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FARM RADIO INTERNATIONAL

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Harnessing ICT to scale up agricultural solutions

Intervention Research: An Assessment of ICT strategies that are most effective and efficient in scaling agricultural solutions in Malawi

Baseline Study Preliminary Results

November 2018

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1 Introduction

Scaling up agriculture improvements and solutions that contribute to greater food security and overall sustainable development remains an imperative and a challenge. There is strong belief that information and communication technologies (ICT), including traditional media and newer tools, such as mobile phones and web-enabled services, can add value to the scaling process. The overall context for this project is the challenge of scaling agricultural and other development improvements to achieve sustainable impact.

The overall research aims to examine the roles and contributions of ICT in scaling agriculture improvements for food, nutrition and income security, with a focus on sub-Saharan Africa. Specifically, the study is focusing on the role and contributions of ICT as an enabler to building awareness of agricultural improvements; the skills, knowledge and contacts to apply them; linkages between key stakeholders in the context of markets; and reducing information and communication transaction costs. The project will aim at answering the following research questions:

- What combinations of ICT, actors and institutional arrangements are most effective and efficient in scaling agricultural solutions?
- What strategies for the use of ICT are successful in facilitating the scaling of agricultural solutions, e.g. interaction with audiences, type and quality assurance of information and content?
- What are the gender equality considerations of ICT-enabled scaling of agricultural solutions?
- How and by whom are ICT technologies and applications being designed, applied and tested as part of business models that lead to successful scaling of solutions and practices?
- What barriers may limit the reach and/or effectiveness of ICTs in scaling initiatives?

2 Literature Review

2.1 The Concept of Scaling Up

The need to scale in order to achieve cost-effective and sustainable development is widely acknowledged, founded as it is on basic needs: "Scaling

up is especially important for agriculture, rural development, and nutrition because of the global challenges of food security and rural poverty", acute issues in sub-Saharan Africa. "Although the diffusion of agricultural innovations can be spontaneous and rapid, often the path from research to widespread application requires systematic support from public, private, and not-for-profit agencies" (Linn, 2012: 1).

Scaling up in agricultural and rural development interventions takes place across multiple dimensions, including "horizontal", "vertical" and "functional" varieties of scaling (WHO, 2010; Linn 2012). Extending the focus of scaling from technology, practice and projects to include programs and policies, Hartmann and Linn (2008) offer a definition of scaling that is frequently cited in recent literature (Brand et al, 2015): "Scaling up expands, replicates, adapts, and sustains successful policies, programs, or projects to reach a greater number of people," to which Linn's 2012 brief for the International Food Policy Research Institute adds "…in a non-linear, iterative and interactive cycle" (Linn, 2012). The latter is important, as will be discussed below, because it recognizes the complexity of the scaling process.

Solutions or innovations to be scaled may be defined even more broadly, ranging from crops to processes to organizations and institutions, as described in International Development Research Centre (IDRC) materials, which include the following: Use or adoption of a new technology; Change in day-to-day practices; Revamping of an entire production process; A new crop in the production basket/portfolio; Access to new markets; New organizations; Value chains; New institutions and policies (IDRC, 2016).

Linn describes scaling-up pathways as "the sequence of steps that need to be taken to ensure that a successful pilot or practice is taken from its experimental stage through subsequent stages to the scale ultimately judged to be appropriate" (2012). He refers to an analytical framework for examining scaling up that includes:

- Pathways to scaling up
- Understanding the drivers of the scaling-up process
- Spaces for innovation to grow to scale
- Monitoring and evaluation (M&E) throughout this process

Linn's framework is mirrored by others, discussed below, in particular the concepts of pathways, drivers and spaces. It is here that this project locates the start of its proposed exploration of the role and contributions of ICT in scaling.

The literature acknowledges the challenge of scaling as complex: micro-level institutional and individual engagement as well as macro-level policy influence and advocacy are key considerations at various stages of the scaling process. For example, the specific role individuals play at the micro level (Markard & Truffer, 2008); political dimensions in the development of technology (Hermans, 2013); the importance of capacity and policy (Global Health University, 2013; Simmons, Fajans and Ghiron, 2007) are important areas to study.

Another aspect of analyzing scalability of agricultural programs is from the *agricultural innovation systems* (AIS) perspective, which goes beyond technology transfer model, and includes the other dimensions that affect the farming system such as human capital development, social capital development and linkages with other actors as key factors to determine scale (Swanson, 2008). An AIS lens will help analyze the role of ICTs in scaling up since ICT exists as part of wider advisory and extension services that need to encompass other factors and interaction of actors affecting the demand for and utilization of such knowledge (Klerkx et al, 2009).

Conceptual frameworks for scaling processes, such as those proposed by Hartman and Linn (2008) and Gillespie et al (2015), overlap in key areas, such as vision and definition; actors and context; process and pathways; drivers and barriers; systemic elements, such as financing and governance; and systems for learning, including monitoring and evaluation. Robinson et al's analysis of 14 case studies in the education sector results in a framework of 14 core ingredients across four key areas: Design, Delivery, Finance and Enabling Environment. Meta-analysis of scaling frameworks within the health sector (Milat et al, 2015) yields a meta-framework with similar areas of overlap as well as additional points for consideration, including active engagement of a range of implementers and the target community, the use of participatory approaches and the systematic use of evidence.

One of the main challenges to scaling, including the use of ICT to enable scaling is financial sustainability, including moving from the piloting stage (typically funded by international agencies) to a financially sustainable model (World Bank, 2016; Nakasone et al, 2014; Danes et al 2014). Farmers may not be willing to pay for information over the medium-long term (Batchelor et al, 2014). Many mobile-

based agricultural information services have experienced low subscription rates in rural areas (GSMA/Frog, 2015). The World Bank's 2012 study, the Transformational Use of Information and Communication Technologies in Africa, offers a useful starting point: "By increasing the scale at which knowledge and new techniques can be applied, and by reducing transaction costs, ICTs help to create sustainable business models."

The experience of Farm Radio Trust (FRT) and Farm Radio International (FRI) in sub-Saharan Africa points to the use of radio and in particular the use of radio in combination with mobile phones and other ICT such as audience mapping and interactive voice response as transformative in the space of communication for agriculture, health and other development objectives (Perkins et al, 2011; Farm Radio Trust, 2013). Of greatest significance are the potential of interactive radio to attract high percentages of potential audiences as regular program users, the likelihood that regular listening contributes to increased knowledge), and that radio PLUS use of interactive ICT results in increased application (20 or more percent), of featured solutions (FRI, 2016; Hampson et al, 2016; Rao, 2015; FRT, 2016).

2.2 Under-researched aspects of scaling, ICT and gender

Many factors affect the scalability of solutions. Several frameworks, and strategies used (as mentioned above) tend to focus on one aspect of scale, while overlooking others. The use of ICT to reach large numbers of citizens and other value chain actors and engagement in gender equality throughout the scaling process are key gaps that are not adequately address in current frameworks and to which this project aims to contribute.

Few studies have systematically and rigorously assessed the impacts of ICT projects, services, products or tools for agricultural development (Baumuller, 2015; DFID, 2013). It is generally recognized, that success rates for ICT for development projects in general are mixed, including those projects targeting the agricultural sector (Mambaa & Isabiryea, 2015). This is despite widespread interest amongst farmers in mobile technologies. Mittal et al (2010) noted that Indian farmers indicated preferences for information categorized by the researchers as 'know-how' (e.g. which crops to plant and which seed varieties to use), 'contextual information' (e.g. weather information, locale-specific farm practices), and market information. In particular, smallholder farmers expressed demand for weather, plant protection (disease/pest control), seed information and market prices (Mittal et al, 2010).

ICT studies often focus on technical aspects or the tools themselves rather than the information and knowledge that is being exchanged, how it is exchanged or the communication channels that ICT opens up between different actors. A useful approach in examining ICTs role in scaling is breaking down each component to study the particular aspects that are relevant to scale.

2.3 Directions for study

Scaling up an innovation raises questions such as: What are the most efficient, sustainable and effective strategies to reach and impact the most people possible over the long term or projected lifetime of your product/service? How and to what extent can ICT be effective elements of these strategies? This project will also aim to examine the more process-oriented aspects of scale that are often under-researched, and yet are key components to achieving intended outcomes at varying stages of the scaling process. These include strategies and tools used in collaborative projects; institutional arrangements and governances; monitoring and evaluation tools and adaptive measures that respond to changes resulting from scaling processes, products and outcomes.

Overall, there are gaps in the current research around scale and the potential for ICT to facilitate processes of scaling. By examining the particular components of ICT, and studying current and past applications of ICT for scale, this project will help to develop a gender-responsive framework through which to further consider the organization and operational factors that are conducive to using ICTs for scale and that can strengthen policy processes that support proven solutions.

3 Research Problem and Justification

Given the strong resonance of scale and scalability terminology to engineering and information technology in particular, the applicability of ICT to scaling might seem straightforward; however, a review of the literature suggests further investigation is needed. For example, research-based solutions—for example in the area of agricultural and development practice, policy and systems—often achieve limited uptake by the groups, institutions, and individuals for whom the innovations or practices were developed or intended (Brand et al, 2015; Milat et al, 2015).

Also, current and recent efforts aimed in scaling solutions often fall short of their intended impact, due in part to prioritizing certain aspects of the scaling process

over others. Some projects focus on distribution, or just on the innovation without recognizing the importance of engaging key actors—government, NGOs, private sector entities, community groups, etc. Some solutions are not fit for scale due to other factors (resource flow such as availability of inputs, lack of loans or financing for farmers and other producers, logistics in getting products/crops to market, other varying contexts, etc.)

Gender equality dimensions of agriculture and food security are often omitted from discussions of scale. The changing roles, labor and time investments and decision-making within processes of scaling-up are rarely considered when planning, designing, planning and implementing solutions for scale (Farm Radio International, 2016). As a result, investments made by development agencies do not generally account for the varying gendered dimensions at certain levels of the scaling process.

Lastly, there is no clear understanding of appropriate techniques and strategies to scale (Gillespie et al, 2015), including the role and contributions of ICT in the scaling process, the factors for success in applying ICT and the specifics of the rural African context for scaling.

Thus, in order to understand how ICT can best be integrated into agricultural and rural development programs and projects for solutions at scale, the overall project will develop and test a theoretical framework for analyzing and presenting ICT for scale initiatives. The need to transform agriculture as enshrined in the National Agriculture Policy (NAP) and Malawi Development Growth Strategy III (MDGS III) necessitates such a study and the findings thereof will benefit Malawi to identify options of scaling up agricultural technology adoption.

Study Context

As already indicated, it is envisaged that this study will be conducted in an already existing scaling up initiative. Currently, FRT is working with The Feed the Future (FtF) Malawi Agricultural Diversification activity (Ag Diversification), as a sub-grantee to scale up various agricultural innovations that link to agriculture, income and nutrition outcomes.

The Agricultural Diversification Activity, which is a five-year project, commenced in 2016. It targets promotion of technologies with the legume (including but not limited to groundnut and soybean) and orange-fleshed sweet potato (OFSP) value chains with options of subtracting or adding value chains over time.

The project is working in the eight districts comprising Malawi's Feed the Future Zone of Influence (ZoI): Mchinji, Lilongwe Rural, Dedza, Ntcheu, Balaka, Machinga, Blantyre Rural, and Mangochi. These districts are some of the highest producers of legumes and sweet potato, yet they suffer from a poverty rate of 65 percent, which is well above the national rate including highest prevalence rates for under nutrition, with stunting of children under five alarmingly high at 48 percent.

Palladium International is the prime-lead agency under the Agricultural Diversification activity, and has subcontracted FRT to provide effective ICT based extension and advisory services on the various value chains through radio, SMS and the farmers call center to support the Agricultural Diversification activities. The main aim of these campaigns is to ensure widespread adoption of the agricultural messages and technologies under these thematic areas. FRT will also be working with Palladium for the next five years.

