EXPLORING THE POTENTIAL FOR INTERACTIVE RADIO

TO IMPROVE ACCOUNTABILITY AND RESPONSIVENESS TO SMALL-SCALE FARMERS IN TANZANIA

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SUBMITTED BY
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Front cover: Farm Radio International

About Making All Voices Count

Making All Voices Count is a programme working towards a world in which open, effective and participatory governance is the norm and not the exception. It focuses global attention on creative and cutting-edge solutions to transform the relationship between citizens and their governments. The programme is inspired by and supports the goals of the Open Government Partnership.

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MAKING ALL VOICES COUNT
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LIST OF ACRONYMS

ALINe	Agricultural Learning and Impacts Network
BMGF	Bill and Melinda Gates Foundation
C4D	Communication for Development
DAC	Development Assistance Committee
FRI	Farm Radio International
GAC	Global Affairs Canada
GoT	Government of Tanzania
ICT	Information and Communication Technologies
IDS	Institute of Development Studies
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IVR	Interactive Voice Response
LIZARDI	Lake Zone Agricultural Research Development Institute
LP	Listening Post
MAFC	Ministry of Agriculture, Food Security and Cooperatives (Tanzania)
MAVC	Making All Voices Count
NGO	Non-governmental organization
OECD	Organization for Economic Cooperation and Development
PICS	Purdue Improved Cowpea Storage
USAID	U.S. Agency for International Development

EXECUTIVE SUMMARY

This report presents the findings of a 12-month long research project funded by Making All Voices Count through their Practitioner Research and Learning grants. The research examines the possibilities of new digital technologies along with radio to facilitate adaptive management processes through rapid feedback to help ensure that agricultural development projects are farmer-centered, and meet the needs of those they intend to serve. Grounded in assessing Farm Radio International's Listening Post—a methodology for collecting real-time, unfiltered feedback from farmers through a multi-channel platform linked to radio—the research highlights barriers to success and articulates lessons learned during the process of designing and implementing the model.

The Listening Post model was initially developed as a pilot project funded by the Bill and Melinda Gates Foundation to help agricultural development actors ensure their initiatives are responsive and accountable to farmers. As a result, the findings presented here are based on examining the processes, impacts and potential uses of this model, which was implemented as an experiment that was exploratory and inductive in nature. The findings will be integrated into future Listening Post iterations and will hopefully inform other actors involved in using ICTs to collect citizen feedback as part of efforts to make development more accountable to those it is meant to serve. Analytically, the research involved a desk review, field-based qualitative data collection in Mtwara, Mwanza, and Arusha, Tanzania, and a content analysis of voice messages farmers left on the system, which is powered by Interactive Voice Response technology.

The research demonstrates that linking a mobile-based crowd-sourcing tool with radio is effective at ensuring engagement from a large number of farmers. The radio stations offer a simple way to recruit participants from among the regular listeners of farmer radio programs. Also, the radio stations tend to be trusted sources of agricultural information among farmers, increasing motivation to participate. Further, the radio programs offer an easy way to close feedback loops by disseminating information about actions that stakeholders are taking in response to feedback.

The Listening Post faced many of the same challenges documented by organizations utilizing similar tools—it was difficult to incentivize stakeholders to adequately respond to farmers, and competing motivations between extension officers, farmers, funders and partner organizations made it difficult to collect high-quality information that was usable and actionable. Moreover, an overarching focus on developing and implementing the technology and engaging a large number of farmers at the exclusion of other factors meant that many of the processes and mechanisms for effectively using the data collected and for responding to what farmers were saying weren't fully developed. Despite these issues, there is significant evidence that the Listening Post model holds potential to act as a conduit for civic action if the correct stakeholders are engaged from the outset, if mechanisms for analyzing and disseminating relevant data from the platform to partners, local stakeholders and farmers is further refined, and if stakeholders ensure farmers can effectively use the technology.

This research has a number of limitations. Out of six Listening Posts conducted to date, only three were selected for analysis due to resource constraints. Due to difficulties in recruiting farmers who left messages on the platform the focus group discussions did not necessarily represent the total population of farmers who participated, or who listened to the associated radio programs. Finally, the content analysis examined a sample of the messages left on the system and did not code all messages. As a result of these limitations, the conclusions and recommendations presented here should be considered indicative of larger trends in the model and not necessarily completely representative.

1 INTRODUCTION AND BACKGROUND

Many Communication for Development (C4D) initiatives aimed at reaching remote or rural audiences use radio and mobile technologies to ensure that small-scale farmers have the information they need when they need it. However, few look at the potential of ICTs for bringing the voices and opinions of rural people to governments, private sector actors, NGOs and CSOs to influence agricultural policies, and to advocate for better extension services, access to subsidized inputs and technologies, and access to markets to sell their crops. While giving farmers information to help them with challenges they face on their farms is an important part of agricultural extension in Tanzania, it is only half the picture. Agricultural policy reforms, and the decisions about small-scale agriculture that are influenced by development agencies and the private sector, greatly impact the lives and livelihoods of small-scale farmers. For this reason, governments, NGOs and other actors also need to receive information from farmers about the needs of their communities and promote policies and processes that support this underrepresented, marginalized and largely impoverished majority in reaching their livelihood goals. Further, these development actors need to ensure that projects are modified and adapted in response to feedback from farmers, oft cited as a crucial aspect of effective, participatory agricultural development.

Called the Listening Post, Farm Radio International (FRI) has designed a model for enhancing how to engage small-scale farmers in dialogue with agricultural development actors through a multimodal ICT system, which holds potential to improve the delivery of products and services to farmers, and to facilitate government and NGO responsiveness to farmers' needs. Developed in Tanzania through FRI's Radio and ICT Innovation Lab (also known as the Hangar), the Listening Post methodology helps farmers in Tanzania give real time feedback on the impact of agricultural development projects that affect them and their communities, thereby facilitating two-way communication between development project implementers (i.e. international NGOs), government extension services and citizens in order to improve accountability and enhance the impact of agricultural development projects.

The Listening Post uses a multi-channel web-based platform called Uliza, also developed at the Hangar, for gathering and analyzing feedback and questions from audience members, particularly farmers. It is built on an interactive voice response (IVR) system powered by VOTO Mobile that enables listeners to vote on poll questions, leave messages and request information through voice or SMS. The Listening Post is typically a radio series that runs for five or six weeks focused on agricultural topics that are relevant to a partner's project and determined through consultation with farmers, extension workers and broadcasters. The radio program usually lasts 30 minutes, but this varies from Listening Post to Listening Post. The overarching objectives of the LP model are:

1. to collect data from farmers that will be useful for partners to assess the impacts of their projects and to make ongoing programmatic adaptations based on feedback;
2. to collect feedback from farmers about the information or topics they would like to hear on the radio programs;
3. to connect farmers with agricultural experts who can answer their questions or concerns;
4. to ensure that farmer voices are included as a core determinant of success in agricultural development projects.

The report is structured as follows: Section 2 gives a brief overview of the research questions and objectives. Section 3 provides a review of relevant literature to discuss the potential and challenges related to the use of ICT-enabled feedback platforms to enhance downward accountability of development programs, and to facilitate adaptive program implementation that iterates and responds to beneficiary feedback and related perceptions of impact. In Section 4, the research methodology and overall research design is explained. Section 5 provides an overview of the three chosen case studies. In Section 6, the research results are discussed and Section 7 presents findings. Section 8 compiles conclusions and recommendations.

2 RESEARCH QUESTIONS AND OBJECTIVES

Understanding how radio and ICTs can best promote the participation and empowerment of small-scale farmers in the agricultural programs and policy decisions that affect their lives is central to FRI's work. However, there is a remarkable lack of grounded evidence to demonstrate the extent to which data received through such ICT platforms is responded to and acted upon by stakeholders such as extension officers or implementing NGOs. Further, development programs often require practitioners to implement projects quickly and to demonstrate a narrow set of results, leaving little time or organizational capacity to integrate learning into projects, and to iterate and adapt based on learning. This research is an attempt to learn from what was done to date in implementing the Listening Post, and to integrate findings into a new design and strategy, currently under development, that has a stronger focus on both sides of the communication equation, where information flows not only to farmers from extension services and researchers, but also from farmers to government and other agricultural development actors. Further, the research aims to understand how best to use aggregated data from farmers to help ensure decision-making in agricultural development is more inclusive and more responsive to farmers' needs, concerns and interests. Finally, the research aims to expand evidence about the challenges and opportunities that feedback models such as the Listening Post provide to improve inclusive and participatory agricultural development and advance adaptive program implementation based on feedback.

The key questions that FRI sought to answer through this research are: 1) Do ICT-facilitated programs that collect and aggregate feedback from farmers actually facilitate dialogue and influence decision-making around agricultural programs and policies? If so, how? If not, why not? 2) To what extent are partner organizations (international NGOs implementing development projects) using farmer data to iterate and adapt their programs? What are the challenges they face in doing this effectively? 3) What barriers—technological and otherwise—prevent the Listening Post platform from collecting useful data from a representative sample of farmers? 4) What motivates the different stakeholders to use the system—Farmers? Partners? Funders? 5) What sustainability mechanisms and pathways to scale exist?

The objectives of the research are two-fold: 1) To assess the effectiveness of the LPs that have been implemented to date and to highlight enabling and constraining factors that affect success, and 2) To

examine the potential for the LP to act as a tool for adaptive management in agricultural programs meant to improve rural lives and livelihoods in sub-Saharan Africa—allowing agricultural development actors to engage in better evidence-based decision-making and downward accountability[6] through real-time feedback.

3 LITERATURE REVIEW

Through a review of literature related to ICTs for development, crowd-sourcing citizen voice, and feedback loops/adaptive management, there are two distinct but overlapping themes that are particularly relevant to this research: ICT4D; and feedback loops, which primarily comes from studies related to transparency and accountability. In particular the distinction between collective voice and institutional response is useful for framing our findings.

