Selian Agricultural Research Institute as key knowledge partners. FRI has a good working relationship already established with both institutes. The knowledge partners will be counted on to provide accurate and up-to-date weather and climate forecasts and related advisory services.

After the IST, broadcasters will meet with radio program design experts to develop a detailed outline of the program structure, and potential content. The outline will include: a purpose statement; a signature tune; a format and style; regular content and special features; timing/pacing; audience interaction.

The results of the scoping study presented above suggest a weekly 15-minute magazine style program, with at least one weekly repeat, plus a variety of complementary ICT services that make the program interactive and give farmers on-demand access to key information. The program would cover topics such as: (a) detailed current weather forecasts including rainfall and temperature (b) interpretation of the forecast by knowledge partners, (c) one topic for further discussion, and one call-in or beep-to-vote segment to answer questions and seek program suggestions.

Radio station producers and presenters are responsible for producing and broadcasting the radio programs according to the agreed schedule and in the designed format. FRI and FRT will support stations in broadcasting and adjusting radio programs, ensuring a consistent sound and schedule, regular repeats, and appropriate use of ICTs to interact with listeners, to expand audiences, and enable community members to listen “on demand.” We will provide backstopping and troubleshooting while programs are on air.

Integrating other ICTs

The project team will work with broadcasters to make maximum use of new ICTs to improve the quality, reach, interactivity and accessibility of farm radio programs. ICTs can be customised according to need, and FRI is constantly experimenting with new ICTs and new ways of effectively reaching farmers and pastoralists. At this stage, the anticipated ICT strategy would include a registration campaign, "Beep4Weather," Agripoll or Beep4Survey, and On-Demand Weather Extension Service.

The goal of the registration campaign is to create a Registered Group of Listeners. All members of the RGL will: receive SMS alerts before a broadcast reminding them to tune in; have the opportunity to rate the radio program; and be first in line for other special services described below.

FRI's Beep4Weather service was piloted in Tanzania. FRI's Radio Officer worked with the Tanzanian Meteorological Agency and Toto Agriculture to create a weekly weather forecast complete with recommendations/interpretations for farmers. Farmers leave a missed call ("beep") which prompts an interactive voice response system to phone back, free of charge. Farmers then listen to a recorded message with the same (or similar) weather report and advisory service broadcast by the radio station. The service proved to be very popular. For more details, see: http://www.farmradio.org/ourblog/2014/07/22/beep4weather-forecast-and-farming-advice-available-on-demand-in-tanzania/.

FRI recently polled, via radio and mobile phone, nearly 9,000 small-scale farmers across Tanzania. Through web-based applications, an extensive network of radio partners, and good links with farmers and communities, the first poll of its kind, aimed to hear from small-scale farmers across the country, was undertaken – see http://www.farmradio.org/ourblog/2014/06/10/paza-sauti-the-results-are-in/.

FRI also uses this polling method at a smaller scale, with radio stations and project partners to gauge the knowledge or attitudes of listeners at different points in a radio series. A multiple-question survey is sent to users via a phone call. Users are prompted to answer questions by using the keypad of their phones. This system can be used to "crowdsource" and map data on the weather issues that farmers are experiencing throughout the broadcast range of the radio station. For example, the radio broadcaster could invite farmers to call one number if it their

soil is saturated with rain, and another number if it is dry, providing a map of areas where planting should be promoted.

A new venture that FRI wants to expand is the on-Demand Weather Extension Service. One extension worker per station is selected who will answer farmers' queries and offer advice in a type of "On-Demand Extension service". Any farmer can call and leave a question for the extension worker, who responds individually with a call or SMS, and shares the best questions with the radio program so all listeners can benefit. In FRI's experience, it is not difficult to recruit qualified extension workers to volunteer for this task. They receive the trainings and support necessary to establish an effective service.

Monitoring, quality assurance, ongoing feedback and interaction

Trained radio monitors will listen to each broadcast to ensure it reaches quality standards in terms of content, journalistic skill and inclusion of male and female farmers and guests. Programs will be archived, and radio monitors will give immediate (weekly) feedback and coaching to broadcasters on program quality and content. Together with feedback from listeners (through SMS, phone systems and/or community visits), this is used to adjust and enrich programs to suit farmers' needs.

Three months after the start of broadcasts we will return to target communities to conduct an initial listeners' review. We will use focus group discussions, quizzes and participatory tools to assess the level of listener satisfaction, with regard to the usefulness and relevance of interactive climate services radio programs. This process will be repeated every 6 months after the first review.

