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Disseminating Agricultural Research Information: A case study of farmers in Mlolo, Lupalama and Wenda villages in Iringa district, Tanzania

By Christian Mubofu
mubofu.christian@gmail.com
and
Emanuel Elia
mklmakala@yahoo.com

Abstract

This study investigated the extent to which agricultural research information is disseminated to farmers. It was conducted in 2015 at Mlolo, Lupalama and Wenda villages of Iringa district. Data were collected from 90 farmers using questionnaires, in-depth interviews and focus group discussions. The study established that the extent of disseminating agricultural research information to farmers was low. The main types of agricultural research information disseminated to farmers included information on improved seed varieties, information on the use of fertilisers, information on crop management and information on pest management. On the hand, the barriers to farmers' access to agricultural research information included inadequate numbers of extension officers, inadequate funding, inadequate sources of information, non-availability of electricity, political interference and the absence of information centres. On the basis of these findings, the study calls for joint efforts aimed to increase the timely dissemination of agro-information to the farmers. In addition, there is a need to use researchers, religious leaders, and community-based organisations as key dissemination pathways to disseminate such information. The study further recommends for the need to repackage agricultural research information tailored towards meeting the farmers' needs. Furthermore, the study urges the government to recruit more extension officers and station them in rural areas. Also, improving access to electricity in villages, allocation of more funds to agro-sector, prohibiting political interference in professional jobs and establishment of community based information centres could improve the availability, access to and use of agricultural research information.

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Introduction

Dissemination involves communicating relevant information, which can be understood by a person and can be stored for later retrieval and use; moreover, feedback on such information is encouraged and acted on (Garforth, 1998). Dissemination also refers to the delivery and reception of a message where an individual is engaged in a process and the transfer of an information product (Harmsworth &Turpin, 2000). On the other hand, Statras (2004) describes agricultural research information as an essential input in agricultural education, research, development and extension services. To a great extent, agricultural development depends on the successful implementation of the disseminated agricultural research information to the farmers (Ofuoko, Each, & Itedjere, 2008). Disseminating agricultural information does not necessarily lead to improved usage of the information. For effective utilisation, agricultural research information needs to be disseminated to farmers through appropriate channels, timely, relevant and tailored to user needs.

In Tanzania, agriculture provides 85 percent of exports, employs 85 percent of the workforce, contributes 75 percent of the country's foreign exchange earnings and contributes about 25.8 percent to the national Gross Domestic Product (URT, 2008). Siyao (2012) posits that the agricultural sector in Tanzania is dominated by small-scale farmers, mainly peasant farmers, who cultivate various types of cash and food crops for subsistence.

In a bid to ensure farmers have access to agricultural research information, Daniel and Elifadhili (2013) observed that the United Republic of Tanzania (URT) through its Ministry for Agriculture has trained extension officers and deployed them nation-wide to ensure that farmers get reliable agricultural research information to spur agricultural development. In disseminating agricultural research information to the farmers the Tanzania government plays a big role by facilitating and organising various agricultural

shows such as Sabasaba (which falls on July 7, hence 7/7) and Nanenane (which falls on August 8, hence 8/8 in the Kiswahili title) festivals, public demonstrations and promoting the use of Kiswahili language which is understood by most of Tanzanians (URT, 2012).

The URT also established agricultural research institutes to provide farmers with technical expertise; improve agricultural productivity; and enhance access to information. Agricultural research institutes in Tanzania include Naliendele-Mtwara, Selian-Arusha, Mikocheni-Dar es Salaam, Uyole-Mbeya, Ukiriguru-Mwanza, Tanzania Coffee Research Institute (TaCRI)-Moshi and Tanzania Forest Research Institute (TAFORI)-Morogoro. Moreover, higher learning institutions—both public and private—also conduct research and disseminate their findings, including to farmers. These include Sokoine University of Agriculture, the University of Dar es Salaam, the University of Dodoma which are public and Iringa University which is a private institution.