ICT4D

Enhanced accountability and government, implementer or funder responsiveness to people's needs are imperative to achieve better and more sustainable development results. The rapid spread of new technologies is transforming the daily lives of millions of people around the world and is recognized for its potential to be a real game changer for development (Giger and Bailur, 2014). With rapidly increasing mobile penetration and internet access globally, many funders and NGOs have turned their attention toward the potential for ICTs to facilitate the achievement of a wide variety of development goals. With their ability to reach tens of thousands of people at an instant—across geographical barriers, conflicts and disasters—ICTs hold great potential to improve access to information, mobilize communities, foster social movements and affect positive behaviour change. Around the world, civil society organizations and NGOs are using ICTs in an attempt to improve development processes by collecting and aggregating citizen feedback and tracking progress towards achieving development goals. While there is considerable hype around "adaptive management" to improve aid transparency and accountability, and the use of ICTs to mediate these processes by crowd-sourcing beneficiary feedback, there is a remarkable lack of grounded, theoretical evidence demonstrating this link.

The critiques of the effectiveness of ICTs to facilitate adaptive management[7] through real-time feedback reflect those leveraged at the ICT4D field more broadly—that the outcomes and impacts of such initiatives are contributions made alongside other factors and actors, rather than achievements attributed to the existence of the technologies themselves (Heusser, 2012). Despite the ability for ICTs to raise citizen voices, there is often limited capacity, and limited willingness, among those in power to adequately respond. Bringing together the demand and supply sides of governance is critical to tackling the accountability puzzle, but is often ignored in laudatory claims of the power of ICTs. In order to have

6 Downward accountability refers to the extent to which development actors are accountable to constituents/citizeens as opposed to funders and policymakers.

7 Adaptive management is defined as a way to manage projects and programs that allows for making adjustments when faced with new information or a changing context through iterative planning and ongoing monitoring, evaluation and learning. http://bit.ly/2iALQDS

greater impact in the governance space, it is first necessary to understand what kinds of accelerators exist for closing the space between supply (governments, service providers) and demand (citizens, communities, civil society organizations).

In their critiques of the over-reliance on ICTs as catalysts for improving governance, Fox (2014), Carothers and Brechenmacher (2014) make a distinction between 'tactical' and 'strategic' approaches to citizen voice. According to proponents of this distinction, tactical approaches are bounded, localized and information-led, where strategic approaches bolster enabling environments for collective action, scale up citizen engagement beyond the local arena and attempt to bolster the capacity for different actors to respond to voice (McGee and Edwards, 2015). Many ICT initiatives inadvertently obscure the differences between technology-focused interventions, and more process- and relationship-focused endeavours that aim to transform development ecosystems by opening them up to a wider range of participants who are able to contest and reconfigure power dynamics. One way around this gridlock may be to differentiate between tactical and strategic approaches, and assess outcomes accordingly.

COLLECTIVE VOICE VS. INSTITUTIONAL RESPONSE

Critics of the claim that voice enhances participation argue that claims about farmers' opinions on contested agricultural technologies or practices are often leveraged to support the positions of those on a particular side of the debate. Data from surveys and interviews that aim to represent "farmer voice" are used to illustrate what is often labeled as "fact" concerning farmers' views on certain agricultural practices. While the farmer's voice can be a powerful tool of assertion, the way in which it is collected, either through research or select quotes, plays a significant role in whether or not it provides a meaningful and legitimate representation or a farmer's lived experience and beliefs (Griswold, 2015). They further argue that such claims about the ''farmer's voice'' tend to obscure the complexities of agricultural decision-making and often valorize opinions about technologies and practices without regard to long-term impacts (Stone and Flachs, 2014).

Literature on citizen voice to improve transparency and accountability dynamics offers a useful way for framing voice that emphasizes the distinction between citizen buy-in (which Peixoto and Fox call 'yelp') and the degree to which stakeholders and service providers respond (which they call 'teeth'). They distinguish between two types of citizen voice— aggregated individual responses to a series of questions and collective civic action. The first approach constitutes user feedback, providing precise information in real time to decision-makers. This allows policymakers and program managers to identify and address service delivery problems at their discretion. Collective civic action, on the other hand, can encourage service providers to become more publicly accountable – an approach that depends less exclusively on decision-makers' discretion about whether or not to act on the feedback. This conceptual distinction is useful to platforms such as the LP in that it can help more clearly define whether the objective is to aggregate user feedback to (hopefully) prompt responses from stakeholders, or to inspire collective action. The first analytical challenge in assessing the effectiveness of crowd-sourcing platforms is to disentangle voice from responsiveness. Much of the research on ICT-enabled voice platforms focuses primarily on citizen uptake (e.g. Gigler and Bailur 2014), without clear evidence that the feedback loop actually closes. In practice, the concept of feedback loop often used to imply that uptake (e.g. citizen usage of crowd-sourced platforms to report feedback) necessarily leads to positive institutional responses. In other words, there is a high degree of largely unfounded optimism embedded in the way the concept tends to be used.

4 RESEARCH METHODS

The research team used a mixed-methods approach that combined qualitative and quantitative analysis examining relevance, effectiveness, impact and sustainability. Three out of a total of six Listening Posts conducted to date were selected for analysis due to time and resource constraints. The selected Listening Posts were implemented in collaboration with Bill & Melinda Gates Foundation (BMGF) grantees. The foundation recruited LP partners who were implementing large-scale agricultural development projects in Tanzania, and for whom farmer feedback would be very useful to assess impact, and facilitate adaptive management during implementation. This research examines the successes and challenges in Listening Posts designed and conducted with N2Africa, Purdue Improved Cowpea Storage (PICS), and MEDA. The three projects are united in that they were all focused around a specific issue – such as promoting the uptake of a post-harvest storage method or encouraging the use of disease resistant cassava seeds – which was being advocated by a specific development partner. They also shared a number of other features: they were large-scale, multi-year projects in the middle of the project cycle, had shown willingness and enthusiasm for beneficiary feedback and adaptive program implementation. The field research was conducted in July 2016 in Arusha, Mtwara and Mwanza, Tanzania. Quantitative analysis was conducted between September – November 2016. A research permit was obtained in Tanzania from COSTECH in June 2016.

A content analysis was conducted in collaboration with ALINe[8] to explore a sub-set of the questions and answers that farmers were prompted to leave on the system with the aim of assessing the user journey—determining the number of farmers accessing the system who successfully responded to the themes and questions asked, identifying causes of attrition, and to examine the representativeness of the data. The content analysis also examined the prevalence of particular themes that farmers addressed and assessed how closely they were related to the planned topics and themes for each week of the LP. The objective of this component of the analysis was to assess how 'useful' the data was in terms of the stated objectives of partners, i.e. to determine whether or not farmers were leaving messages or asking questions that were in line with the type of real-time, beneficiary data that partner organizations wanted to receive. Finally, the content analysis aims to determine whether or not the LP platform and process could be useful to inspire civic action through collective voice.

Qualitative data was collected through semi-structured interviews and focus group discussions with key stakeholders, including farmers who participated in the Listening Post in three regions in Tanzania (Mtwara, Mwanza and Arusha), representatives from the partner organizations and program staff at FRI and BMGF (Table 1). Semi-structured interviews with stakeholders and focus group discussions with farmers aimed to provide greater nuance about the motivations and perceptions different stakeholders have about the Listening Post programs they were involved with, and to identify actors, processes, networks and relationships that need to exist around the technology for it to succeed in its aim to raise the voices of farmers to key decision-makers.

8 ALINe (the Agricultural Learning and Impacts Network) is a specialized monitoring, learning and evaluation organization. http://www.aline.org.uk

Table 1: Interviews

#	Interviewee	People	Location	Type
1	Partner - MEDA	1	Mtwara	Interview
2	Partner – CABI (N2Africa)	1	Arusha	Interview
3	Partner - PICS	1	Dar es Salaam	Interview
4	Farmers – MEDA LP participants	8	Mtwara	FGDs
5	Farmers – MEDA LP participants	7	Newala	FGDs
6	Farmers – MEDA LP participants	6	Newala	FGDs
7	Farmers – PICS LP participants	10	Mwanza	FGDs
8	Farmers – N2Africa participants	14	Arusha	FGDs
9	Radio station – Newala FM	1	Newala	Interview
10	Extension officers	3	Mwanza, Mtwara, Babati	Interviews
11	PICS distributor	1	Mwanza	Interview
12	Bill and Melinda Gates Foundation	3	Skype	Interview
Total	**All stakeholders**	**57**	**N/A**	**All**

5 OVERVIEW OF CASE STUDIES

Farm Radio International has implemented Listening Posts with six partners to date—the Government of Tanzania (GoT) in collaboration with BMGF, Lake Zone Agricultural Research Development Institute (LIZARDI), International Institute of Tropical Agriculture's N2Africa Program, Purdue Improved Cowpea Storage (PICS), MEDA, and Global Affairs Canada (GAC). As stated in the methods section, three out of the six were chosen for analysis. The three chosen—N2Africa, PICS and MEDA—were thought to be a representative sample as the GoT and LIZARDI LPs were prototype and pilot studies that led to the elaboration of the Listening Post as a format, and the GAC LP was conducted after the design and commencement of the research.

The Listening Post is an interactive radio series that combines specialized interactive radio broadcasts with Uliza, a tool created by FRI for gathering and analyzing feedback and questions from audience members, particularly farmers. Uliza is built on an interactive voice response (IVR) system that enables listeners to vote on poll questions, leave messages, and request the delivery of specific information. Programs on the Listening Post include radio mini-series on specific topics—with listeners invited to participate in polls, ask questions and offer opinions. This feedback mechanism allows listeners to send unfiltered opinions to policy makers and other development partners. What differentiates an LP from an interactive radio program is its specific aim to collect and aggregate farmer feedback to help aid decision-making and project implementation.

How it Works

- Each episode of an LP poses questions to listeners. Listening farmers respond by sending a missed call to a number advertised on the radio program.
- Uliza—FRI's polling tool— calls the listener back free of charge
- Uliza sends simple questions with up to six multiple-choice responses. The listener responds by pressing numbers on the keypad.
- Listeners are given the opportunity to leave a message with questions or opinions related to the topic.
- Callers' votes are tabulated in real-time for use by both radio stations and development partners such as extension agents.
- The poll results together with the audio recordings (opinions and questions) are assembled on the Uliza dashboard, where broadcasters, extension officers and project partners can access them.
- Data gathered from regular subscribers to the Listening Post allows FRI and partners to profile and map users by geographic location, gender, age or any other metric valued by project partners

N2Africa is a large-scale research project focused on putting nitrogen fixation to work for smallholder farmers growing legume crops in Africa. The consortium of partners aims to build sustainable, long-term partnerships to enable African smallholder farmers to benefit from symbiotic N2-fixation by grain legumes through effective production technologies, including inoculants and fertilizers. The project is

9 Information taken from the N2Africa website: http://www.n2africa.org/

five years in duration (2014 – 2019) and is led by Wageningen University together with the International Institute of Tropical Agriculture (IITA) and the International Livestock Research Institute (ILRI)[9]. N2Africa were planning a nationwide scale-up of their program in Tanzania and wanted to understand farmers perceptions of planting beans for selling to markets and their understanding of using nitrogen fixation to increase yields. The Listening Post helped them get a sense of the questions farmers wanted to know in the two impact areas of their work.