It is envisaged that this project would be a good opportunity to test and assess the combinations of ICTs, actors and institutional arrangements that are most effective and efficient in scaling agricultural solutions in Malawi. Specifically, it is planned to isolate the scaling up of the use of inoculant. Inoculation is a process of adding effective bacteria to the host plant seed before panting with the purpose of ensuring that there is enough of correct type of bacteria present in the soil for a successful establishment of legumes-bacterial symbiosis. Inoculation is a significant technology for the manipulation of Rhizobia, nitrogen –fixing soil bacteria, for improving crop productivity and soil fertility through N2- fixation. The use of inoculants containing rhizobia, is a proven biotechnology of enhancing legume production such as soybean, Based on the relatively inexpensive cost of inoculants and the high cost of nitrogen fertilizers, the addition of inoculants to legumes species is a wise investment in crop management.

3.1 Study Sites/locations

Based on the locations of the Feed the Future Agricultural Diversification, it is anticipated that the intervention research will be conducted in a district in Malawi preferably outside the FtF immediate zones of influence; this is because the districts are major legume growing areas. Thus, the district that will be selected for the intervention research is Mchinji, where the Mudzi Wathu Community Radio will be involved as a partner. The district of Kasungu will also be included in the study for comparative purposes as it is not reached by the

Mudzi Wathu Community Radio. It is anticipated that the two districts will have quite a low awareness of inoculants within which allow us to test our theory regarding the impact of the ICT-based interventions. An important objective of the baseline study will be to examine the extent to which the two districts are comparable in terms of socio-demographic characteristics and access/utilization of inoculants.

3.2 Study Participants

The study will involve participants at two levels. Firstly, the staff involved in FtF-FRT project implementation will be consulted in order to obtain a good overview of the FtF project implementation processes during the situation analysis and baseline study. This will include understanding the awareness of local communities of the inoculant. This is because studies have previously been conducted by the FtF Team on the drivers and barriers to adoption of inoculant. Secondly, the community members will also be consulted in order to assess appropriate ICT strategies that could be used to scale up the technology.

4 Preliminary results of the baseline

This report presents preliminary results of the baseline study in October. A more detailed report with rigorous analysis and in combination with data from Focus Group Discussions FGDs) and key informant interviews will be submitted once the data is fully cleaned and analysed.

The sample is 693 respondents and distributed 354 and 339 between Mchinji and Kasungu, respectively. There are 299 male respondents and 394 female respondents. The female respondents are distributed equally between Mchinji and Kasungu whereas there are slightly more male respondents in Mchinji than in Kasungu (See table 1 and graphically Figure 1). The Figures that follow are in percentages and the absolute numbers are as presented here.

Table 1: Distribution of the sample by sex and district

District	Sex of respondent		Total
	Male	Female	
Mchinji	158	196	354
Kasungu	141	198	339

Total	299	394	693

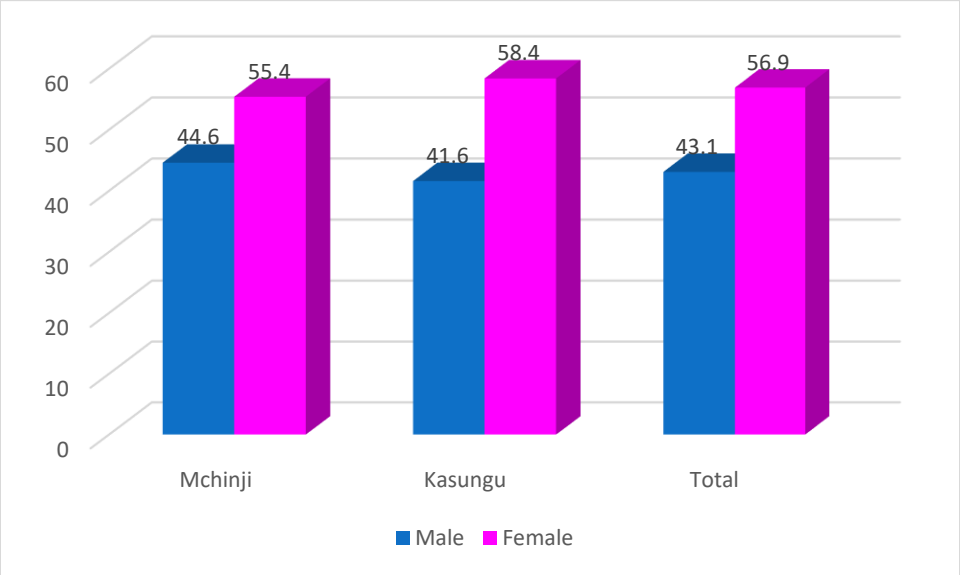

Figure 1: Percent distribution of respondents by district

As would be expected, the population is young with 55% younger than 36 years of age; 31% is between 35 and 55 years of age and 14% is 55 years and older (See Figure 2).

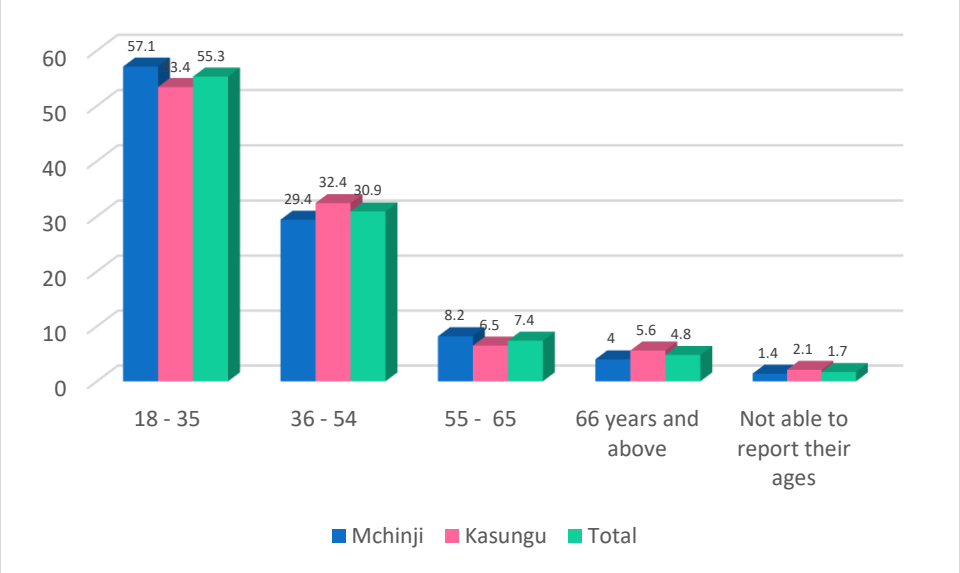

Figure 2: Percent of respondents by age and district (Mchinji N=354 and Kasungu N=339)

The distribution is the same even when age is cross-tabulated by sex (See Figure 3).

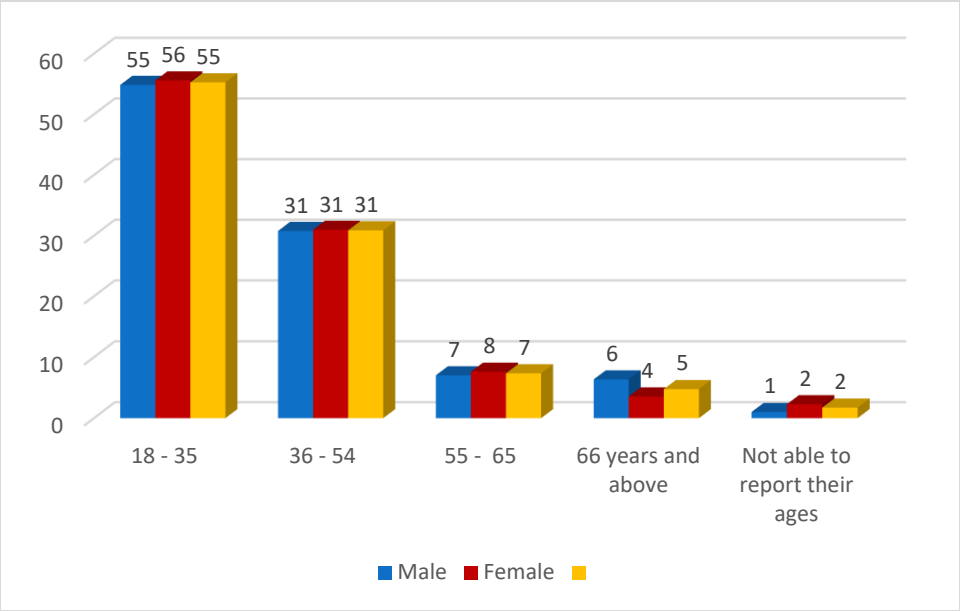

Figure 3: Percent of respondents by age and district (Male N=299 and Female N=394)

In terms of education of the respondents, a large majority (68%) did primary school only. There are slightly more females (71%) who reported to have attended primary school than males (64%). This is expected as more girls enrol in school than boys but later drop out. This is why in secondary school there are significantly more males (28%) who attended than females (9%) See Figure 4).

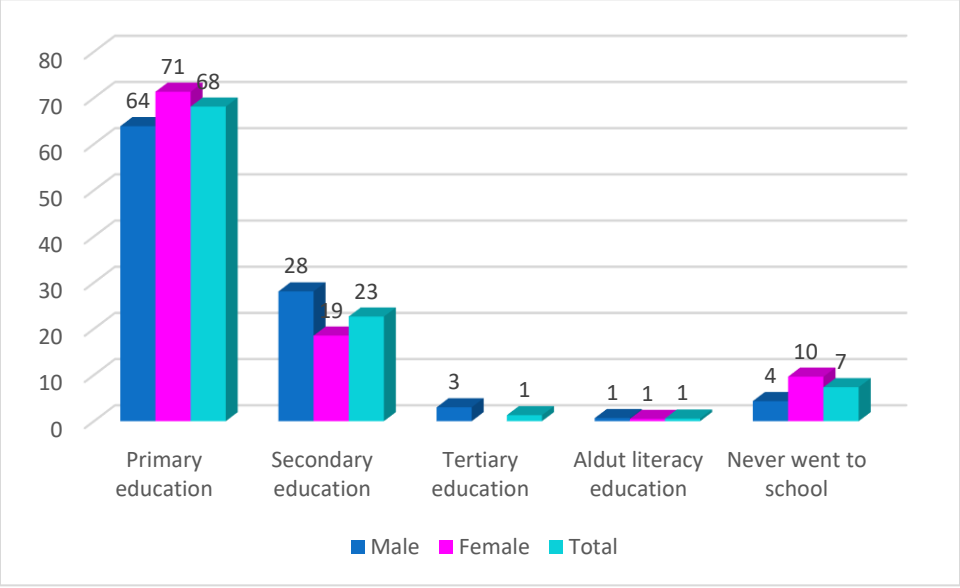

Figure 4: Education level of respondents by sex

The number of respondents who reported to have attended primary school are significantly more in Kasungu (71%) compared to Mchinji (65%). But this difference virtually disappears when they reach secondary school (See Figure 5).

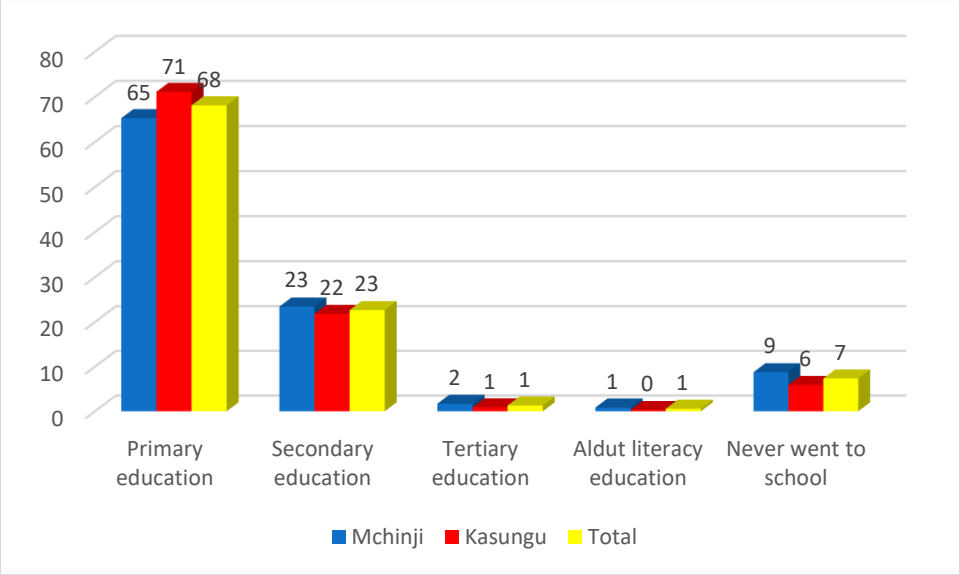

Figure 5: Education level of respondents by district

As we say in Malawi, the backbone of the economy is agriculture. The main economic activity of the respondents is selling farm produce. This represents 80% of the respondents and the is virtually no difference between the two districts (See Figure 6).