Evaluation and Plan for Scale-up

Twelve months after the new climate services programs have been on the air, a comprehensive evaluation will be conducted to learn how the program is enhancing the capacity of small-scale producers to anticipate, prepare for, respond to and otherwise adapt to a changing climate. With evaluation results in hand, project partners will work together to identify improvements to, and then scale-up the interactive climate services radio programming to more radio stations, so that a large majority of small-scale producers can access and benefit from it in each country.

Conclusion

The scoping study shows that for both Malawi and Tanzania, there is clear scope and demand for climate information services among farmers and pastoralists. Radio and mobile phones are in common use, and are rated by farmers and pastoralists to have great potential as effective and trusted channels where they can access various climate information services. Farmers noted that radio programs, backed up by ICT services, would serve them best. Rainfall patterns, temperature data and forecasting services – both weekly and daily – were mentioned as particular needs. In general, farmers would trust climate information received via their preferred radio stations, and would use it in decision-making on their farms.

Key findings from the audience research provide evidence that there is demand for climate information services in specified regions of Tanzania and Malawi, and this need is not currently being met in other ways. The audience research brought out several key points. Radio listening is common practice. Access to mobile phones is relatively high and they are in common use. Radio programs were the most preferred method for receiving weather information. Farmers prefer radio shows that are relevant to their needs and include interviews with farmers. They will also tune in to hear specific shows, and where the signal is strong.

Women often have access to radios and listen to radio programs, but less than men. They also have some access to and mobile phones, though less often than their male counterparts. In Malawi, women are less likely than men to own phones, although most who do not own phones can access them. Mobile phone ownership is higher in Tanzania, and nearly identical for men and women. In both countries, women spend less than men on mobile phone airtime. Location had much greater influence than gender on preferences about information content and delivery channels, likelihood of using information to change decisions, and expected benefits.

Some listening groups exist. Other types of groups exist, and there is interest in joining listening groups or adding “radio listening” as a new activity of their existing groups. Two particular radio stations in each country stood out as most popular and trusted. Farmers are used to hearing weather forecasts on the radio but do not appear to listen in or use them in any systematic way as yet. Respondents would welcome daily weather information. Key

information requested includes rainfall patterns and temperature: daily, weekly and seasonal. Respondents would also welcome warning about extreme events. Farmers expressed that they would use weather information from the radio to help them make decisions on their farms. There is clear potential and demand for climate services for farmers and pastoralists via radio.

As a response to farmer articulated demand, in this working paper Farm Radio International and Farm Radio Trust propose working with key named institutions and one or two radio station partners per country to develop interactive climate services radio programming for regions targeted by WFP and CCAFS. Interactive climate services radio programming will respond to farmers' ongoing climate information needs, and will engage them in program design, broadcast, monitoring and evaluation – together with partner radio stations.

Given the audience research results, we recommend a weekly 15-minute magazine style program, with repeat, plus a variety of complementary ICT services, and an option for a daily forecast or interpretation. The program would cover topics such as: (a) detailed current weather forecasts including rainfall and temperature (b) interpretation of the forecast by knowledge partners, (c) one topic for further discussion, and one call-in or beep-to-vote segment to answer questions and seek program suggestions. Programs would be continuously monitored and assessed by audiences and project staff to ensure relevance, usefulness, level of use and accuracy.

Appendix 1. Budget and Timeline to Develop Interactive Climate Service Radio

Budget

Project: *Climate services for Farmers and Pastoralists in Malawi and Tanzania (Phase II)*