PICS are post-harvest storage bags that offer an affordable and preferred alternative to chemical pesticides for preventing post-harvest losses when storing grains after harvest.[10] The bags are on the market in certain areas of Tanzania, and PICS researchers wanted feedback from listeners in these areas about their experiences using the bags. They also wanted to know other common methods that farmers were using for post harvest storage. Finally, they wanted a system to assess demand and to tailor their marketing approaches, while also helping farmers locate a PICS dealer in their area.

MEDA is an international economic development organization whose mission is to create business solutions to poverty.[11] In Tanzania, MEDA is working on promoting a variety of cassava that is drought and disease resistant. Since cassava is prone to pests and diseases, the seed offers an opportunity to increase yields and thereby improve livelihoods. They are using local farmers cassava seed entrepreneurs to sell the improved seeds, and they wanted to use the Listening Post to understand levels of awareness of the improved seeds; challenges farmers face in the re-use of their seeds; barriers to accessing and buying new seeds; and perceptions about cassava in general.

6 Research results

The results presented below are divided into findings from the quantitative study and the field-level qualitative data collection.

QUANTITATIVE RESULTS

The quantitative findings present engagement statistics, as well as the results of a content analysis that aims to: determine the extent to which data received on the system responds to the themes and types of data that partners prioritized; assess the user journey and identify motivations to participate, causes of attrition, and barriers to participation; examine whether the data collected is reliable, actionable and representative of the community the partner wants to receive feedback from.

ENGAGEMENT STATISTICS

Looking across the LPs that were investigated for this study, the aggregated engagement statistics for the three projects are:

- There were 64,449 unique interactions with the system;
- A total of 11,764 individuals participated in the polls;
- Extension workers answered more than 150 questions left by farmers on the system on-air.

10 For information about PICS visit: https://ag.purdue.edu/ipia/pics/Pages/home.aspx
11 For more information about MEDA's work in Tanzania: http://meda.org/market-systems-our-projects/market-systems-current-projects/74-tanzania-cassava-seed-system

Table 2: Overall Engagement Statistics

	TOTAL	SOME CLOSED	ALL CLOSED	OPEN	NO RECORDING	SUCCESSFUL RECORDING*	
N2AFRICA	**6220**	2488	3732	2593	3627	1608	985
PICS	**5196**	2875	2321	2126	3070	1765	361
MEDA	**3148**	1882	1266	1464	1684	1186	278

**NB: Extrapolated from sample*

We also compared the levels of listener engagement between each Listening Post to identify total users who left a successful recording, or question, for each Listening Post across their entire run. The following graphs demonstrate the engagement statistics for each of the six weeks disaggregated by LP.

Figure 1: N2Africa Listener Participation

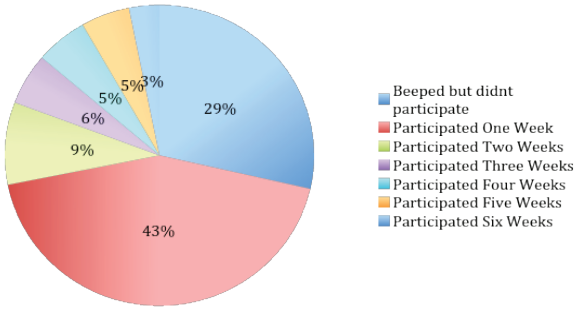


Figure 2: PICS Listener Participation

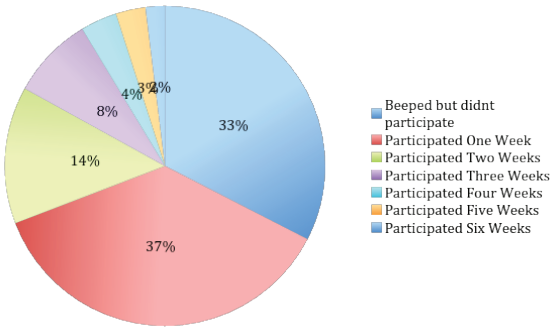
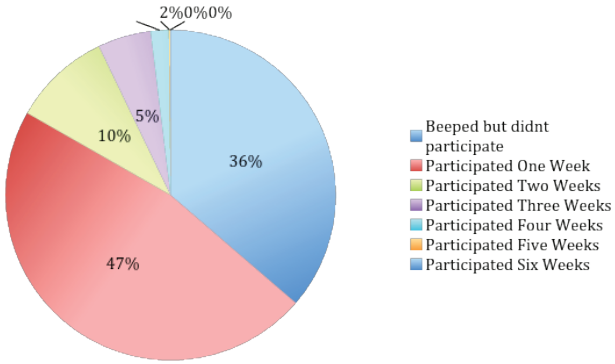


Figure 3: MEDA Listener Participation



We also found a notable number of repeat participants – including listeners participating again within the same week. Some listeners participated more than six times during the entire run of the LP, with a small number of users participating eight, nine or ten times.

In total, 42% of individuals left a voice recording on the IVR system after navigating through some or all of the closed questions. The percentage of successful recordings varied between Listening Posts - from 41% of PICS participants through to 47% of MEDA participants. Similarly, the percentage of participants leaving a question varied from 17% - 31%. These percentages were calculated based on the total successful recordings made or questions left in each sample analyzed. Therefore, extrapolations across the entire population are estimates only.

Using an average of the above percentages, we can estimate that an average of 31% of all participants who engaged with the LP left a successful recording across the three Listening Posts. With regard to asking a question, we can estimate that an average of 25% of all participants - across all three Listening Posts - will have successfully left a question. These numbers varied across each Listening Post, and are explored in greater detail below.

CONTENT ANALYSIS

Through coding a random sample of all messages recorded by farmers on the IVR system, this analysis aimed to identify:

1. **The types of questions farmers ask when calling the IVR system as part of a Listening Post.** For example, for the open question during the cassava-themed week on the MEDA LP: did farmers ask a follow-up question relating to the topic of that week; did they ask a wider cassava-themed question; or did they ask a completely unrelated question?
2. **Whether farmers are asking similar types of questions.** This could guide future programming options if a large number of farmers are asking similar questions that are not explored by the Listening Post
3. **The challenges to collecting useful data from farmers.** This could help partners adapt programs based on 'real-time, unfiltered' feedback from farmers

In our analysis, we coded a discrete sample of both open and closed questions that prompted a voice response (as opposed to an SMS poll) from each Listening Post. Open questions are defined as those that do not have a prescribed theme, thereby giving farmers an opportunity to ask questions, leave feedback or raise concerns. An example of an open question is: "Please leave a message with any questions or concerns you have about post-harvest storage". We define closed questions as those that delimit responses to a specific topic or theme. An example of a closed question is: "Where do you buy cassava seeds from?" Each sample was chosen randomly, and translated verbatim by a member of the FRI team in Tanzania and verified for accuracy by another FRI staff member. Two members of the research team, to ensure analytical rigor, then coded each question. Coding focused on whether the caller left a successful question, whether the question was related to the topic of the week and – for open questions – the focus of the question asked.

In order to identify and code as representative a sample as possible, we used a modified version of Galvin, 2015. The main part of this approach is the probability that in responding to the open question, farmers will mention one of a range of themes. In addition, the approach also considers the population size - in this instance, the total number of farmers who recorded a question on each Listening Post – and the confidence interval – using standard values of between 0 and 1. For this analysis, a 95% confidence interval was used.

Taking a conservative approach, we hypothesized that 1-in-20 farmers – representing a 5% likelihood - would ask a question related to that week's show, or the Listening Post topic more widely. This was based on the assumption that as the open questions were positioned at the end of each show – and as each week is themed – there was likely to be some clustering of participants' responses based on the week's theme. For example, in the week focusing on cassava, farmers are probably going to ask a question concerning cassava. The 5% likelihood aimed to err on the side of caution, and also provided a much larger sample size for analysis. Using this probability, and the 95% confidence interval, we analyzed a sample of 58 open questions and 58 closed questions from each Listening Post. If a 10% likelihood had been used then this would have reduced the sample size for each Listening Post to 28, which the coding team felt was too small for analysis. The overall sample numbers are included below.

Table 3: Total Population of Voice Messages Received

	TOTAL	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
PICS	**5196**	883	1298	746	1195	1074	-
MEDA	**3453**	290	612	1392	602	252	305
N2AFRICA	**6220**	1216	1217	1298	1128	1361	-

Table 4: Sample (open questions)

	TOTAL	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
PICS	**58**	-	-	-	58	-	-
MEDA	**58**	5	11	23	15	4	-
N2AFRICA	**58**	15	6	13	9	15	-

Table 5: Sample (closed questions)

	TOTAL	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
PICS	**58**	12	20	13	6	7	-
MEDA	**58**	8	16	15	1	6	12
N2AFRICA	**58**	18	9	-	25	6	-

There are four notes associated with sampling from the Listening Posts:

- PICS featured an open question in one week only – Week four
- MEDA was the only Listening Post to run for six weeks. However, its sixth week featured no open question
- The recording length for open questions varied considerably. No questions have been filtered-out for being too short

Similarly, each sample featured a range of questions that were not related to the topic, not questions at all, or unsuccessful calls. These were not removed from the sample so as to highlight the prevalence of these types of recordings. Each sample was chosen randomly, and translated verbatim by two members of the research team, to ensure analytical rigor, then coded each question. Coding focused on whether the caller left a successful question, whether the question was related to the topic of the week and – for open questions – the focus of the question. In addition, we explored wider listener engagement for each Listening Post – including farmers' engagement with the technology, and the wider user journey from `flashing' the service through to recording a question.