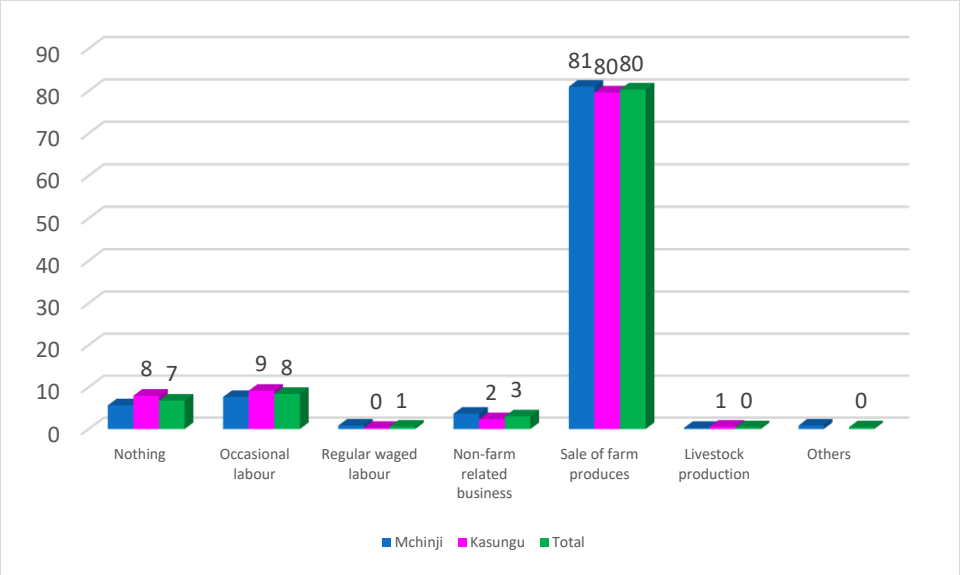

Figure 6: Main economic activities of the respondents by district (%).

Figure 7 shows the results of cross-tabulation of economic activity by sex. Again, it is found that a large majority (80%) of the female respondents rely on sales of farm produce.

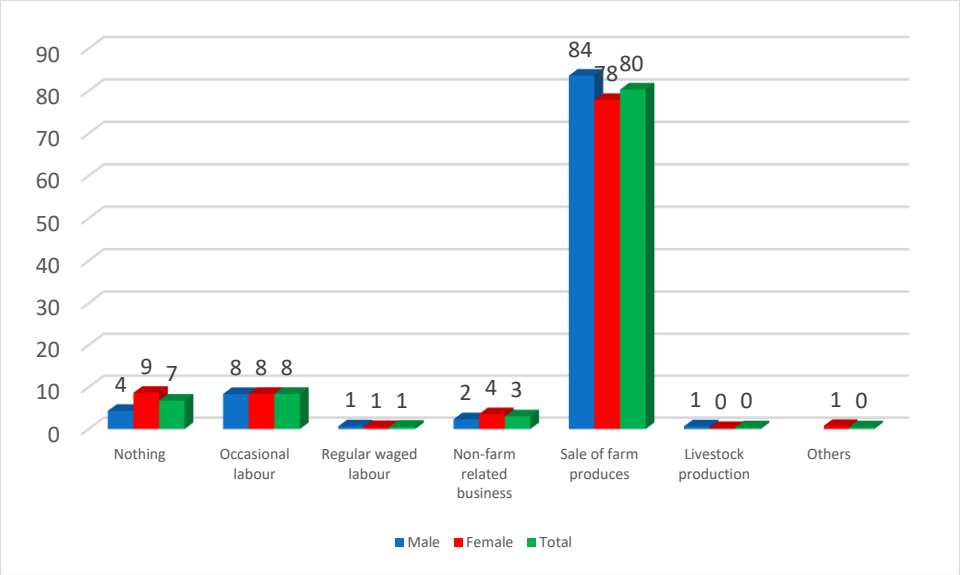

Figure 7: Main economic activities of the respondents by sex (%).

Land ownership is a critical asset for many people in Malawi. In this baseline, a significant minority of the respondents are landless (13%). This is slightly more among the female respondents (14%) than it is for the male respondents (11%) (See Figure 8). The extent of landlessness is a surprise for these two districts but it

could be that the sample includes a good population of tenants since these two districts have many large scale farms that use tenant labour.

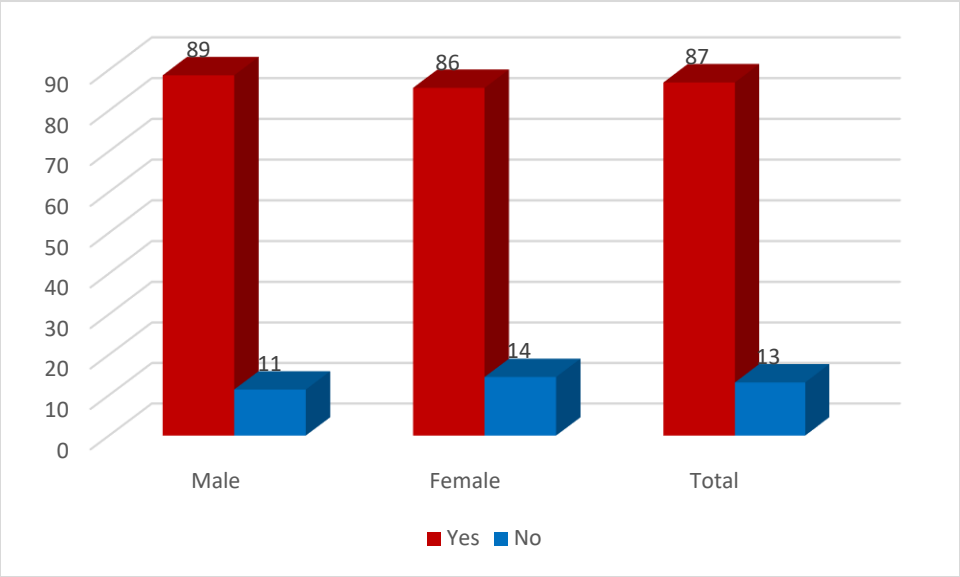

Figure 8: Land ownership by sex of respondent

A large majority of the respondents (75%) have between 0 and 4 acres of land and this is comparable to the national figures. Forty-five percent of these have holding of between 1-2 acres. The interesting find is that there are more females in each landholding category than males except for the category of five acres and more (See Figure 9). This may suggest that women dominate the subsistent farming as men dominate the commercial farming.

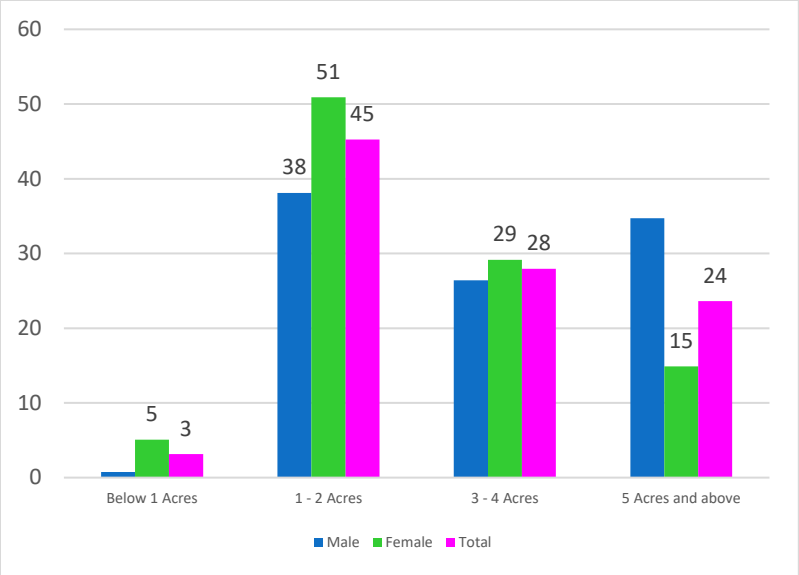

Figure 9: Land holding size by sex of respondent

The landholding sizes do not differ between the two districts (See Figure 10).

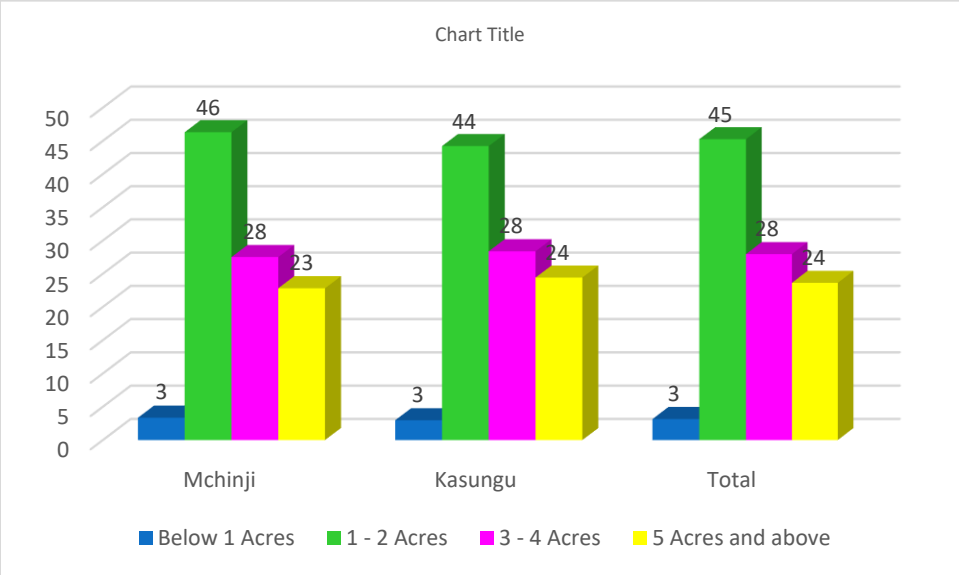

Figure 10: Land holding size by district of respondent

The dominant source of agriculture information is the extension worker mentioned by 55% of the respondents (See Figure 11). The second source is mobile phone followed by radio. This means that there is potential to use the combination of radio and mobile phone. However, the dominance of the extension worker suggests that for purposes of scaling up technologies, the extension worker still plays a crucial role. Furthermore, whereas the extension worker reaches both

female and male farmers equally, the majority of those who mentioned mobile phone as their source of agricultural information are male; 20% Vs. 5%.

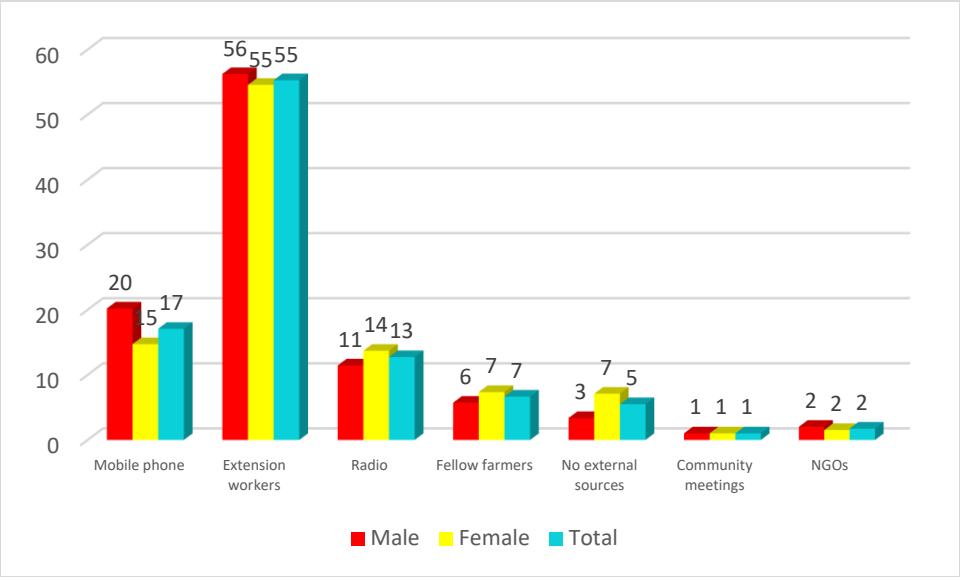

Figure 11: Main source of agriculture information by sex of respondent

Fewer respondents (50%) in Mchinji mentioned extension worker as a source of agricultural information compared to 60% in Kasungu. However, more respondents mentioned the mobile phone (21%) in Mchinji compared to 13% in Kasungu (See Figure 12). There is no immediate explanation for this difference.