However, the extent to which agricultural research information is disseminated to farmers by both government and non-governmental organization in Tanzania and specifically in Iringa district remains largely unknown. This has happened despite the Tanzania government's initiatives and strategies to disseminate agricultural research information to farmers including establishing agricultural regulatory organisations, agricultural trade information centre, agricultural research institutes, training, use of various slogans such as green revolution and "Kilimo Kwanza" (Agriculture First) and using researchers, extension officers, frequent seminars, workshops, special festivals and use of mass media,.

This study, therefore, sought to investigate the extent to which agricultural research information is disseminated to farmers in Iringa district. It was guided by the following research questions: To what extent is agricultural research information disseminated to

the farmers? What type of agricultural research information is disseminated to the farmers? And what challenges face the dissemination of agricultural research information to the farmers?

Research methodology

This study was conducted in purposively selected villages of Mlolo, Lupalama and Wenda in Iringa district. The choice of these villages was based on the presence of demonstration plots which were overseen by researchers from the Institute of Agriculture, University of Iringa. The study deployed a mixed methods approach which facilitated the deployment of both qualitative and quantitative methods in data collection and analysis. Primary data were generated from 90 respondents gathered using questionnaires, in-depth interviews and focus group discussions. Quantitative data were analysed using Statistical Package for Service Solutions (SPSS) version 18. The SPSS enabled the researchers to generate tables, frequencies and percentages. Qualitative data generated were subjected to content analysis.

Literature Review

Types of Agricultural Research Information

Farmers need agricultural research information to improve harvest and increase income. In this regard, the dissemination of relevant, accurate, understandable and factual information links the scientist to the farmers (Lucky & Achebe, 2013). Timely access to information on new farming practices has the potential of speeding up the farmers' adoption of new improved practices (Browne, Harris, Barrett, & Cadoret, 2003).

Ndungu, Odondi, Oyure and Andima (2000) noted that information on farm operational skills and agro-technical aspects were types of information disseminated by most of the agricultural research institutions. Such information entails access to certified seeds and fertiliser for a given location or information on the effective management of livestock.

Elia, Stilwell and Mutula (2016) observed that researchers disseminate to farmers information on the use of drought-resistant crops, early farm preparation and farming, high yield varieties, use of farm implements, proper use of fertiliser and on diseases.

A study that was conducted in Tanzania by Kaaya (1999) on role of information technology in agriculture established that the types of agricultural research information that are highly disseminated to farmers include information on newly-generated technologies from the research institutions, particularly on appropriate methods of pest and disease control, appropriate soil erosion control measures, optimal planting and harvesting times and marketing as such information helps them to enhance agricultural production. Another study conducted in Tanzania by Elia (2014) shows that farmers received climate change agricultural-related information from researchers on improved seeds varieties, use of rainwater harvesting technologies, spaced planting, inter-cropping, seed production, grain preservation and the proper use of pesticides.

Challenges to Effective Dissemination of Agricultural Research Information

A study in Nigeria by Ifukor (2013) found that, information dissemination can be hindered by factors such as the use of improper communication channels, illiteracy level, use of foreign languages and over-dependence on oral communication rather than on printed communication. Oladele (1999), on the other hand, found weak linkages between farmers, extension workers, and researchers, which contributed to poor dissemination of agricultural research information. In fact, these weak relationships hinder the farmers' ability to participate in the prior planning which requires information. Furthermore, Ferris (2005) noted that small-scale farmers in many African countries lack accurate and relevant agricultural information, which is was one of the major constraints in efforts aimed to improve the agricultural sector in developing countries.