MEDA LISTENING POST

The MEDA Listening Post ran for 6 weeks and focused on farming cassava – including identifying the variety of cassava grown by farmers, and any difficulties they encountered. Across the 6 weeks, over 3,000 farmers participated in the interactive elements of the show by leaving a response to an open or closed question. 17% of this group participated more than once, sometimes in the same week – and a total of 4% participated 3 or more times (including a small number of users who participated 8, 9 or 10 times).

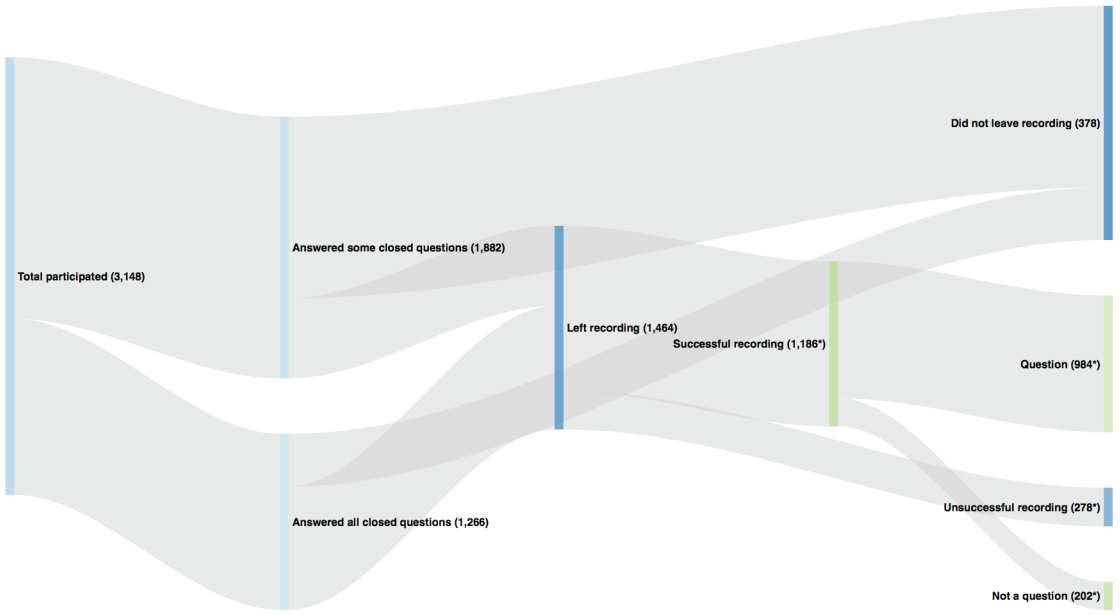
The sample of 58 open questions and 58 closed questions was distributed as follows*:

Table 6: MEDA Sample

	TOTAL	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6*
OPEN QUESTION	**58**	5	11	23	15	4	-
CLOSED QUESTION	**58**	8	16	15	1	6	12

**NB: Extrapolated from sample*

Figure 4: Sankey Diagram* MEDA



** The Sankey diagram depicts the user journey from original missed call through to a successful message that is on topic, and provides the data requested.*

OPEN QUESTIONS

47 respondents completed a successful call whereby they left an audio recording in response to completing the poll and being prompted to record a question or leave a comment. The recordings from the other 11 listeners were inaudible, or otherwise unsuccessful (including two listeners who appeared to not understand how to leave a question). Within this sample of 47 responses, 39 were questions. The other 8 recordings were largely statements. For example:

I am asking, please my fellow farmers lets convince the government to distribute cassava cuttings.

I still do not know where I can get this improved seeds, until now there is no effort made to distribute these seeds.

41 recordings in total were broadly on-topic and relevant to the topic of the week. The dominant themes emerging from the coding are listed below.

32% of the sample that left a successful question asked about buying or locating cassava seeds – in general and the 'improved' variety discussed. A further 4% of respondents asked questions about growing cassava. For example:

My questions is where can I get this seed and how good is this type of seed?

19% asked about pesticide selection – including which pesticide was best, and which would be most suitable to protect against insects and other pests.

I like to grow cassava crops, my cassava is attacked by white insects... what pesticides should I use?

17% of the sample highlighted that they lack information on pests and diseases – in particular, inquiring about what diseases were responsible for particular symptoms and asking about pests and diseases more broadly.

What pesticides kill these white insects that looks like fungus, they usually populate top part of the leaf?

4% asked about broader topics. For example:

How can cassava farmers be empowered to improve cassava production so that Tanzania country can benefit?

I do not have money to buy improved seeds and pesticides, what should I do so that I get help as I need to farm?

The prevalence of these topics offers potential future programming opportunities. Although they were explored to some extent during the five-week run of the MEDA Listening Post, future initiatives may want to focus in more detail on these areas.

CLOSED QUESTIONS

31 respondents completed a successful call and left an audio recording. The other 27 respondents left no recording at all (12); did not appear to be familiar with the technology (9), left an inaudible recording (5) or were speaking in a local language (1). Within this sample of 31 responses, 3 recordings were questions instead of responses to the question posed. Similarly, none of these 3 was related to the topic raised in the question:

I am asking; what type of seed should I grow?

There are insect that attacks my Cassava, I would like to know; is it possible to get pesticides that could kill these insects?

I would like to ask; how can I get good Cassava seed? I have already prepared my land for planting. I have prepared one acre.

Therefore, excluding the above 3 questions, 28 responses in total were left within the sample. 17 of these were related to the question asked of respondents. 11 of these provided an answer of some description to the question. This included:

Q How do you transport cassava cuttings to your farm?
A Normally people transport cassava seed by car, motorcycle and bicycle. It's very challenging to me transporting my cassava

The additional 11 responses – those that were not related to the question – were wide-ranging and largely did not focus on shared themes. Overall, the percentage of all users in the sample who left a response that answered the question posed was 19%.

N2AFRICA LISTENING POST

The N2Africa Listening Post ran for 5 weeks and focused on growing beans, and associated challenges. Across the 5 weeks, over 6,200 farmers participated in the interactive elements of the show by leaving a response to an open or closed question. 23% of this group participated more than once, sometimes in the same week – and a total of 5% participated 3 or more times (including a small number of users who participated 6, 7 or 8 times).

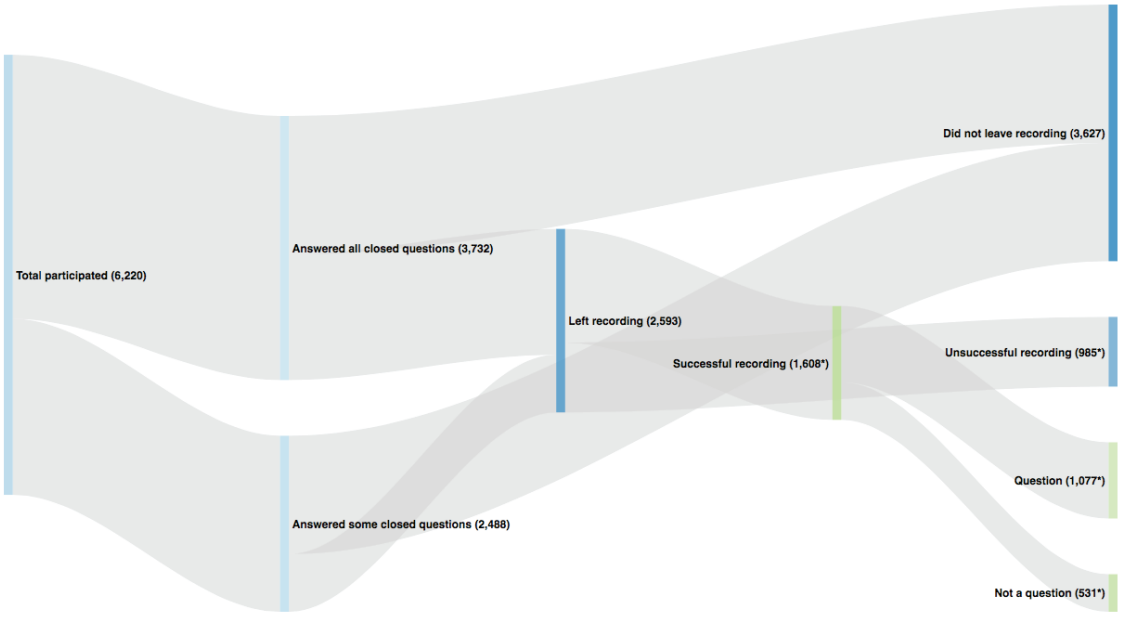
The sample of 58 open questions and 58 closed questions was distributed as follows:

Table 7: N2Africa Sample

	TOTAL	WEEK 1	WEEK 2	WEEK 3*	WEEK 4	WEEK 5
OPEN QUESTION	**58**	-	-	58	-	-
CLOSED QUESTION	**58**	18	9	-	25	6

**The N2Africa Listening Post only included an open question in week 3*

Figure 5: Sankey diagram N2Africa



OPEN QUESTIONS

36 respondents completed a successful call. The rest of the recordings were inaudible, or highlighted that respondents had difficulties using the technology. 24 of these 36 recordings were questions, with the rest being statements, for example:

> *I have opinion not question, my opinion is we would like to have demonstration plots and extension officer in this area, so that we can learn how to use fertilizers.*

However, of the 24 questions only 1 was related to the topic of the week:

> *I usually use organic fertilizers...what technique should I use to farm beans so that I can get more harvest?*

The rest focused on disease prevention and bean farming more widely – in particular, several respondents discussed fertilizer. With regard to fertilizers, 7 respondents discussed fertilizer types and 4 respondents also asked about fertilizer usage. 1 respondent inquired about fertilizer availability.

15 respondents – whether in questions or statements - discussed disease prevention methods. 6 respondents discussed or asked questions about particular pests or diseases, while 7 others inquired about the causes of pests or diseases. 6 respondents also discussed types of pesticides. For example:

> *There is common diseases that attacks beans, changes beans color to yellow, before we use to grow beans and there were no such diseases, I want to know what is the cause of this diseases?*

> *When I grow beans, when flower start to develop there are white insect starts to attack beans, I use a pesticide to kill the insect. I do not know if this is correct or not.*

The sample highlighted that only one question was related to the topic of the week, therefore there appears to be some need for the above topics to be addressed by the LP. These were also not explored during the interactive elements of the LP, across the weeks, with the exception of a question on constraints in Week 2 (which included an option for participants to mention 'pests and diseases'). However, the size of the sample does not allow wider inference.