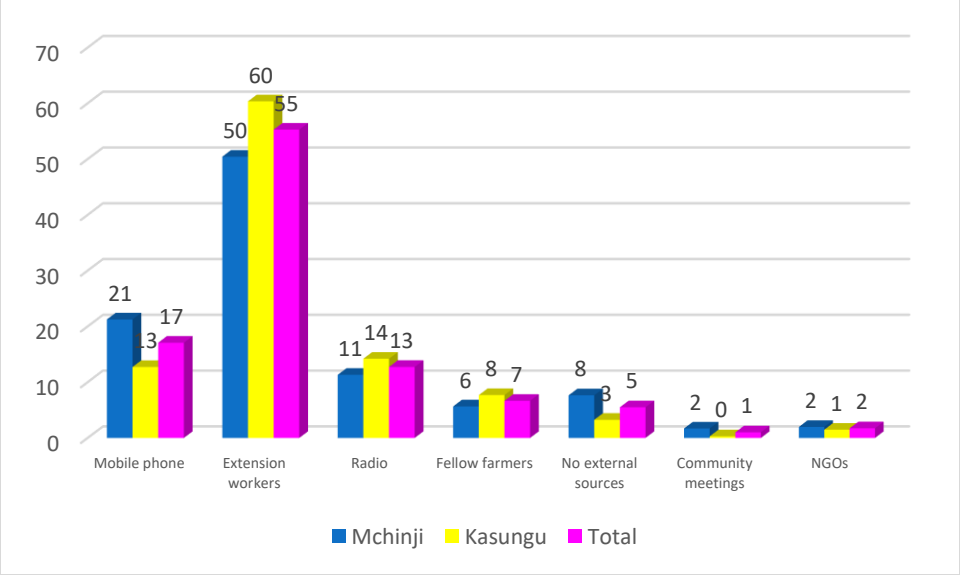

Figure 12: Main source of agriculture information by district of respondent

In terms of mobile phone ownership, the results show that 70% of the respondents in Mchinji have mobile phones compared to 59% in Kasungu (See Figure 13). This may partly explain the finding that more people in Mchinji mentioned mobile phone as source of information.

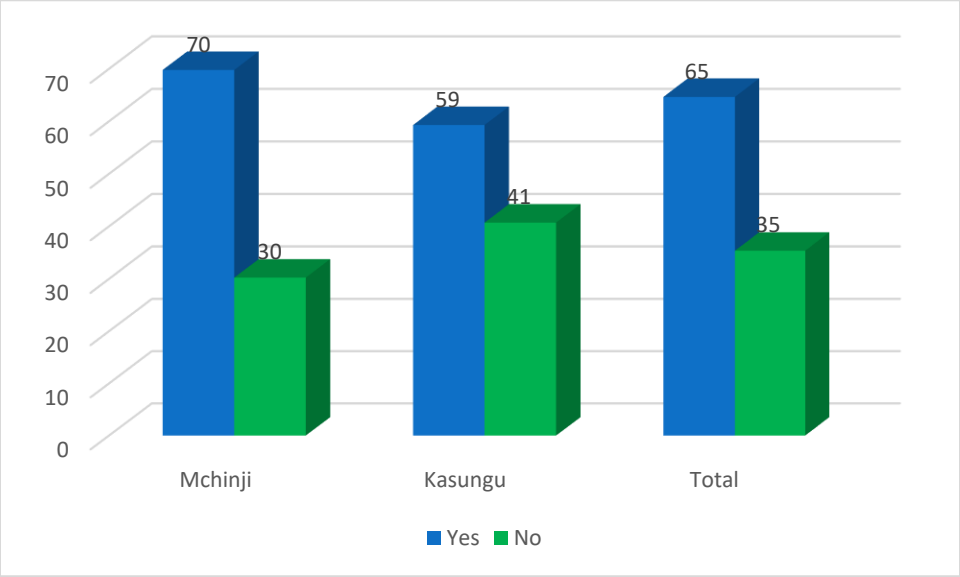

Figure 13: Percentage of mobile phone ownership and access by district

Figure 14 shows phone ownership by sex of the respondent. As may be observed, there is a significant difference in mobile phone ownership between men and women. Seventy-three percent of the males have mobile phones compared to 58% of the female respondents.

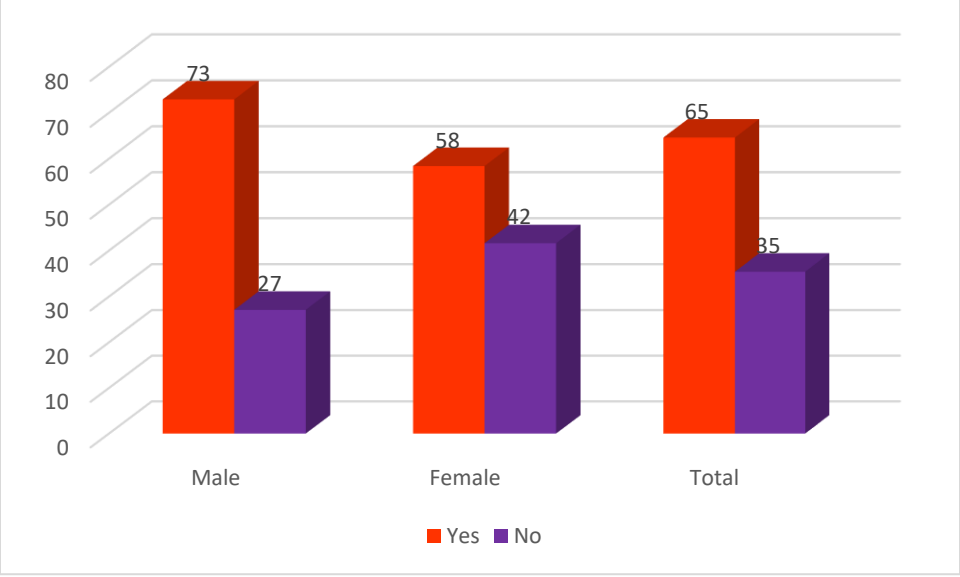

Figure 14: Percentage of mobile phone ownership and access by sex

Figure 15 shows the major legumes grown in the study area. As can be seen in the figure, the major legume crops are groundnuts and soya beans with groundnuts having a slight edge over soy beans and Kasungu having a slight edge over Mchinji. The third crop is beans but it is mentioned by a far much lower percentage of respondents than the other two crop signifying the subsistence nature of beans.

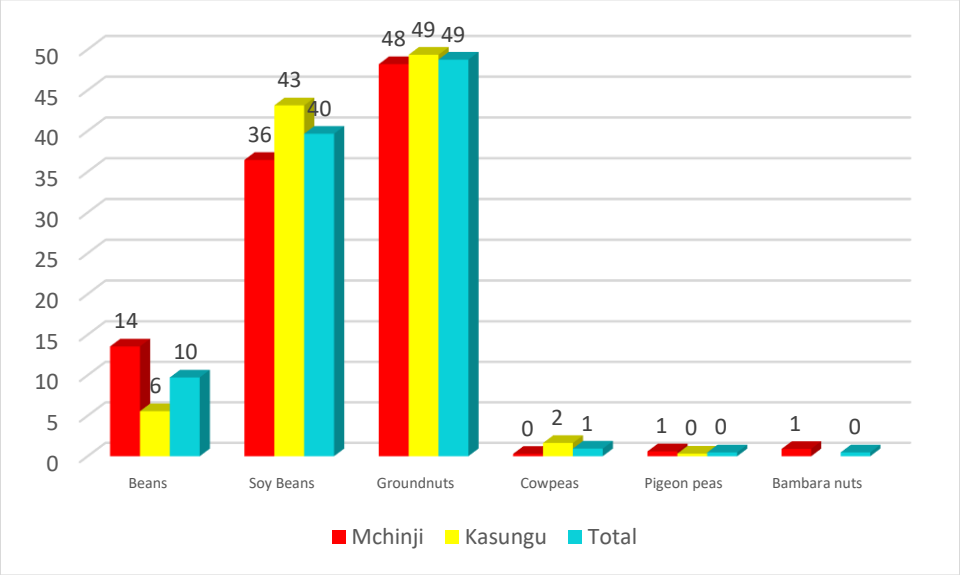

Figure 15: Legume crops grown by district

When the data is analysed by sex, it is found that more men (49%) grow soy bean than women (33%). In terms of groundnuts, slightly more women (53%) grow nuts than men (44%) (See Figure 16).

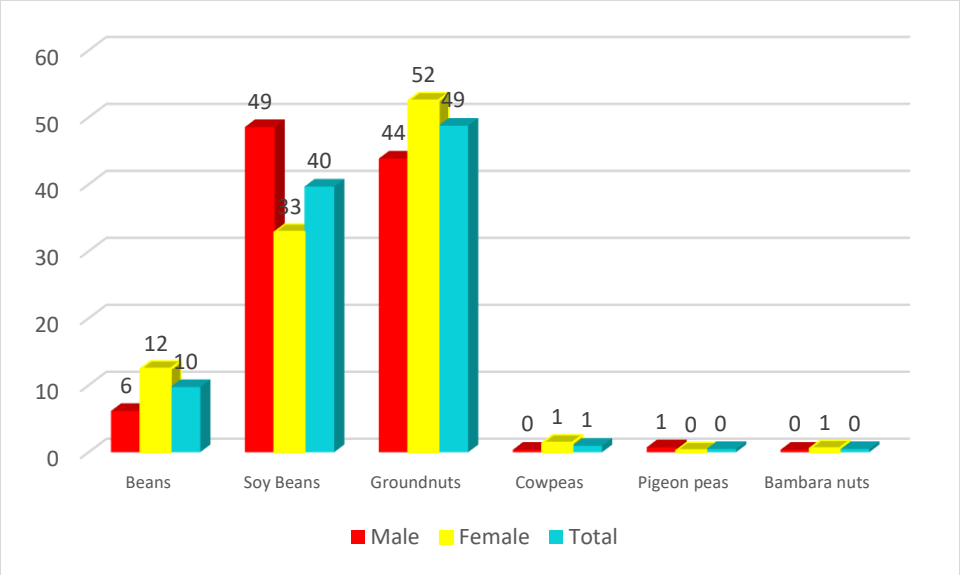

Figure 16: Legume crops grown by sex of respondent

The technology chosen to be scaled up in this study is inoculant. We asked the respondents to tell us where they get information about inoculant. Figure 17 shows the results of this question. As can be observed, the approximately 36% of the respondents get information from the extension worker, followed by radio (27%) and fellow farmers 20% (See Figure 17). The mobile phone is mentioned by an average of 3%. There are no significant differences between the districts.