The language used to disseminate agricultural research information can also affect how farmers use the information they receive. A study on the challenges to the dissemination of agricultural information by Mokotjo and Kalusopa (2010) found the agricultural information delivered to farmers was in a print form and written in vernacular languages. The use of local languages enabled the farmers to utilise the information effectively. Furthermore, a study by Lwoga, Stilwell and Ngulube (2011) found that farmers' illiteracy level posed a challenge to the dissemination and use of agricultural research information in Tanzania. In another study conducted in Tanzania on sources of agricultural research information for women farmers in Hai and Kilosa districts, Isaya (2015) found that farmers faced challenges such as inadequate knowledge on how to apply the information acquired from extension officers and researchers, lack of credit to purchase farm inputs, improved seeds and chemical fertilisers.

A theoretical Framework Underpinning the Study

The process of disseminating agriculture information to farmers starts from researchers who provide information to extension officers and religious leaders. These information intermediaries are then expected to disseminate the information to farmers. Researchers conduct a number of agricultural related researches and the findings are provided to the government employed extension officers so that they can disseminate them to the farmers. Agricultural information is also disseminated by the Iringa University which is a religious-based University to pastors who send the information to their believers who are mostly farmers. Most of churches in Iringa have the so-called 'Shamba la Kanisa' which denotes a church farm. These farms are owned by the church and monitored by the pastors and other church leaders. The Shamba la Kanisa is also known as a demonstration plot. This approach allows farmers to receive from their church leaders relevant and reliable as compared to the one coming from the government extension

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officers. Diagram 1 presents a model for disseminating agro-research information to the farmers:

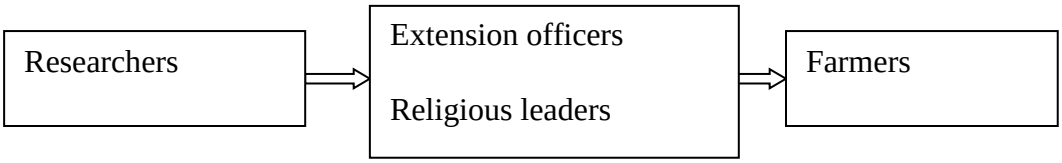

Diagram 1: A model to disseminate agricultural research information to farmers

Discussion of the findings

Extent of Disseminating Agricultural Research Information to the farmers

The study sought to establish the extent to which extension officers and religious leaders disseminate agro-information to the farmers as received from the researchers. Researchers from Iringa University generate new agro-research information and disseminate it to extension officers and religious leaders who eventually send it to the farmers. Farmers were asked to state how often extension officers and religious leaders disseminated agricultural research information to them. The findings summarised in Table 1 show that 30(33.3%) farmers received agricultural research information from extension officers and religious leaders once a year. Four (4.4%) farmers indicated that they received agricultural research information weekly. The findings further indicate that 29(32.2%) farmers received agricultural research information twice per year whereas 27(30%) farmers reported receiving such information on monthly basis.

Table 1: Extent of Disseminating Agricultural Research Information to Farmers

Extent	Frequency	Percent
Weekly	4	4.4
Monthly	27	30.0
Bi-annually	29	32.2
Annually	30	33.3

Total	**90**	**100.0**

Source: Field Data (2015)

The number of contacts with the extension officers during the specified periods was used to establish the extent of disseminating agricultural research information to the farmers. According to Krishna Reddy and Ankaiah (2005) and Harcourt and State (2000), access to extension agents can promote access to information and help farmers make informed farm decisions on the choice of crops, land, labour, livestock, capital and management. On the whole, access to timely and reliable agricultural information has the potential of improving agricultural production. The study findings indicate that the majority of the farmers in the study area receive agricultural information annually. This low frequency in dissemination is likely to affect negatively the farmers' productivity. On the other hand, frequent contacts between farmers, extension officers, and religious leaders have the potential of improving production as farmers would be enabled to communicate effectively on farming issues.