CSFP	TZ-MW CCAF

QuickBook/Quickens Codes

Budget in US Dollars

	Category	Base	Rate	Tanzania Qty	Tanzania Amount	Malawi Qty	Malawi Amount	Total Budget
1. Personnel								
1.2	Senior Staff (Programme , OPS & Finance)	70,000	40.00%	1	28,000	1	28,000	56,000
	Sub-Total Canadian &Regional Staff				28,000		28,000	56,000
1.3	Country Director/Coordinator	35,000	20.00%	1	7,000	1	7,000	14,000
1.3	Field Project Coordinator	16,800	100.00%	1	16,800	1	16,800	33,600
1.3	Field Project Staff	45,000	20.00%	1	9,000	1	9,000	18,000
	Sub-Total Field Staff				**32,800**		**32,800**	**65,600**
Sub-total					**60,800**		**60,800**	**121,600**
2. Fringe & Benefits								
2.1	*Sub-Total Canadian &Regional Staff*		**20.00%**		5,600		5,600	11,200
2.2	*Sub-Total Field Staff*		**18.00%**		5,904		5,904	11,808
Sub-total					**11,504**		**11,504**	**23,008**
3. Service Units and Consultants								
3.1	*Local consultants*							
3.2	Enumerators	75	100%	5	375	5	375	750
3.3	In Station Radio Trainers	100	100%	20	2,000	20	2,000	4,000
3.4	*Mid level*							
3.5	FRI knowledge partner--radio program	150	100%	20	3,000	20	3,000	6,000
3.6	*Senior*							
3.7	FRI Knowledge Management Unit	360	100%	15	5,400	10	3,600	9,000
3.8	FRI Radio Craft Development Unit	360	100%	15	5,400	10	3,600	9,000
3.9	FRI Radio & ICT Innovation Unit	360	100%	15	5,400	10	3,600	9,000
3.10	Evaluation expert	675	100%	15	10,125	15	10,125	20,250
Sub-total					**31,700**		**26,300**	**58,000**
4. Travels (staff)								
4.1	International Travel	3,000	1.00	1	3,000	1	3,000	6,000
4.2	Ground Transportation (Fuel, ...) Tanzania	0.450	1,000	8	3,600	0	0	3,600
4.3	Ground Transportation (Fuel, ...) Malawi	0.450	1,000	0	0	10	4,500	4,500
Sub-total					**6,600**		**7,500**	**14,100**
5. Conferences & Workshops								
5.1	Local Translators	100	3.00	2	600	3	900	1,500
Sub-total					**600**		**900**	**1,500**
6. Training								
6.1	Venue - In station training 10 dys x 10 partic.	10	100.00	1	1,000	1	1,000	2,000
6.2	Loc Travel - In Station Training	50	100.00	1	5,000	1	5,000	10,000
6.3	Venue - Training Interactive Radio 2 stations	2	500.00	1	1,000	1	1,000	2,000
Sub-total					**7,000**		**7,000**	**14,000**
7. Equipment								
7.1	Mobile phones	100	1.00	1	100	1	100	200
7.2	Equipment - Tablets for both TZ and MW	500	1.00	1	500	1	500	1,000
7.3	Interactive voice response systems	2,500	1.00	1	2,500	1	2,500	5,000
7.4	Recording devices (sansas)	75	1.00	6	450	3	225	675
7.5	Mobile data collection (TZ)	600	1.00	3	1,800	0	0	1,800
7.6	Mobile data collection (MW)	600	1.00	0	0	3	1,800	1,800
7.7	Solar radio	100	60.00	1	6,000	1	6,000	12,000
Sub-total					**11,350**		**11,125**	**22,475**
8. Research								
8.1	Radio program production Tanzania Station	5,350	1.00	1	5,350	0	0	5,350
8.2	Radio program production Malawi Station	5,350	1.00	0	0	1	5,350	5,350
8.3	Radio program broadcast (IREP)	3,500	2.00	1	7,000	0	0	7,000
8.4	Radio program broadcast (IREP)	3,500	2.00	0	0	1	7,000	7,000
8.5	Radio program monitoring and quality control	200	2.00	20	8,000	0	0	8,000
8.6	Radio program monitoring and quality control	200	2.00	0	0	20	8,000	8,000
8.7	Support to community listener groups	300	10.00	1	3,000	1	3,000	6,000
8.8	Resource packs	1,500	1.00	0	0	1	1,500	1,500
Sub-total					**23,350**		**24,850**	**48,200**
9. Other Direct Costs								
9.1	Office and supply expenses	500	1.00	12	6,000	12	6,000	12,000
9.2	Bank charges	80.00	2.00	3	480	3	480	960
9.3	Communication--airtime office	200	1.00	11	2,200	11	2,200	4,400
9.4	SMS costs both Tanzania and Malawi (for interactive tools)	0.125	25000	1	3,125	1	3,125	6,250
9.5	IVR airtime	32.00	25	5	4,000	6	4,800	8,800
Sub-total					**15,805**		**16,605**	**32,410**
	Total Direct Costs				**168,709**		**166,584**	**335,293**
	Overhead		**14%**		**23,619**		**23,322**	**46,941**
	Total Indirect Costs							
	GRAND TOTAL				**192,328**		**189,906**	**382,234**

Timeline

Component	Activity	Time frame (quarters)									
		1	2	3	4	5	6	7	8	9	10
Develop capacity of selected radio stations	Issue invitation to participate to stations										
	Select and engage stations (1-2 per country)										
	Training needs assessment										
	In-Station Training										
	ICT installation and training										
Planning and production of interactive climate services radio programming	Partnership with knowledge partners										
	Interactive climate services radio programming Design										
	Interactive climate services radio programming production and broadcast										
Integration with other ICTs	Listener registration										
	Introduce beep4weather										
	Introduce agripoll										
	Introduce on-Demand weather extension servic										
Monitoring, quality assurance, feedback and interaction	Listening, monitoring, feedback and coaching by Radio										
	Community satisfaction reviews										
Evaluation and Plan for Scale-up	Evaluation										
	Plan for scale-up										

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