CLOSED QUESTIONS

Within the sample of 58 closed questions – which also included 'questions' asking respondents to leave a statement or opinion – 40 respondents managed to leave successful recordings. Of these, 36 were related to the topic raised during that particular week. The remaining recordings within the sample were not successful due to being inaudible, or highlighting respondents' difficulties with the technology. Looking at the sample more widely, 31 respondents provided an answer to the question raised by the Listening Post. The example below demonstrates a response that was related to the question of the week:

Q Why are you planting this variety (of bean)?
A I grow this bean because it provides me food and this variety is more resistant to diseases compared to other variety

PICS LISTENING POST

The PICS Listening Post ran for 5 weeks and focused on harvesting and crop protection – including the equipment that farmers use to store their harvests, when they sell their harvest, and pesticide usage. Across the 5 weeks, nearly 5,200 farmers participated in the LP by leaving a response to an open or

closed question on the Uliza platform. 24% of this group participated more than once, sometimes in the same week, and a total of 7% participated 3 or more times (including a small number of users who participated more than 6 times).

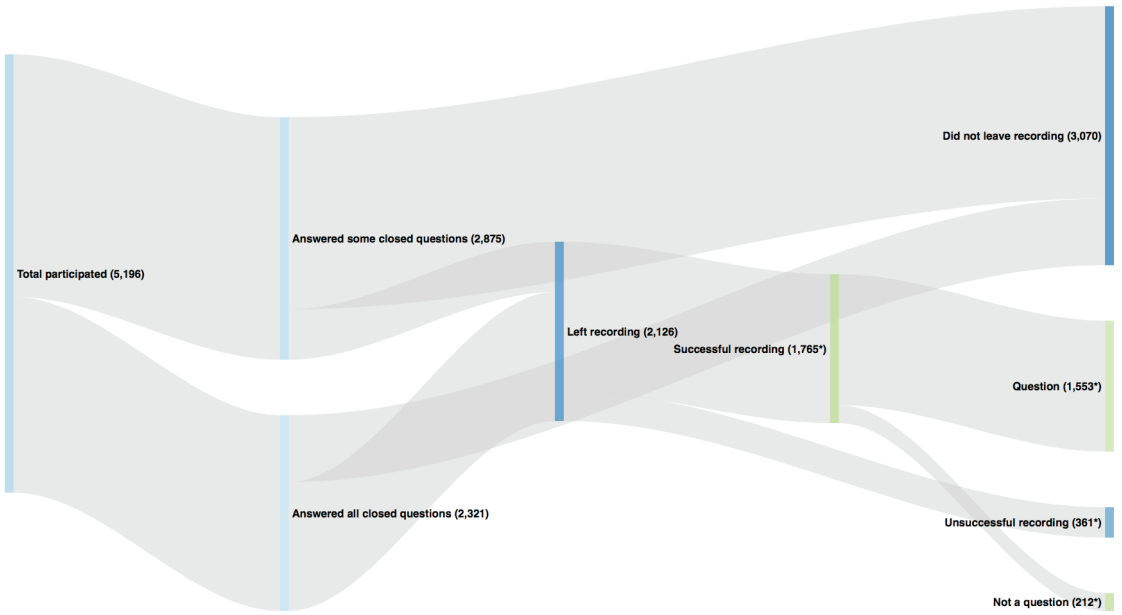
The sample of 58 open questions and 58 closed questions was distributed as follows:

Table 8: PICS Sample

	TOTAL	WEEK 1	WEEK 2	WEEK 3	WEEK 4*	WEEK 5
OPEN QUESTION	**58**	-	-	58	-	-
CLOSED QUESTION	**58**	12	20	13	6	7

**The PICS Listening Post only included an open question in Week 4*

Figure 6: Sankey diagram PICS



OPEN QUESTIONS

48 respondents made a successful call, and left a recording. Most of the other 10 calls included in the sample were inaudible, although 2 demonstrated that the respondents had difficulty with the technology. 42 respondents left a question for the expert, and 38 of these questions were related to the topic of the week (pesticides), with a further question specifically about the PICS bags (the topic which the Listening Post was centred around). Looking at the sample more widely, 17 respondents raised concerns or questions around the perceived negative impact of pesticides:

> *I would like to ask how can the small industries assist us or can the government give us alternative way of fighting insect/diseases that attacks our harvest so that we can stop using pesticides that are poisonous to food consumers?*

> *I have a question about the pesticides we get from shops, I heard that they have health hazard. What health hazards do they have on us?*

12 respondents discussed pesticide availability – including the cost of pesticides, and selecting the correct one while 13 recordings focused broadly on using pesticides:

> *Where can I get good pesticides? Because sometimes we buy pesticides from "input dealers" and they are not active at all, they don't kill pests.*

Beyond these, 4 respondents raised more general pest protection questions and 2 respondents discussed the availability of PICS bags.

> *Where I am from (Bukoba), we don't have access to PICS Bags. These bags are not reaching us on time and when they do reach us they are very expensive. This makes it difficult for us to use these bags to store our crops.*

> *We from the villages cannot easily access the PICs bags. The distributors are supposed to be visiting villages and sell these bags especially on farms.*

CLOSED QUESTIONS

42 respondents left successful recordings, with the rest of the sample made up of unsuccessful recordings due to difficulties with the technology. Of these 42, 33 recordings were related to the respective topic of the week. The example below demonstrates this:

Q What do you do with infected stored crops?
A Rotten crops have no use. We throw them away

QUALITATIVE RESULTS

The qualitative data focused on three lines of inquiry—farmers, local partners (including radio stations) and international partners/funders. In speaking to farmers who participated in the LP polls and left messages on the system, the overall objectives were: to understand their motivation and incentives to participate, to clarify what they understood the purpose to be and their expectations of participating; receive recommendations from them with respect to how the platform can help amplify their voices and needs to decision-makers. In speaking to local stakeholders, including staff from the partner organizations, extension officers and radio broadcasters, the aims were: to clarify their level of involvement in the various stages and process of the LP; to determine whether and how they received the data from farmers; to understand how they used the data; to receive recommendations on the types of data and method for receiving it that would be most useful to guide their decision-making. The third line of inquiry—international partners or funders—aimed to identify their motivations and expectations of the platform; to understand their incentive to partner with FRI for the LP; to receive recommendations that could guide future implementation of the LP.

FARMERS

As evidenced by the engagement statistics, farmers are participating in the polls, and at relatively high rates when compared with similar crowd-sourcing platforms.[12] Most farmers interviewed report they did not completely understand the purpose of the poll they participated in, also evidenced by a wide variety of answers given to the question "What did you feel was the purpose of participating in the mobile polls?"

Many farmers felt the purpose was to receive follow-up information about a crop, technology or technique:

12 Interview with Musa Kpaka, IITA

The purpose is to be able to ask questions to get more information (respondent, Babati, N2Africa).

A few farmers understood the purpose of the polls was to send the data to secondary parties who want to hear from farmers:

The value of feedback is to inform secondary parties about what farmers are doing day to day on their farms, like the plant fertilizers and medications they are using (respondent, Newala, MEDA).

The information they give can go to "the right people" who can take action, for instance to extension officers or suppliers (respondent, Mwanza, PICS).

Yet, many farmers didn't know that the LP was linked to an agricultural development program, and understood that the purpose of their feedback was to include it as part of the radio program, and to have experts answer their questions on-air. Perceptions of whether this is a good strategy or not varied widely from community to community. Some farmers feel that having their questions and concerns aired on the radio program and answered by experts is valuable in and of itself:

When a farmer leaves a question that is answered or a suggestion that is addressed, they feel motivated to give feedback. They feel important in their community if giving feedback can help with things like getting access to the bags. The neighbours would thank them (respondent, Geita, PICS).

Others indicated that it's only a good strategy when the radio program broadcasts the results, follows up on the information consistently, and ensures it is an expert rather than the broadcaster answering their questions:

I am very motivated to get the improved seeds and I have the income to purchase them, but I don't know where to get them. I said in the poll that this is a challenge for me, but I still don't know where to get them (respondent, Tandahimba, MEDA).

I am concerned that when I answer a poll or leave a question, I can't be sure whether it just goes to the radio host or whether it also goes to an expert. We need good quality, expert information (respondent, Babati, N2Africa).

However, many farmers indicate that they don't find participating in the polls to be that useful in and of itself, i.e. they didn't see regular, tangible benefits as a result of participating. Some respondents indicated they participated with the hopes of getting different kinds of information, such as the types of commercial crops that would be most beneficial to start planting in their area, but they did not get this information despite leaving a message requesting it. For instance, one farmer who participated in the N2Africa LP indicated he wants to participate in the polls but only if it helps him get access to new kinds of seeds rather than the ones he has been using, which are low quality. He did not see this result and was disincentivized to continue participating. Similarly, farmers who gave feedback as part of the PICS polls believed the polls would help improve distribution of the bags, which are not available in their area:

If we give feedback we thought we would get access to bags here but this didn't happen (respondent, Geita, PICS).

Farmers in Newala who participated in the N2Africa LP expected that their feedback would reach and influence MEDA, who was distributing the improved seeds during the wrong season. They also hoped that

their feedback would reach suppliers or distributors and would help lower costs or improve distribution of the seeds:

> *There was an expectation that by voting 'no I cannot afford seeds' that someone would lower the cost (respondent, Tandahimba, MEDA).*

> *I expected that if we farmers said there was no place to buy the improved seeds near us, that the seeds would be made available (respondent, Newala, MEDA).*

Farmers universally expressed that there is immense value in participating in the polls to receive follow-up information from the radio program, to influence extension officers to improve distribution processes or visit their villages, and to make suppliers and distributors more responsive and accountable to farmers. However, in the three case studies represented here, these hopes and expectations were not regularly met. While all LPs provided follow-up information on the radio programs in response to farmers' questions and concerns, it was only heard by a small sample of farmers interviewed. This is likely due to the fact that not every farmer who participates in a Listening Post tunes in to the corresponding follow-up radio program every week, and some partner radio stations did not follow up with the questions on the next program, but rather later on in the series once they received relevant information from experts.