The results of the study presented in Table 1 indicate that farmers, who received agricultural information either monthly or biannually, were better placed to improve farming practices than those who received information on annual basis. Regular dissemination of agricultural research information creates awareness and helps to farmers to put more efforts towards agricultural development (Lwoga *et al.*, 2010; Mtega & Msungu, 2013; Elly & Silayo, 2013). To a large extent, in many developing countries such as Tanzania, the dissemination of agricultural research information to farmers depends on information disseminators such as extension officers and religious leaders who disseminate information to them (Elia, 2014). The major role information disseminators play in the study area is to educate farmers on best farm practices and how to use effectively information derived from researchers and other agricultural information generating institutions. However, challenges to accessing reliable

information disseminators prevent farmers from effectively practising modern farming (Elia, Stilwell, & Mutula 2016)

Types of Agricultural Research Information Disseminated to Farmers

Farmers were asked to state the types of agricultural information they received from extension officers and religious leaders. Findings indicate that 81(90%) farmers received information on improved seedlings; 61(67.8%) on the use of fertiliser whereas 54 (60%) received information on crop and pest management. The study findings also indicated that 37(41.1%) of the farmers received information on weed control and disease management; 29(32.2%) on harvesting and marketing and 22 (24.4%) received information on weather. The results also show that 19(21.1%) farmers received information on financial planning whereas 18(20%) farmers received information on soil fertility as Table 2 illustrates:

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Table 2: Types of Agricultural Research Information Disseminated by Extension Officers to Farmers N=90

Agricultural Research Information Disseminated	Yes		No	
	F	%	F	%
Information on Improved seedlings	81	90	9	10
Information on crop management	54	60	36	40
Information on harvesting and marketing	29	32.2	61	67.8
Information on pest management	54	60	36	40
Information on use of fertilizers	61	67.8	29	32.2
Information on soil fertility	18	20	72	80
Information on Weed control and disease management	37	41.1	53	58.9
Information on financial planning	19	21.1	71	78.9
Weather information	22	24.4	68	75.6

Source: Field Data (2015)

The study findings, therefore, show that most of the farmers received agricultural research information on improved seedlings; use of fertilisers; and on crop and pest management. On the other hand, the study findings show that information on soil fertility, information on financial planning and weather information was not frequently disseminated. This low dissemination of this information could be caused by various factors. One is lack of need by farmers on the stated types of information. The other reason might be inadequate expertise from researchers, extension officers and religious leaders. Soil fertility, weather and financial planning need adequate research, expertise and trialability before one can effectively apply the knowledge with the farmers. Based on these study findings, it is clear that dissemination of agricultural research information facilitates farmers' farm decision-making on what and when to plant, how to cultivate, when and how to harvest, what post-harvest management practices to follow, and when and where to market their farm produce (Salau *et al*., 2013).

Other studies have also reported similar findings on agricultural information disseminated to farmers. These include relevant information disseminated to farmers on

crop management such as season for planting (Krishna Reddy & Ankaiah, 2005; Tiwari, 2008) and improved seedlings (Elia, 2014). It also includes input price and availability (Rao, 2004; Tiwari, 2008) and soil fertility (Ekoja, 2004). Moreover, the role of different categorised of information disseminated to farmers on improving the agricultural production in the growing season has been explained by a number of scholars. Rao (2004) and Tiwari (2008) who elucidated on weather information; Ekoja (2004) who narrated on the supply of fertiliser; and Krishna Reddy and Ankaiah (2005) who emphasised on proper application, amounts and timing. Others were on pest surveillance and management (Ekoja, 2004; Rao, 2004; Tiwari, 2008); type and dosage of pesticides (Krishna Reddy, & Ankaiah, 2005); weed control (Ekoja, 2004); and disease management (Ratnam, Krishna Reddy, 2005; Tiwari, 2008).

The findings by these scholars are consistent with those of Elia (2014) and Gue'ye (2010), which found that the provision of timely agricultural research information to stakeholders is important in influencing agricultural development. Farmers' preference of the types of agricultural research information indicates that they need information to fulfil their need, which is to improve agricultural productivity and increase income. Harcourt and State (2000) and Elia (2014) assert that improvements in agricultural productivity can be catalysed by disseminating relevant, reliable and useful information to the farmers. Since farmers had a wide range of information needs, timely dissemination of and accessibility to agricultural research information from extension officers have a potential of improving the farmers' agricultural production.