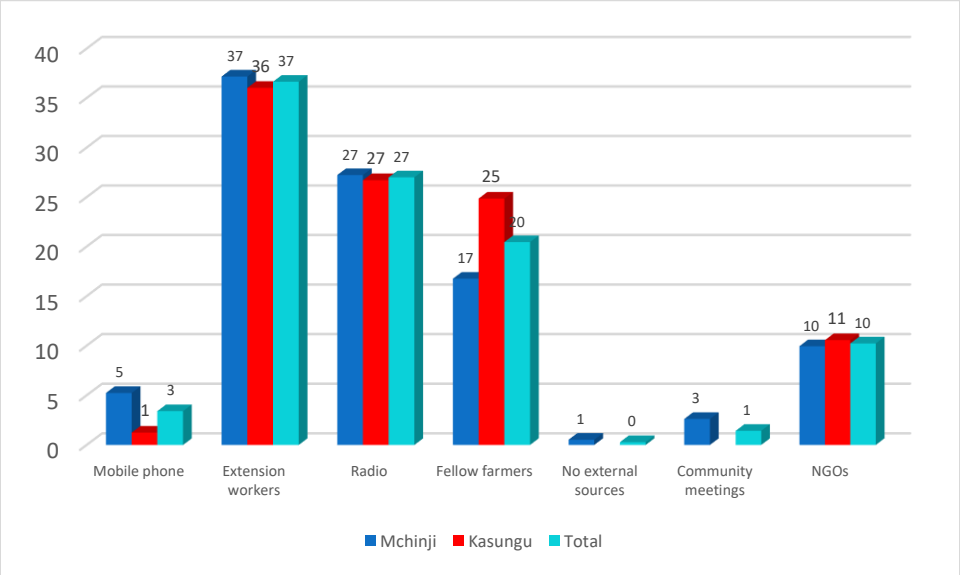

Figure 17: Sources of inoculant information by district (%)

The information was analysed by sex and there appears to be minor differences between male and female respondents (See figure 18).

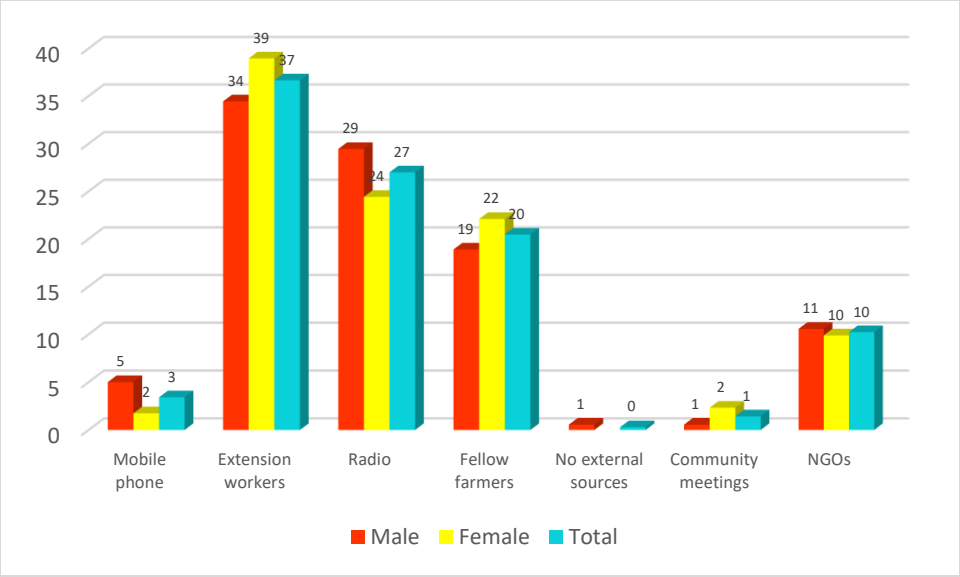

Figure 18: Sources of inoculant information by sex

Figure 19 shows more clearly the dominance of the radio as a source of information about inoculant. In both districts over 90% of the respondents receive information about inoculant from the radio.

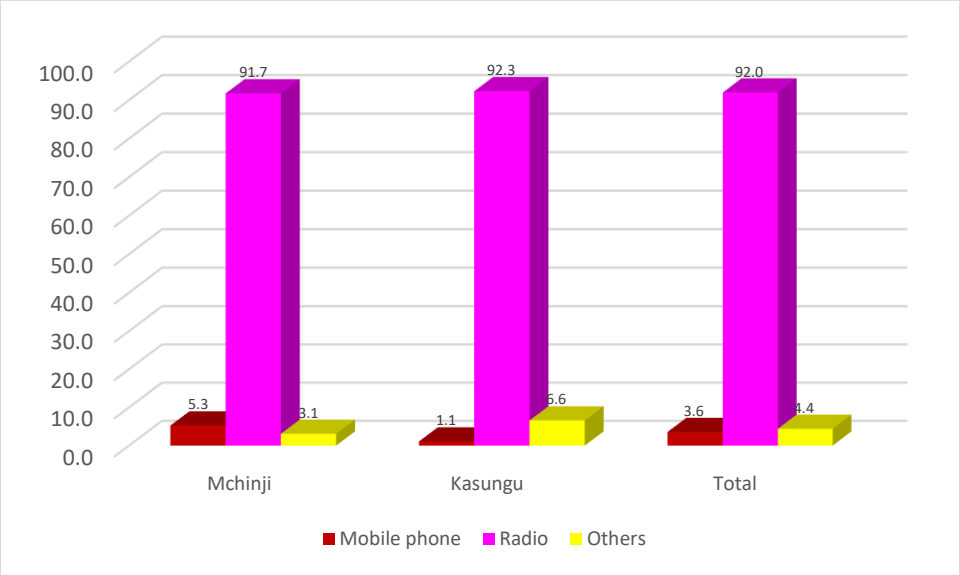

Figure 19: ICT used to receive info about Inoculant by district (%)

The situation is not different when ICT tech is cross-tabulated by sex. For both men and women, the most used ICT to receive information about inoculam is the radio.

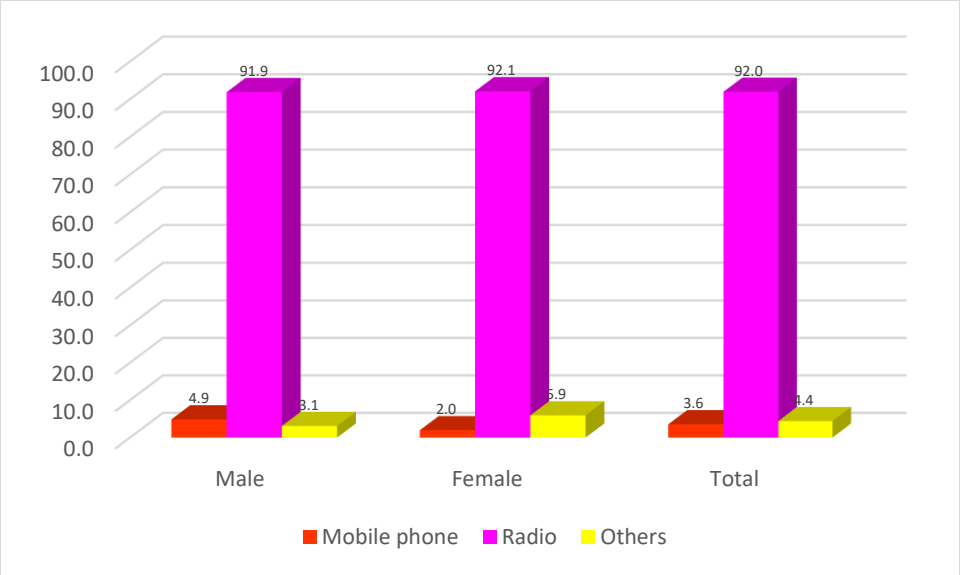

Figure 20: ICT used to receive info about Inoculant by sex (%)

We wanted to know what type of information people receive about inoculant. Figure 21 shows the results. There is a variety of messages people receive about inoculant and these include where to find it, how to use it, etc. (See Figure 21). There are no major difference between the two districts.

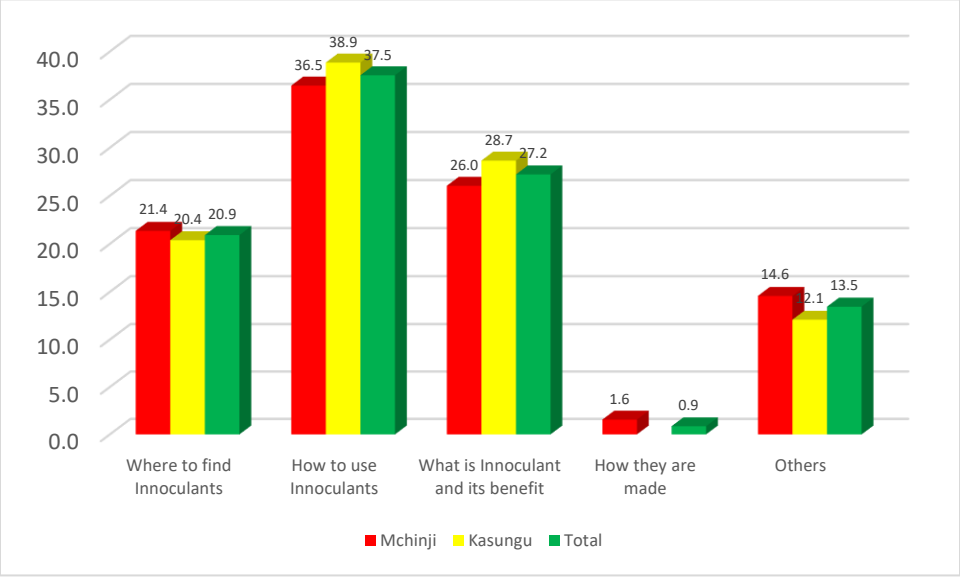

Figure 21: Information received about Inoculants by district (%)

The messages do not differ greatly between men and women (See Figure 22).

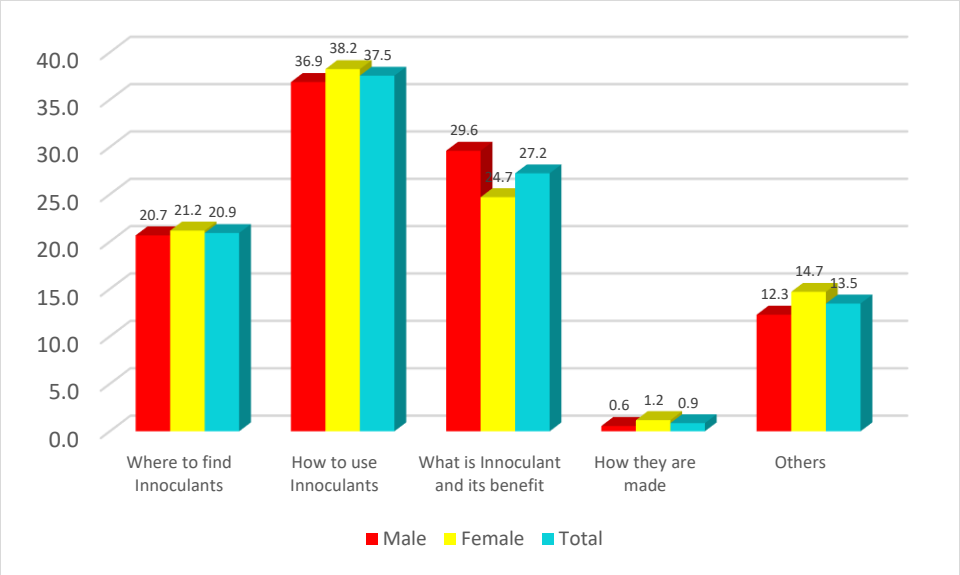

Figure 22: Information received about Inoculants by sex of respondent

Again the ICT based communication channels for receiving information about Inoculants is dominated by radio broadcasts (Figure 23). The mobile phone is also used but the percentage of respondent who use it are much lower compared to radio.