Farmers generally enjoyed participating in the polls, but most indicated they would not do so on a regular basis without a tangible benefit, such as evidence that the feedback loop has been closed, or some follow-up action by implementing partners with respect to concerns or questions raised (e.g. if a farmer leaves a message indicating PICS bags are not available in their area, they would like to see some efforts to improve distribution as a result of airing their concern). Some Listening Posts were more relevant to farmers than others. For instance, the PICS Listening Post was thought by most farmers to be highly relevant, as they struggle with losing crops due to pests and are skeptical about chemical fertilizers. One farmer in Geita, Mwanza said:

> *I was very excited by the polls. I wanted to get help to prevent insects from destroying my crops. We use pesticides that are of very low quality and my beans aren't doing well.*

Other farmers agreed, one stating:

> *I had heard of the bags and I really want to learn more. Pesticides don't work and the sellers are only concerned to make a profit.*

Some polls, however, didn't respond to farmers' experiences at all. For example, farmers in a district where MEDA was promoting cassava expressed that they don't grow cassava in their community, and haven't in that area for more than a decade due to poor markets. They were perplexed as to why polls were asking them about cassava, yet they nonetheless participated in them:

> *We are confused about why the radio program is telling us to produce cassava when there is no market for it. We used to grow a lot of cassava in this area, but we haven't been producing much for almost ten years.*

> *The radio program tells us there is a market for cassava, but that has not been our experience and if there is a market we don't know how to access it.*

Farmers in other districts, such as Newala, are cassava growers, and they feel the polls do respond to their day-to-day realities. Nonetheless, this raises some questions as to the validity of the polls, and suggests a need to ensure that farmers who are best positioned to participate (i.e. those who grow

the target crop) are recruited as participants. Project partners also expressed this as a concern. For instance, Seperatus Kamuntu, PICS researcher and distributor, indicates that many farmers from rural areas don't participate, even though rural communities are the target populations for the PICS bags:

> *Many people from town participate, and they aren't even farmers. They just enjoy participating for something to do, not because they are interested in post-harvest techniques.*

Some farmers in the focus group discussions expressed a similar concern. For instance a farmer who participated in the N2Africa polls claims:

> *The value of feedback is to inform secondary parties about what farmers are doing day to day on their farms. But often people who aren't farmers answer the polls. They hear it on the radio and think it's a fun thing to do. So the information the parties receive isn't always correct.*

Despite these challenges, farmers nonetheless find the radio programs to be very useful, and feel that the polls are a good way of raising their questions and concerns, enabling a type of two-way communication with agricultural development actors that they hadn't experienced before.

> *The radio program, and the ability to ask questions and get responses, helps give us the faith we need to try something new, such as spacing seeds rather than planting randomly so we waste less seed (respondent, Babati, N2Africa).*

> *Before this, I was never asked about my problems or challenges. Giving feedback helps the radio program and extension officers know what our daily problems are. So by giving our feedback they are better able to help us solve those problems (respondent, Mwanza, PICS).*

According to the focus group discussions, the primary motivation for farmers to participate is to receive follow-up information that is valuable to them. While farmers are enthusiastic about the potential for their feedback to influence government extension officers or suppliers/agrodealers, they are not convinced that this will actually happen. For instance, farmers in Babati claim:

> *...it's almost impossible to get a supplier to do that despite farmer demand.*

> *The government should play a role through offering subsidies and improving distribution, but the government does not respond to us even if we tell them what we need.*

They nonetheless feel that receiving information from experts, extension officers or suppliers in response to their questions and concerns is invaluable to them because it helps to build relationships between farmers, experts, suppliers, development workers and policymakers.

> *We can tell the radio stations what information we need every day through mobile phones and then get that information a lot more quickly than waiting for an extension officer (respondent, Babati, N2Africa).*

> *Giving feedback via the radio program could help farmers in remote areas. They will hear what other farmers are saying—the kinds of questions they are asking—and get information that is also useful to them. The questions and answers can spread far this way and they are relevant to more people than just who is asking (respondent, Mwanza, PICS).*

Further, despite their skepticism that it will be responded to or acted upon, all farmers interviewed feel it is valuable and necessary to give their feedback to decision-makers:

> *We need to participate as experts and extension officers need to know what is happening on the ground so they can make better decisions (respondent, Newala, MEDA).*

Many feel that if their feedback goes through the proper channels, i.e. those actors who are meant to represent farmers, there is greater potential than sending it directly to decision-makers:

> *We cannot influence the government to help provide better access to improved seeds, but the extension officer has influence. If the extension officer knows our problems and needs, they can take it to the government and act on behalf of the farmers. (Respondent, Babati, N2Africa).*

Overall, the LPs were all successful in attracting a large number of farmers to give feedback. Many respondents who listened to the corresponding radio programs on a regular basis felt that it was immensely valuable in that the programs adapted their content based on what they were hearing from farmers—such as correcting misinformation and responding to confusions and concerns. However, the representativeness of this feedback is questionable. Very few women or older people participated in the polls, and FGD respondents indicate that this was less due to access to technology and more to a lack of interest in farming issues. Nonetheless, in order to receive feedback data from farmers who are best positioned to give their opinions and concerns, it may not be ideal to strive for representativeness, but rather for good quality data. In order to ensure good quality data, it is necessary to determine the profile of the target respondent and ensure the platform has systems in place both to attract those respondents and to draw them out from the less reliable participants, in short to separate the data from the noise. This is especially challenging when LPs are aired on radio stations that have national reach.

LOCAL PARTNERS

The partners who were interviewed all feel that beneficiary feedback throughout implementation can help ensure their projects better achieve their intended impacts, and they all express that the Listening Post is a valuable addition to their programmatic activities and institutional monitoring, evaluation and learning. Stakeholders not identified as direct target audiences for the data—such as extension agents, vendors and suppliers—also indicated they think they the feedback would be extremely valuable and would improve their ability to effectively address farmers' needs.

> *Polling farmers is a great way to get a sense if they have adopted the technology to better focus our marketing efforts to places with low adoption rates (PICS Business Consultant for Tanzania).*

> *Farmers are always asking where they can access the seeds, and the radio programs and polls were useful in helping connect farmers to vendors (MEDA Country Coordinator for Tanzania).*

> *It would also be useful to understand from farmers why they aren't using the bags, and why they wouldn't be willing to try them (PICS Distributor/Researcher).*

> *More data can help decision-making. For instance if I hear that a lot of farmers do not know or are not using disease-resistant seeds, I can be informed about whether it's because they are not available in that area or that farmers don't know where to get them (Extension officer, Newala).*

Despite this, there is little evidence that partners analyzed and acted on beneficiary data in a systematic way, other than responding to questions and concerns on the radio program. Often the partners expressed that they understand the value of feedback, but they often haven't included "adaptive practice[13]" as a part of project design from the beginning. This makes it difficult for them to act on feedback, and to adapt decision-making based on what they are hearing on the ground.

> *Information flowing between farmers, agrodealers and extension services doesn't happen in a systematic way to respond to farmers' demands...not every stakeholder in the system is in a place to respond to every concern raised by farmers (Extension Officer, Newala, MEDA).*

There was not a systematic process in place for partners to receive the data in real-time, but rather it often happened in an ad hoc way, and often because the radio station wanted to give more accurate information back to farmers by engaging experts, rather than with the intention that the project partner will use the data to guide decision-making and adapt implementation. Further, stakeholders that were involved in the project but outside of the partner organizations (e.g. extension officers, vendors, suppliers, district representatives) did not receive the data or even know that it was being collected. Despite the fact that partners had access to a dashboard and were trained on how to access the data, and were also sent periodic reports from the FRI team, there is little evidence that this data was acted on, or that those within the partner organizations who are best positioned to act on the data ever accessed the dashboard or received the data in any form. For instance, Bernadette Majebelle, the Tanzanian focal person for PICS indicates:

> *I never received the data from farmers. If I received this information, I would have made a follow-up to see where we could concentrate our training.*

Most partners were involved with the radio programs—answering farmer questions left on the platform, addressing concerns and correcting misinformation:

> *I was very involved in the radio programs and in answering questions. Most farmers asked questions about the seeds. There were jingles to promote them, but they wanted to know more about it---how to access them and how they were better than other seeds (MEDA Country Coordinator for Tanzania).*

All local partners and extension officers interviewed feel that aggregated citizen voices hold potential to influence government and ensure that farmers are at the center of decisions about agricultural development:

> *The councilors at district level—we want to work with them. We need political will to pick up the technology. The force of the farmer demanding the technology can influence the government if they see the demand and realize how much it is helping farmers... The districts have the power in their mandate to convince the councilors and commit budget to subsidize the distribution of this technology (PICS Distributor/Researcher).*

13 According to the Global Partnership for Social Accountability, adaptive practice refers to the process of collecting relevant feedback and data in an effort to open up new avenues for learning and iterative action. This departs from citizen feedback as being a largely 'extractive' exercise where information goes primarily one way--from user to provider--and opens up new avenues for action based on dialogue. http://gpsaknowledge.org/wp-content/uploads/2016/04/NOTE_march.pdf

This kind of data could inform the government of what the farmers need and if enough farmers participate it can help ensure the government responds to their needs (Extension officer, Tandahimba, MEDA).

Farmers could inform extension workers what is happening on their farm, such as if there is a shortage of seeds or fertilizers. The officers could then connect farmers to suppliers to get assistance immediately when there is a shortage (Extension officer, Babati, N2Africa).

We are closest to the farmer. The partner works through us. The government works through us. Even the vendors work through us. So we are well positioned to know what kinds of information from farmers is needed to influence these stakeholders (Extension Officer, Newala, MEDA).

In some cases, the broadcaster developed the question along with FRI staff with minimal input from partners. In other cases, partners were involved in developing the questions, but did not tailor them well to farmers' daily lives and experiences.

Many of the poll questions were high-level and confusing, and didn't connect well to one another. There should be a process of continually refining information where one question leads to the next stage of inquiry (Consultant, N2Africa).

In the best design scenario, the broadcaster, partner and FRI technical staff worked together to develop the questions after a period of formative research with farmers and extension officers.