Barriers to Farmers' Accessing of Agricultural Research Information

Farmers were further asked to state the barriers to accessing agricultural research information disseminated to them. Results show that the majority of the farmers, 88(97.8%), noted inadequate funding as the main factor affecting the dissemination of

agricultural research information whereas few, 65(72.2%), mentioned limited number of extension officers. The study findings further indicate that 79(87.8%) farmers were of the view that inadequate sources of information hindered the effective the dissemination of agricultural research information; 78(86.7%) indicated lack of information centres; 76(84.4%) reported political interference; and 72(80%) farmers mentioned non-availability of electricity (see Table 3). The next section explicates on the barriers to the farmers' accessing of agricultural research information**.**

Table 3: Barriers to Farmers' Access to Agro-research Information N=90

Barriers	Yes		No	
	F	%	F	%
Inadequate extension officers	65	72.2	25	27.8
Political interference	76	84.4	14	15.6
Non-availability of electricity	72	80	18	20
Absence of information centre	78	86.7	12	13.3
Inadequate funds	88	97.8	2	2.2
Inadequate sources of information	79	87.8	11	12.2

Source: Field Data (2015)

Inadequate Funding

Inadequate funding was reported by the majority of the farmers (97.8%) as one of the factors preventing farmers from receiving the disseminated agricultural research information. The paucity of funding prevents them from accessing information sources such as radio, television, researchers, extension officers and print sources. These study findings concur with those by Ronald, Silayo and Abdalah (2015) in Tanzania who found that, farmers in Unguja district could not access agricultural information as a result of inadequate funds to purchase information dissemination sources such as news papers, books and magazine. Their study also observed that farmers failed to attend important workshops, seminars and agricultural exhibitions due to the cost.

Farmers' access to information sources is crucial to the actual use of information by farmers. The information sources facilitate the provision of new knowledge and innovations to farmers. Inadequate funds prevent farmers from buying gadgets such as radio and television which transmits information on agriculture. Elia (2014) observes that in inadequate funds also prevents farmers from purchasing batteries in rural areas with no electricity. Despite the availability of a local radio known as *Furaha FM* radio which broadcasts agricultural information on weekly basis in selected study villages, farmers' inadequate funds will deprive them of their purchasing power to buy the radio or batteries. Lack of these information accessing tools prevents farmers from receiving timely and appropriate agricultural research information disseminated.

Moreover, inadequate funds may prevent farmers from travelling from their households where information is disseminated. In essence, farmers who live far from the village centres and who have meagre funds are more likely not to attend the meetings with agricultural experts in designated areas. In this regard, farmers with access to adequate funds are in a better position to access a right channel, at a right time with prompt feedback. Timely feedback is crucial in the farmers' farm decision-making process.

Inadequate Sources of Information

The study also found inadequate sources of information such as books, brochures, flayers, magazines and leaflets to be among the challenges hindering farmers' access to agricultural research information. Information disseminators such as extension officers and researchers are supposed to ensure farmers receive the intended information on time through sources in an oral, print or electronic format. The study findings indicate that farmers received information from extension officers and religious leaders more often in an oral form than the print form. Despite the oral form being effective in creating understanding and quick feedback, farmers were in need of the print sources to enhance

their knowledge. Print sources, despite having a fairy higher production cost, are advantageous because farmers can read at their convenient time and easily recall and compare with the information they had received orally from other sources. In this regard, farmers' access to appropriate information sources is essential in making informed decisions (Sani, 2014)

Absence of Information Centres

The absence of information centres was another challenge reported by farmers as affecting them accessing agricultural research information. Information centres store and facilitates the transmission of agricultural information to farmers. Commenting on the essence of information centres one extension officer said:

> The fact that research and extension services are the most important sources of growth in farm productivity; they require reliable infrastructures to be functional. The increasing problem of inadequate resources in various levels including district council authorities have been identified as a challenge hindering farmers from efficiently and timely accessing agricultural information in the study area. The absence of an information centre affects the entire farming and production system as we lack access to new knowledge. The availability of an information centre is very useful to us as through them we can gain new knowledge which helps us to cope with the latest innovation in agricultural sector.