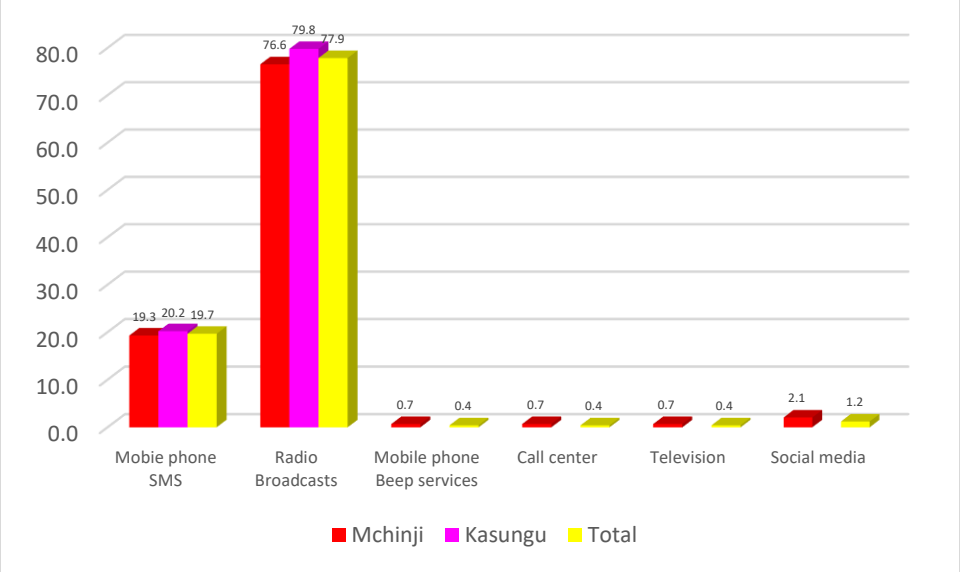

Figure 23: ICT based communication channels for receiving info about Inoculants by district (%)

Inoculant is a relatively new technology in Malawi; in particular to smallholder farmers. Figure 24 show that inoculant is used by 24% and 15% of farmers in Mchinji and Kasungu, respectively. Only 21% of the male respondents and 18% of the female use inoculant (Figure 25). The reason for low use of inoculant are given in

Figure 26 and include lack of knowledge, lack of money and inaccessibility among others. The reason given when inoculant non-use is cross-tabulated by sex are not significantly different between men and women (Figure 27).

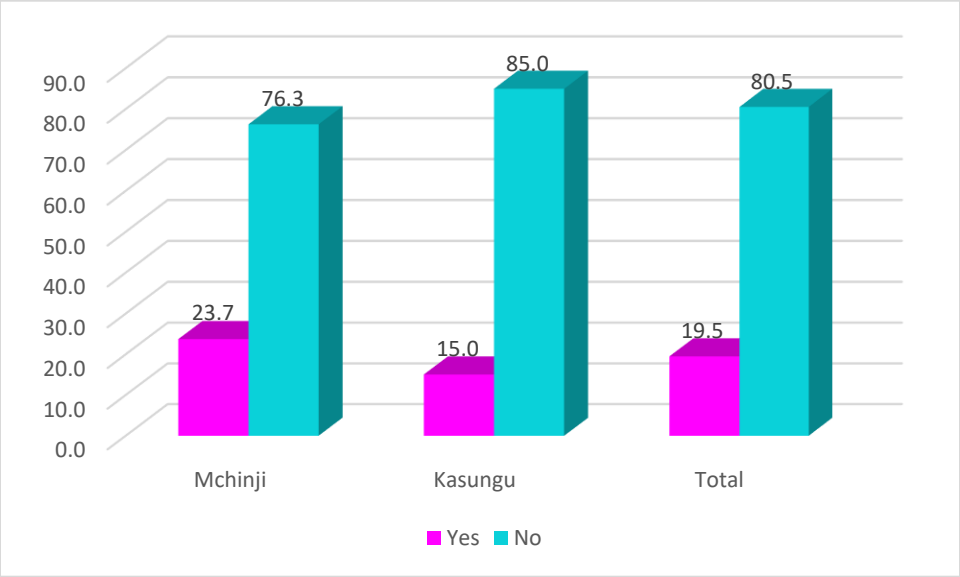

Figure 24: Inoculant use by district (%)

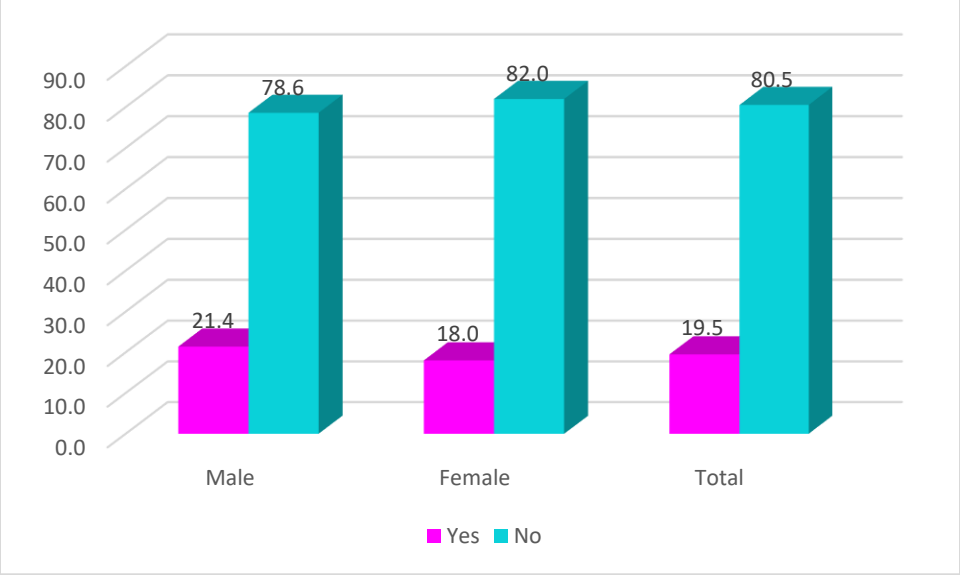

Figure 25: Inoculant use by sex of respondent (%)

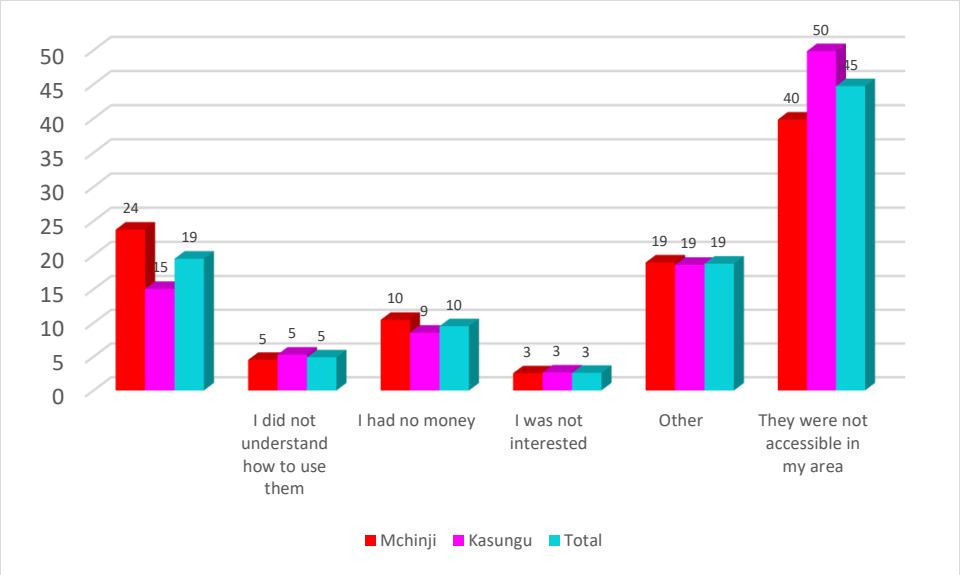

Figure 26: Reasons for not using inoculant by district (%)

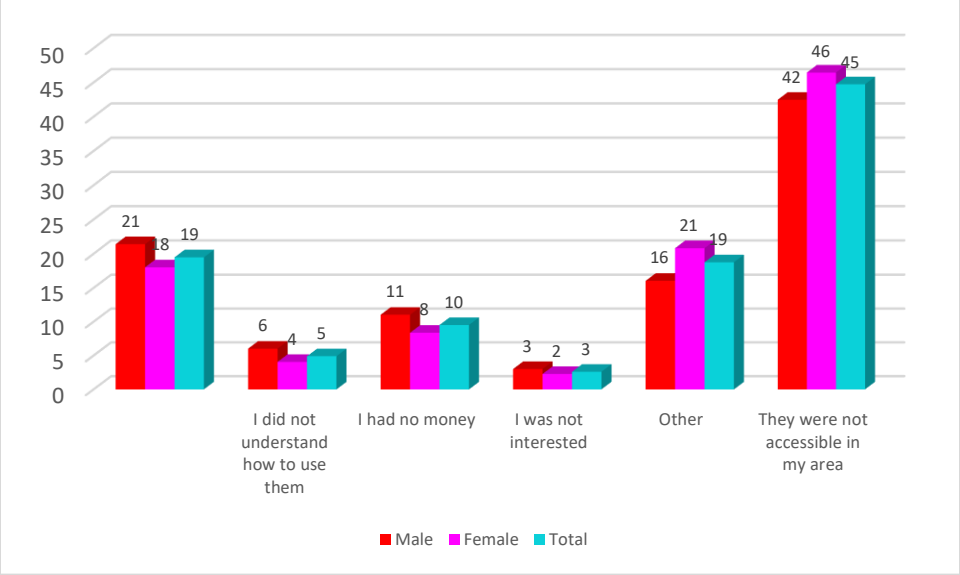

Figure 27: Reasons for not using inoculant by sex (%)

The main sources of motivation for using inoculant are curiosity, need to increase yields and being encouraged by friends (Figure 28). While the sources of motivation are the same between female and male respondents, there significant differences in the ratios of female and male respondents (Figure 29).

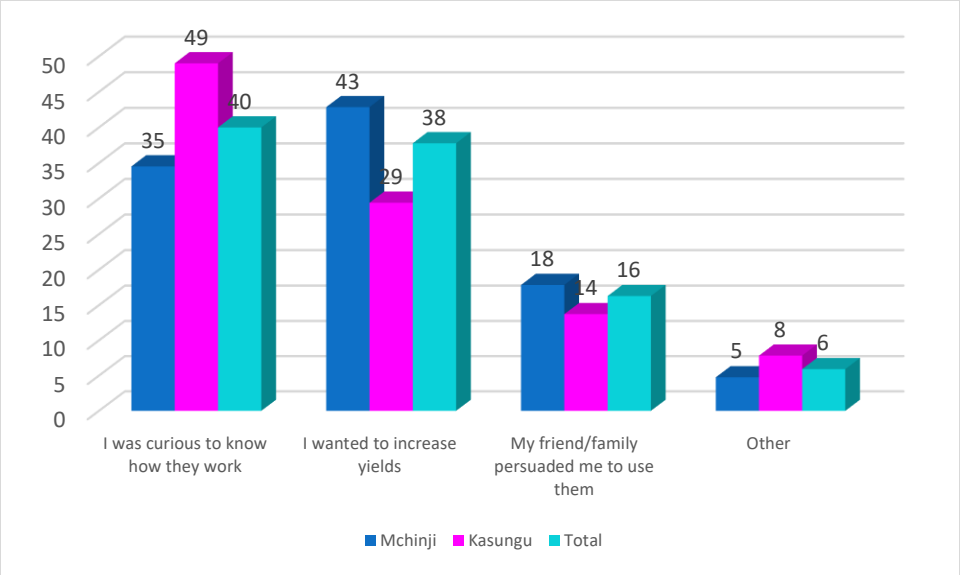

Figure 28: Source of motivation for using inoculant by district (%)

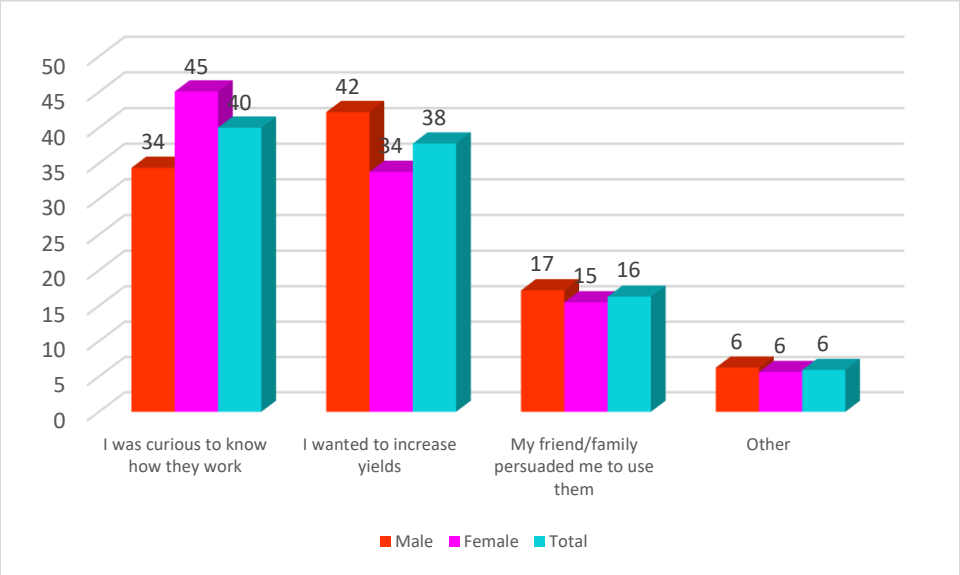

Figure 29: Source of motivation for using inoculant by sex (%)

We analysed the data in terms of use of inoculant in groundnuts by male and female respondents. Less than 2% of both male and male respondents used inoculant in groundnuts. The figures are not different in the two districts but it is notable that while about 3% use inoculant in groundnuts in Mchinji, none use it in Kasungu.