There is evidence from the interviews that there was a high degree of buy-in from partners at the outset. BMGF selected partners who were particularly eager to get beneficiary feedback about their projects. However, timing was often an issue, and the data wasn't collected at an ideal time for action in the project cycle, meaning that even when partners accessed and viewed the data, they often didn't feel capable of responding.

It was difficult for grantees to change. By the time they got the feedback they were already past what they could adapt in their implementation (Musa Kpaka, former BMGF Program Officer).

Developing a selection process for the "ideal" partner is key. Implementing partners who want to improve their impact are the best kinds of partners, and they need to identify their adaptive, or flexible, project elements during the design process of an LP and ensure they collect data from farmers that responds to those elements and is actionable.

In order to have a platform for adaptive management to work, you need have implementing partners who are already converted, who already understand the value of feedback and want to use it. The organizations that are implementing the agricultural development initiatives need to lead the process (Karin Lion, former BMGF program officer).

INTERNATIONAL PARTNERS

There is a lot of enthusiasm among international partners, including USAID, BMGF, Hewlett Foundation and CABI, who were interviewed, especially with respect to importance of ongoing feedback from citizens and adaptive programming. They feel that the LP has great potential, especially with the combination of a mobile platform with radio, which few other people are using.

> *The radio program offers a unique outlet for recruiting farmers, as they are already listening to the program. It's also an excellent vehicle for crowd-sourcing then correcting misinformation. Not many other organizations are doing this in the adaptive management world (Duncan Scones, Consultant advising CABI).*

> *Radio is a great tool for participatory rural advisory services as it reaches a lot of farmers and they trust it. We don't yet have great ways for integrating radio with other ICTs for a more multi-modal approach to advisory services that is tailored to the farmers you want to target. The LP holds potential for this type of multi-modal platform (Christian Merz, Senior Program Officer, BMGF).*

Some of the partners and funders engaged to date feel that the LPs targeted for the research suffered from an overall lack of strategic vision and processes/systems, likely due to the exploratory and inductive nature of the design, which was initially conceived of as an experiment in tech-enabled crowd-sourcing of farmer feedback. As a result, the aims and objectives were not set in stone from the beginning, but were continually developed and redeveloped through the course of experimentation. Partners also expressed that there is an overemphasis on the technology itself at the exclusion of other elements such as stakeholder mapping, partner buy-in, formative research with farmers, and consultations with potential users of the data. For example, the program officer at BMGF who led the original concept along with FRI's ICT and Innovation Lab, says:

> *Our major metric of success was coverage—how many farmers could we reach? How long can we sustain their interest and what kinds of information are they asking for? We knew these experiments hadn't really been done before. As a result, we probably focused more on the technology at the outset rather than the process" (Musa Kpaka, former BMGF Program Officer).*

Partners also expressed some confusion over who the main target user of the LP data is, and whether the primary aim is to enhance the radio programs by addressing farmer concerns and providing more tailored information about the target technologies or products, or to provide development organizations with data that could guide decision-making. While FRI and BMGF were clear that the objective was of providing real-time, unfiltered data to implement programs that were more responsive to farmers, this objective became muddled over time, likely due to a desire to please everyone. While feedback from target communities throughout a project cycle is crucial for accountable and participatory development, it is challenging to collect data that can both be used for this purpose while at the same time be a mechanism for raising the voices of citizens to decision-makers.

7 DISCUSSION AND FINDINGS

The aim of practitioner research that examines the successes and failures of a particular intervention is to provide credible and useful evidence to strengthen accountability for results and contribute to learning processes. In line with this aim, the research findings presented here are discussed according to engagement, data quality and feedback loops, while also addressing issues related to farmer voice and the potential for the LP to enhance accountability to farmers in agricultural development initiatives.

ENGAGEMENT

Studies focused on ICTs to enhance participatory decision-making in development repeatedly cite the benefit of using digital technologies to crowdsource citizen opinions (Piexoto and Fox, 2016). ICTs significantly reduce the costs of participation and provide an accessible platform to voice opinions, ideas and experiences, thereby allowing more citizens to participate and engage in the development process. Developing a system to engage a large number of citizens is central to this process. According to our analysis of the LP, the model is successful at attracting farmers to participate in polls, primarily due to its connection with a trusted radio station. Previous research indicates that sustaining engagement over time is a challenge, and we would expect high numbers of attrition. However, in the LPs presented here, total engagement rates decrease over time, but the number of voice messages (arguably a deeper level of engagement) received increases over the course of the six weeks. While it is not necessarily the same individuals participating in an LP week after week, connecting the mobile platform to farmer radio programs means that as time goes on, more and more farmers are recruited as participants through jingles advertising the poll. It is well-documented that radio is a trusted and effective method for reaching farmers with agricultural advisory services, and leveraging a tool that is already trusted and used means the LP has a ready and willing cohort of potential respondents from the outset. However, there will always be some users who are only testing out the system and who will dropout quickly. In order to keep engaging over the longer-term, there needs to be better targeting of the polls to ideal respondents, a system for pilot-testing questions to help ensure they are relevant to respondents, and a method for frequently responding to concerns and questions posed by participants.

The analysis also demonstrates that representativeness remains an elusive goal, and is particularly challenging when the radio program reaches everyone, despite whether or not they are target respondents. People who already participate in call-in radio programs tend to be the ones who respond most often, and the model isn't terribly effective at reaching those whose voices typically aren't heard. For instance, very few women participated in the LP due to "a lack of interest in farming issues" according to men who participated in focus group discussions. The few women who participated in the focus groups argue it is not for lack of interest in farming issues that they are not inclined to participate, but rather that the questions were targeted towards men, claiming: "We didn't listen to the program. We have access to phones, but we weren't encouraged to participate because it wasn't relevant to us." These claims are surprising for the LPs focused on beans and cassava, which are crops typically grown by women. When questioned further, female farmers indicate that the types of questions—about seed selection, fertilizer use and so on—are of little relevance to them because they have limited decision-making capacity to choose seeds or determine best farming methods, even if they are growing the crops.

Including representativeness as a methodological aim is a good idea in theory, but it is difficult to balance this while also striving for good quality data that can aid decision-making, whereby data is collected from the people who are best positioned to answer the questions that stakeholders are interested in.

While engagement levels remained relatively high throughout the duration of an LP due to continually adding new participants to the cohort, there were a number of technological challenges across all of the LPs that prevented a greater number of people from participating. The content analysis of voice responses left on the system highlights that some farmers didn't understand what to do when they were asked to leave a comment or questions on the system, saying "hello, hello" anticipating a person on the other end, or just hanging up. Further, the LP relies on the radio stations to broker the process, which worked well in some instances, but not in all LPs. For example, the MEDA LP had high participation over most of the weeks, but only 81 respondents left voice messages in week 5 and 0 respondents in week 6. This was due to the LP being aired over the holiday season, and the radio station closed down for the last two weeks of the series. The polls were still open, but the radio station was no longer playing jingles to recruit participants.

Finally, the research demonstrates that engagement is inextricably linked to motivation, and clear incentives for participation are necessary. External incentives, such as offers of airtime to complete all of the polls, were largely unsuccessful in recruiting or maintaining participants. Farmers indicate that their primary motivation is a desire to receive agricultural information that is specifically targeted to the types of crops they grow, and their individual questions and concerns. As discussed below, in many cases the follow-up the farmers would receive, and when was not clearly communicated. As a result, respondent expectations were not consistently met, which disincentivized some farmers from further participation, also affecting overall engagement rates.

DATA QUALITY

Data quality is crucial in order for the LP to successfully work as a platform for participatory decision-making and adaptive programming that is responsive to citizens. In order for development partners and stakeholders to understand the benefit of feedback, it must give them useful and actionable information. Many ICT initiatives that collect data to aid decision-making suffer from a focus on quantity over quality. Many scholars and practitioners argue that this emphasis misses the larger picture, stressing that collecting and using "downstream data"[13] to amplify collective impact requires much more than the latest tool or technology; it requires appropriate indicators and questions, supportive structures and mechanisms, and the human resource capacity and institutional motivation to ensure that data can be used to inform programmatic decision-making. When these processes are in place, the right technology can be an enabler of both better real-time data and better real-time decision-making.

Supporting the findings of previous studies on the subject, the qualitative and quantitative analysis of LP data further highlights the challenge data quality poses to ensuring that citizen feedback can effectively aid decision-making. The content analysis set a conservative hypothesis that 1-in-20 farmers would ask a question related to that week's show, or the Listening Post topic more widely, at the 95% confidence level. Our analysis supported the hypothesis, indicating that the frequency of addressing the key themes and topics is indeed much higher—approximately 1-in-7 farmers in our sample left a voice message

13 At a presentation at MERL Tech's annual conference Reboot defined downstream data as the data collected from individuals and programs http://bit.ly/2i7iKeh

related to the theme of that week and the question asked of them. An example of a non-relevant voice message left on the system is a message from a farmer who participated in the PICS LP asking: "I leave near by Singida Town, my question is how can I get access to PICs bags?" when asked questions about pesticide use. While the question was nonetheless related to the overall LP, the farmer did not answer the question asked, posing some questions about data quality. This demonstrates that in order to give high quality data to relevant stakeholders using a voice-messaging service, a significant amount of data sorting needs to occur to separate the useful and relevant responses from the non-relevant ones. The polls (as opposed to the questions where farmers were prompted to leave a voice message) are more constrained in that respondents select one of five or six possible responses to a question, largely circumventing the relevance issue. However, many farmers expressed dissatisfaction with participating in the polls, expressing a strong preference for leaving a recorded message. Focus group respondents who participated in the MEDA LP said:

> *The questions are clear, but response options are too brief. They don't adequately capture what we want to say (respondent, Tandahimba, MEDA)*

> *We should have been consulted on the questions to ensure relevance. For instance, markets wasn't a topic that was addressed, but in this region lack of access to markets for cassava is the biggest barrier for farmers and we don't want to grow it. The polls or radio program didn't give information about markets, or about the crops that we do grow (respondent, Newala, MEDA)*

While polling—whether via IVR or SMS— is a better method for aggregating responses to basic questions, such as what types of pesticides do you use, or have you heard of PICS bags – and easier to analyze quickly to inform decisions – they do not give the in-depth information that could genuinely constitute participation. Rather, they remain in the domain of market research, which can be useful for planning projects and assessing uptake and adoption of particular technologies, but is less useful for accountable decision-making and adaptive management that truly responds to farmers' articulated needs and priorities. There is a trade off between high levels of engagement (which is most easily managed through "thin" mechanisms such as polling), and in-depth, qualitative responses ("thick" engagement), which require greater manpower to effectively analyze, and may be hit or miss in terms of data quality potentially falling victim to the "chatter of the crowd" where responses represent a wide variety of themes, desires, concerns and needs. A desire to please everyone also affected data quality. The partner and farmer have very different motivations, and collecting, managing and using data that responds to both is extremely challenging. Further, with the world of agricultural technology becoming increasingly contentious and polarized, understanding farmers' lived experiences with various technologies is essential to teasing out the nuances of its particular successes and failures (Griswold, 2015). Yet, understanding these lived experiences and the consequent opinions of farmers is not a simple task, and is not likely to be deduced from "thin" feedback mechanisms such as polling through multiple-choice questions.

FEEDBACK LOOPS

Our experience verified what thought leaders in the ICT4D and feedback space have been arguing for years: collecting feedback is not enough; we need better tools to respond to feedback. While many tools exist to help us collect and analyze feedback from citizens, actually closing feedback loops – adapting based on what we hear from respondents– remains a challenge that is frequently cited. A common mistake in using ICTs to improve feedback processes has been to concentrate on the

technology rather than on the problem that technology is meant to solve. A study conducted by CTA argues that out of the ICT4Ag projects they examined "an almost universal feature was that developers, perhaps encouraged by the success of ICTs for other uses in rural areas such as mobile money, tended to put all their emphasis on the ICT" (Shepherd, 2015). The overarching focus on the ICT at the exclusion of other factors and processes has meant that the majority of these initiatives fail to adequately close feedback loops. A key challenge in many ICT platforms created to collect real-time feedback for adaptive management is that it is not sufficient to empower marginalized communities to make their voices heard; it is necessary to go beyond listening and support stakeholders to build institutional systems that allow project teams to better incorporate citizen voices in decision-making processes and thus to increase the responsiveness of development projects to people's real needs (Giger and Bailur, 2014). While improved engagement has an intrinsic value in itself, it often falls short of improving the reach and quality of services offered to farmers that could ultimately improve their lives.

There is evidence that the LP experiences similar difficulties with respect to closing the feedback loop, i.e. in ensuring that farmers' comments, questions and concerns were adequately responded to by project partners and other stakeholders. Despite the fact that BMFG selected partners who indicated a strong interest in farmer feedback, there were differing ideas from the outset about what the objective of the LP is. One of the BMGF project officers explained the main purpose was to help grantees measure adoption rates of their products, practices or technologies among farmers. Another project officer asserts that the original idea was to do an experiment in adaptive management and the overarching aim was to collect large amounts of real-time feedback to help ensure projects put farmers at the centre of implementation. Project partners also differed in what they understood the purpose to be, ranging from assessing impact, to measuring adoption, to assessing demand for their products, to answering questions from farmers about the practice or technology on the radio program. As a result, partner organizations did not seem to understand that there was a feedback loop, and that they were key actors within it, perhaps resulting from the fact that the LP was an experiment at the outset whereby the overall objectives were inductive rather than established. Nonetheless, this confusion points to the need for there to be clear and agreed upon objectives from all partners in order to ensure that data collected is useful and actionable.

The radio programs are an excellent tool for closing the feedback loop in some regard by disseminating expert answers to questions or concerns raised by farmers, connecting farmers to vendors or extension services, and in giving farmers information about the progress of projects or initiatives thereby enhancing accountability, but a solid and systematic process needs to be developed for this to happen. Farmers expressed that they often did not receive any follow-up information on the radio programs, not even the results of the polls, which they are interested in. Others say they did hear follow-up information in the form of experts on the radio program answering common questions and concerns, or the radio host playing recordings of the comments farmers left on the platform. However, most respondents cited that they did not know when the follow-up would be broadcast, and even when they did know, they were not always able to listen to the program at that exact moment.

While ensuring that the feedback loop is closed by providing follow-up information on the radio program is a relatively simple solution that is easy to implement, ensuring that the farmers who ask questions or raise concerns are responded to in an appropriate timeframe remains a challenge that is not overcome simply by airing the answers to the common questions on the next week's show. Even more complicated is closing the feedback loop with government and development actors in terms of more concrete actions—such as leveraging political will to provide subsidies for poor farmers who cannot afford to purchase improved seeds or post-harvest bags, or improving distribution mechanisms where there is

high demand but low supply. Nonetheless, combining a feedback platform with radio offers the unique ability to publicly disclose user feedback, thereby holding the potential to inform citizen action (Peixoto and Fox, 2016).

Unfortunately, implementing an LP where there are few mechanisms in place for closing the feedback loop may do more harm than good as it further reinforces what farmers already believe—that it doesn't matter what they say, no one responds to it. Farmers are highly skeptical about the potential impact of their contributions on the outcomes of initiatives and projects meant to serve them. For this reason, it is critical to identify and incentivize actors who are capable of responding during the design phase of an LP, and to ensure that they are involved in every stage of the process—from designing the questions, to analyzing the data, to disseminating the findings to relevant stakeholders. It also important that project partners who are interested in beneficiary feedback identify the flexible or actionable points in their project frameworks from the outset, rather than collecting data that they are not able to use to adapt their programs, or collecting the right kind of data at the wrong time in the project cycle.

It is also important to build an ecosystem around the data, as different stakeholders have different capacities to respond, and to tailor the data for the various stakeholders. For example, the partner may be primarily interested in adoption of the technology or practice, where extension agents may be more interested in the problems farmers are facing in a particular community to better target advisory services. The LP could potentially be a tool that parses data for different stakeholders, thereby enhancing its relevance and increasing the likelihood of a response by one or many of the actors in the ecosystem. Despite difficulties with closing the feedback loop, there is evidence that raising collective demands and concerns holds potential in and of itself. According to Piexoto and Fox's distinction between 'yelp' and 'teeth', collective civic action can encourage service providers to become more publicly accountable, an approach that depends less on a decision-makers' discretion or motivation to act on the feedback. This is especially valuable when such feedback is publicly disclosed, allowing for collective action and downward accountability.

8 CONCLUSIONS AND RECOMMENDATIONS

The research clearly shows that citizens/farmers enjoy interaction with the Listening Post, and feel that it is useful to raise their questions and concerns to NGOs, policymakers and experts. Though much remains to be done in terms of closing feedback loops and ensuring data quality, the LP model has clearly demonstrated its potential to strengthen the chain of relationships between citizens-extension services-suppliers-projects-policymakers. It has also demonstrated its potential to collect real-time feedback from farmers that could be used to aid decision-making and improve accountability in agricultural development initiatives, helping to ensure they are more responsive to farmers. However, a number of challenges were identified, including closing feedback loops, ensuring data quality, reaching hard-to-reach farmers, and technical literacy. In order to ensure that feedback collected from farmers is used by development actors to guide decision-making, the following recommendations emerged from the research.

EFFECTIVE PARTNERSHIPS ARE THE KEY TO SUCCESS.

The LP needs to attract the already converted, i.e. partners who have enthusiasm for the value of feedback from the beginning and are willing and able to lead the process. Partners need to sign onto a Listening Post knowing that they will be responsible to citizens and to varying degrees accountable for making adaptive changes and responding to major farmer issues or challenges. Partners need to be involved in every step of the design and implementation – from identifying the adaptable aspects of their programs, to designing questions that respond to those aspects, to determining which types of data are actionable and in what forms, to analyzing feedback data. There also needs to be a clearer design process to develop questions, with clear roles and responsibilities. Finally, the design process should include farmers as partners from the beginning, with formative research and user testing to ensure that the polls are addressing the types of crops, projects and concerns that are happening in their communities. The design phase for an LP could include stakeholder mapping to help identify all of the potential actors and partners, and to determine who should receive the data, what kind of data, how it will be used, and how this will happen.

COMMUNICATE CLEAR OBJECTIVES TO ALL STAKEHOLDERS AT EVERY STEP OF THE PROCESS.

Clear objectives and aims of an LP should be communicated to farmers and partners throughout the process. For farmers, information about why their feedback is being solicited and how their questions and concerns will be responded to is essential to retaining motivation and enthusiasm to participate. For partners, they need to know what types of data they will receive, how often, in what form, and what the expectations are in terms of responding to farmers. Partners need to understand what role they play in the feedback loop and how they can fulfill it. Clear communication can help ensure alignment between expectations (both farmer and partner) and what the LP is promising.

OFFLINE PROCESSES NEED TO SUPPORT THE TECHNOLOGY.

ICTs and digital platforms are tools for solutions but not solutions themselves. ICTs are enhancers and facilitators, but still require an off-line structure to be successful. Ensuring the technology is integrated with on-the-ground interventions is crucial for success. Traditional extension services still have much to offer, and are trusted agricultural advisory services in many parts of Tanzania. A frequent observation from the case studies is that farmers still prefer to receive information through personal contact. Resources therefore need to be allocated so that extension staff can utilize available ICT services to the full, and that the services compliment the work they are already doing.

DATA QUALITY IS AS IMPORTANT AS A ROBUST PLATFORM.

There needs to be a greater understanding of what kinds of questions will elicit what types of responses, the difference between open and closed questions (quantitative vs. qualitative types of data) and how they can be used. There should be a process where one question leads to the next stage of inquiry, continually refining information throughout the course of the LP. Frequent data quality checks should be embedded in the methodology to ensure partners receive data that is useful and actionable.

USER TESTING CAN HELP IDENTIFY POSSIBLE PITFALLS AND METHODS FOR MITIGATING THEM.

Technological difficulties could be mitigated by having simple instructions sent to farmers with the IVR prior to the first poll or as an introduction to each poll. Demographic trees that segment data according to the type of respondent could help identify the "ideal" respondent from the non-ideal one (e.g. a farmer from a non-farmer, or a woman from a man). User testing is integral to the design phase of an LP to help identify possible technical difficulties prior to launching the model. User testing should also include pilot-testing the questions to ensure they are relevant to the target population, which could help circumvent issues related to gender, and ensure more of the voice messages received are related to the themes and questions presented to farmers.

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