An attempt was made to find out if there was a difference in yields before and after using the inoculant. However, due to the small numbers of respondents using inoculant in groundnuts the results are not reliable.

In terms of use of inoculant in soybeans, overall about 18% use it. There are slightly more male than female respondents who use (Table 2). This is not surprising because, as we found earlier, more males grow soybeans than females. However, for the time being, it is not possible to discuss the before and after effect of inoculant in soybeans until the data is cleaned further.

Table 2: Use of inoculant by sex of respondent

Response	Gender of respondents		Total
	Male	Female	
Yes	19.7	16.0	17.6
No	80.3	84.0	82.4
	100.0	100.0	100.0

In preparation for the intervention research, a question was put to the respondents to tell us the type of information they need about inoculant. The results are shown in Figure 30. The majority (60%) of the respondents want information on where to find the inoculant. There is no difference between the districts. Another 20% would like information on how to use the inoculant and there is a significant minority (11%) who still do not know what inoculant is and would like this type of information. These trends are not different when you cross-tab by sex of respondent (See Figure 31).

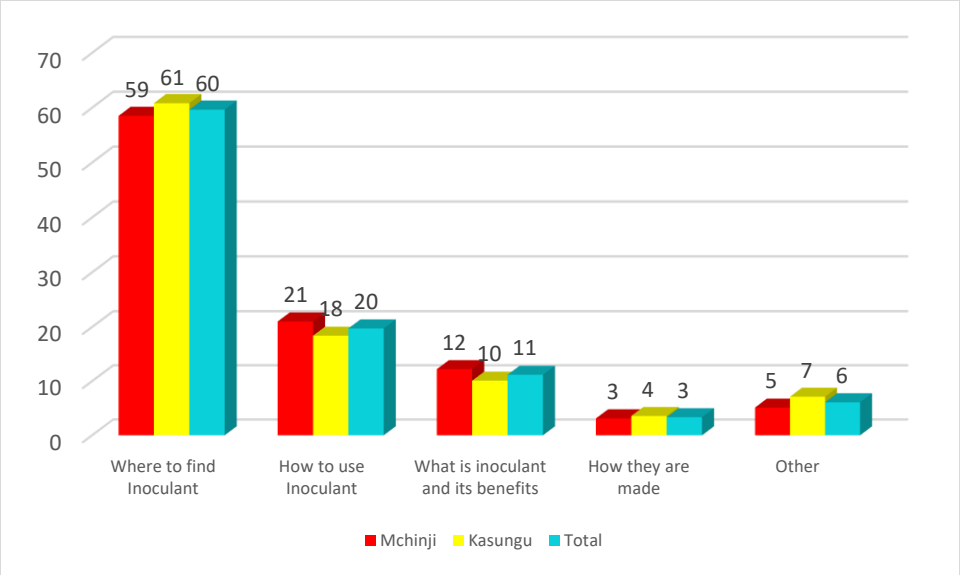

Figure 30: Information about Inoculant needed by farmers by district (%)

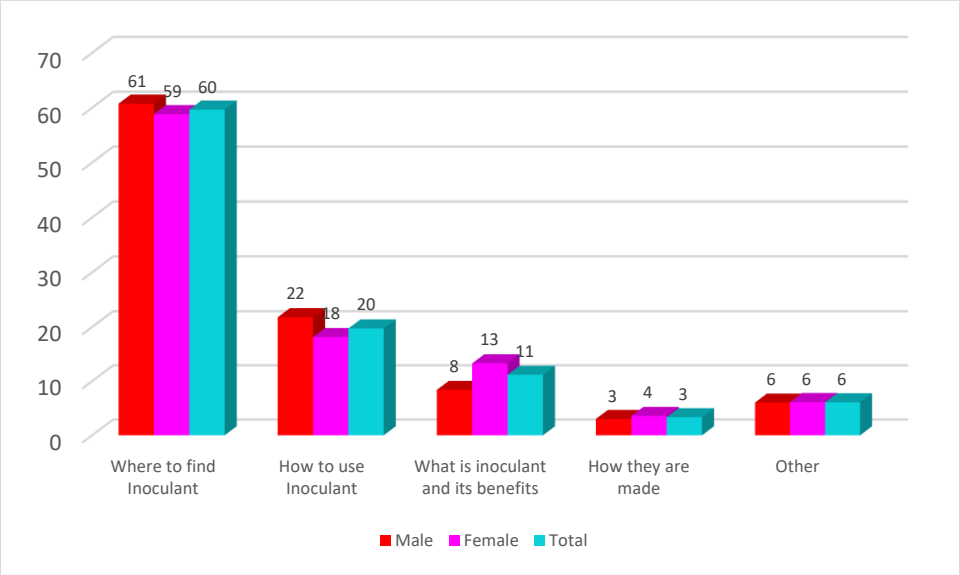

Figure 31: Information about Inoculant needed by farmers by sex (%)

When asked what communication channel they want like for receiving inoculant information, they chose the mobile phone and extension worker. This suggests that a combination of mobile phone and extension worker may be a good combination for scaling up technology. Nonetheless, radio is still mentions but by a very small minority (8%) (Figure 32). These figure are consistent even when you cross-tab by sex of the respondent (See Figure 33).

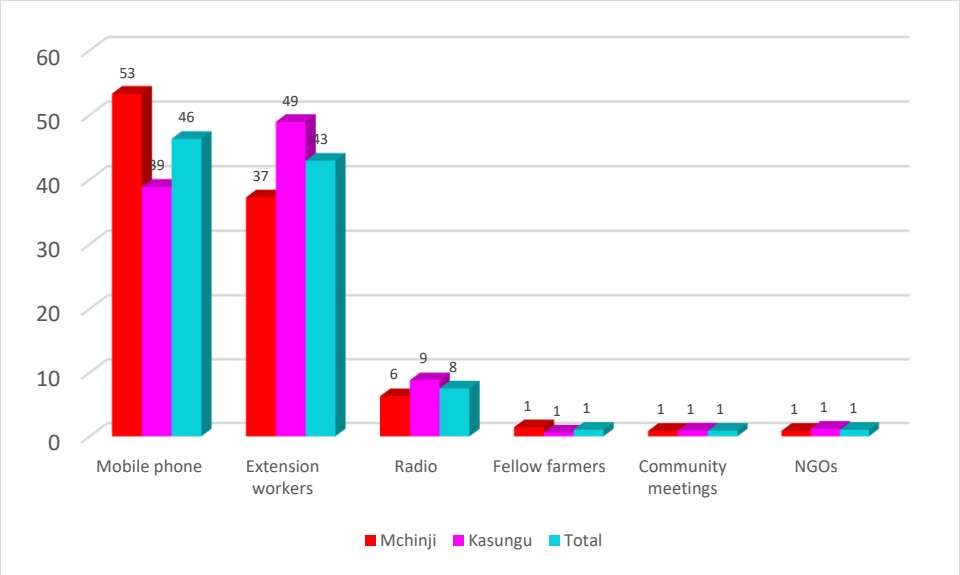

Figure 32: Preferred ways of receiving info about inoculant by district (%)

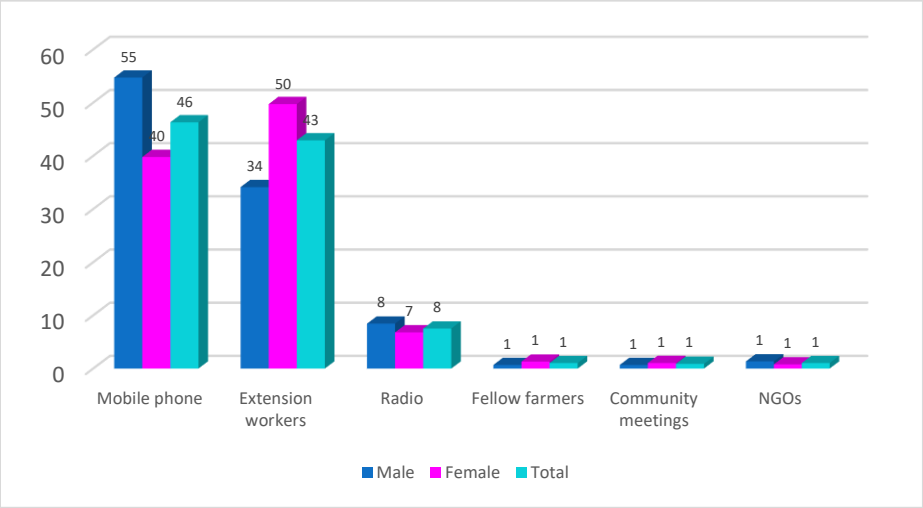

Figure 33: Preferred ways of receiving info about inoculant by sex (%)

The information above was confirmed when the respondents were asked the top three ICTs that they thought would be easy for accessing information, a majority (54%) mentioned mobile phone. There no significant difference between male and female respondents. Radio comes second and TY is virtually absent. However, there is a slight difference when cross-tabulated by district. More respondents in both Mchinji and Kasungu mentioned radio as easier; 56% and 63% respectively. The data has to be analysed further to figure out why this difference.

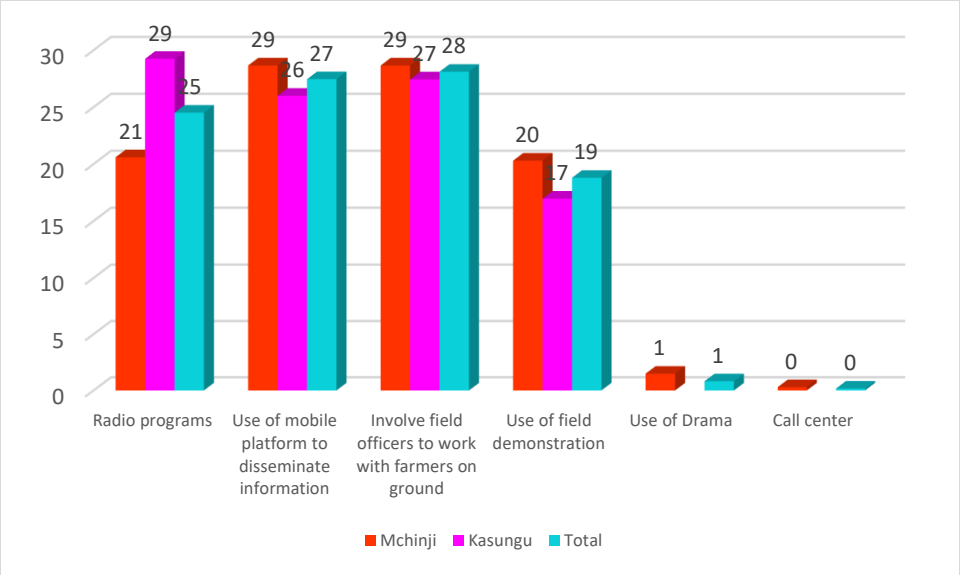

Figure 34: Suggested design of inoculant information for maximum impact by district (%)

Respondents were asked to suggest the kind of design of inoculant information for maximum impact. The results are shown in Figures 34 and 35. As can be observed in both figures, the respondents appear to be suggesting a combination of radio broadcasts, mobile phones, extension workers to work with farmers on the ground, and/or use of field demonstrations. The message is generally the same whether one analyses the data by district or by sex of respondent. The only difference is in terms of emphasis between male and female respondents.

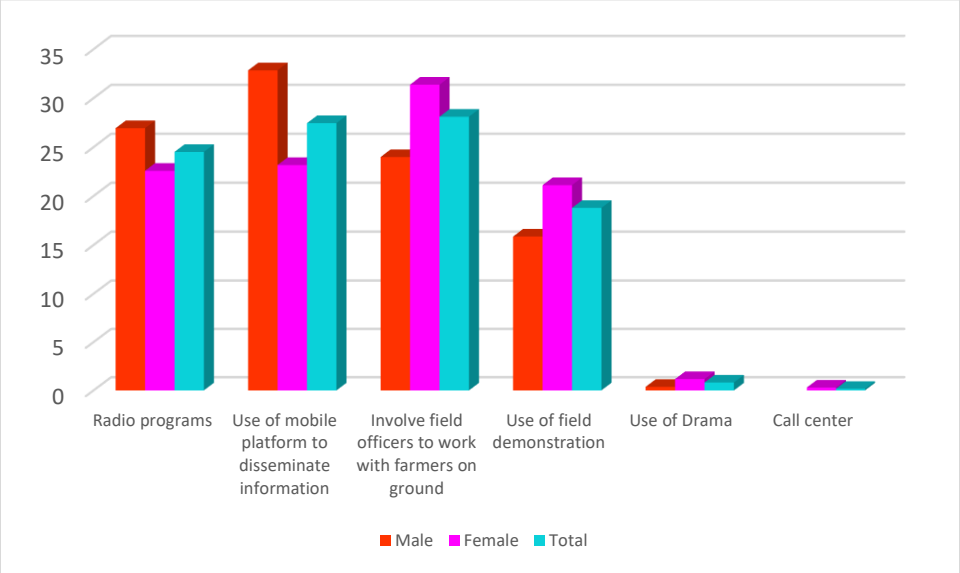

Figure 35: Suggested design of inoculant information for maximum impact by sex (%)

From the point of view of institutional support, a minority (12%) received support. The percentage is the same whether data is cross-tabulated by district or by sex of respondent. Hence institutional support is one area that may deserve investment.

For those that received support from institutions, the majority (65%) received support through demonstration on how to use the inoculant. Other support included free inoculant (18%), provision of inoculant on credit and provision of loans to buy inoculant. It appears that the support was similar between districts and between male and female respondents (See Figures 36 and 37).

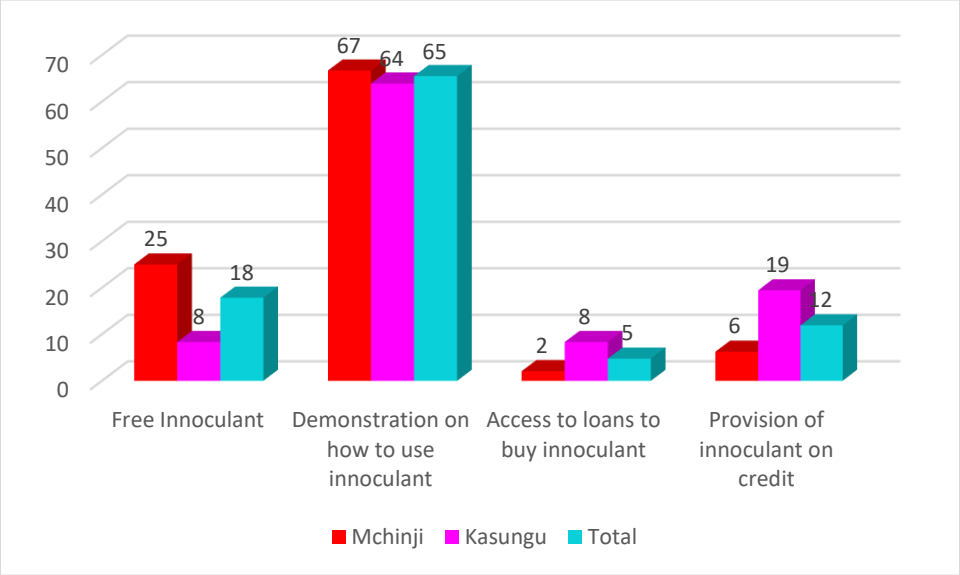

Figure 36: Support received from institutions by district (%)

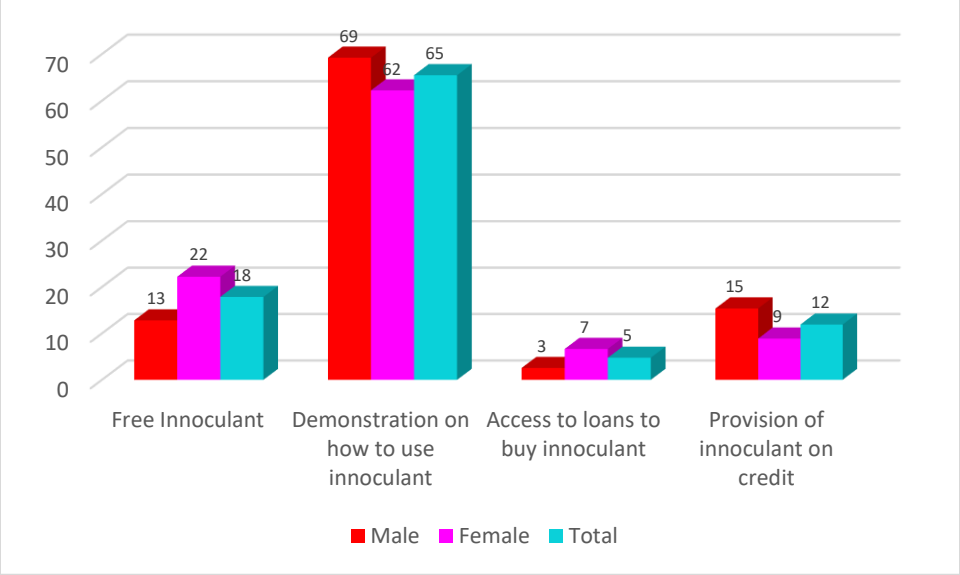

Figure 37: Support received from institutions by sex (%)

Respondents were asked the type of support they would like to get on inoculant use. Figures 38 and 39 give the results of the analysis of the data. As may be observed, the most popular response demonstrations on how to use inoculant. This is indicated by 38% of the respondents. The second response is free distribution of inoculant (28%); followed by provision of inoculant on credit. The pattern of the responses is very much similar between districts and between male and female respondents.

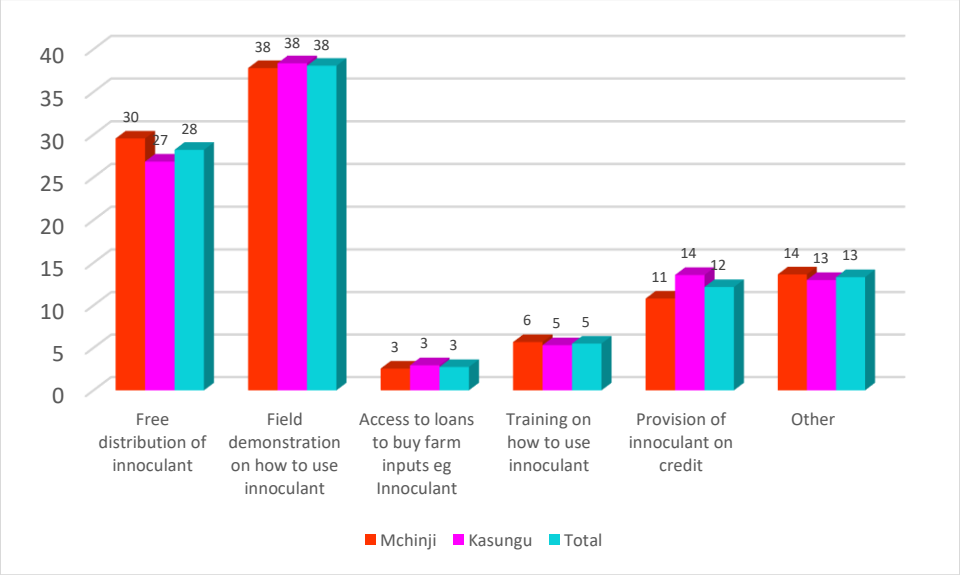

Figure 38: Type of support farmers want by district (%)

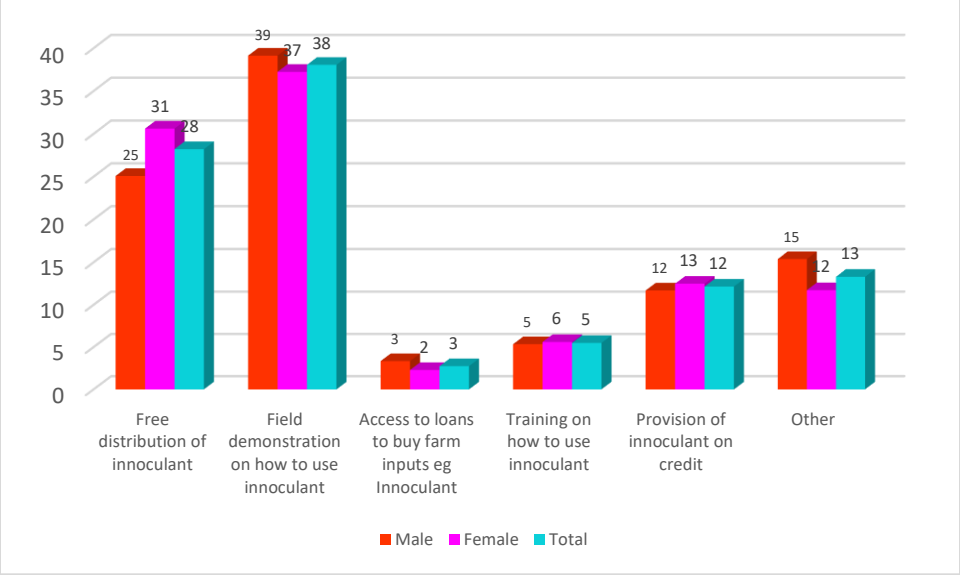

Figure 39: Type of support farmers want by sex (%)

5 Preliminary conclusions

Accepting that the data needs further cleaning and analysis, some preliminary conclusions can still be drawn as follows:

i) The population is young with 55% younger than 36 years of age; 31% is between 35 and 55 years of age;
ii) More men (49%) grow soy bean than women (33%);
iii) The major legume crops are groundnuts and soya beans with groundnuts having a slight edge over soy beans and Kasungu having a slight edge over Mchinji;
iv) there is a significant difference in mobile phone ownership between men and women. Seventy-three percent of the males have mobile phones compared to 58% of the female respondents;
v) In terms of education of the respondents, a large majority (68%) did primary school only;
vi) The main economic activity of the respondents is selling farm produce
vii) In this baseline, a significant minority of the respondents are landless (13%);
viii) A large majority of the respondents (75%) have between 0 and 4 acres of land and this is comparable to the national figures;
ix) The dominant source of agriculture information is the extension worker mentioned by 55% of the respondents;
x) The majority of those who mentioned mobile phone as their source of agricultural information are male; 20% Vs. 5%;
xi) There is a significant difference in mobile phone ownership between men and women. Seventy-three percent of the males have mobile phones compared to 58% of the female respondents;
xii) Approximately 36% of the respondents get information from the extension worker, followed by radio (27%) and fellow farmers 20%;
xiii) The ICT based communication channels for receiving information about Inoculants is dominated by radio broadcasts;
xiv) Only 21% of the male respondents and 18% of the female use inoculant;
xv) Respondents appear to be suggesting a combination of radio broadcasts, mobile phones, extension workers to work with farmers on the ground, and/or use of field demonstrations.