These findings are in line with those of Kameswali *et al*. (2011), Chahal *et al*. (2012) and Siyao (2012), who argued that barriers to agricultural information access mainly hinged on the availability of information centres in the farming communities. Indeed, the presence of information centres tends to make farmers in the study area access easily agricultural research information through different formats print or electronic. Aina (2007), Lwoga (2009) and Siyao (2012) point out that among farming communities in Africa, there is lack of an organised system for the dissemination of information, poor information centre management and lack of expertise in information among providers and users of information that limit the provision and usage of such services. Mtega and Malekani (2009) and Lwoga (2009) observed that poor quality of information services

and irrelevant materials have limited the accessibility of information. Farmers' challenges to accessing information from information centres, in turn, create barriers to the transfer and use of agricultural technologies. Javed *et al.* (2010) found that the barriers have the potential of lowering agricultural production and, ultimately, affecting the economy of the country. Supporting Javed's views, Aina (2007) contends that farmers would fully benefit from global information once information centres are constructed in rural areas. Aina asserts that constructing information centres would not give anticipated impact if they lacked information and communication equipment and qualified information professionals to disseminate information to the farmers effectively.

Political Interference

Farmers also reported that political leaders were a factor that contributed to the problems farmers faced when it came to accessing agricultural research information. Political leaders, who were expected to help build a good rapport between the extension agents and local farmers, were actually reported to contribute to the communication breakdown and effective services delivery by differing in political ideologies. These study findings corroborate with those of Khan *et al*. (2013), who stressed that the most daunting challenges affecting the dissemination of agricultural research findings are people's inability to think and draw logical inferences attributable to the existing political interference. Ferris (2005) also notes that political interference in many African countries undermine the dissemination of relevant agricultural information to small-scale farmers, hence being a major factor constraining efforts aimed to improve the agricultural sector in developing countries. Stressing on the influence of politics in the dissemination of agricultural information, an extension officer from Wenda village in Mseke ward said during an interview:

> Today most of us are not performing our duties according to our profession due to political interference. The professionalism is not considered from the council level to the village level. It is too desperate to serve farmers in a results-oriented manner since most of the extension officers' time and working facilities are too inadequate. The extension duties are always

interrupted by Ward Councillors and other village leaders who tell farmers not to accept new innovations. It is also amazing nowadays to see a professional extension worker collecting a tax from livestock-keepers instead of serving the farmers.

Non-Availability of Electricity

Results from this study also attest to the non-availability of electricity as one the barriers to the farmers' access to agricultural research information. Electricity helps run electronic media such as radio, TV, and mobile phones which can expedite and promote the transfer of agricultural information to the farmers. The availability of electricity in the study area would help farmers receive timely agricultural research information disseminated through devices such as radio, television and mobile phone. The study findings from the study villages indicate that there was a farmer agricultural awareness programme broadcast on *Furaha FM* radio on weekly basis. The programme known as 'Kilimo cha Kisasa' (Modern Farming practices) has proven to be effective in educating farmers in Mlolo, Lupalama and Wenda villages. Despite radio being convenient and cost-effective in disseminating agricultural information to farmers (Garforth, 1998), lack of electricity prevents farmers from accessing agricultural-related radio programmes. Likewise, TV plays an important role in disseminating agricultural research information as it has both an audio and visual learning support mechanisms. These findings corroborate with those by Garforth (1998) who stated that videos were effective in delivering technical agricultural information to the farmers. However, poor power supply and low income levels limit TV and radio coverage in many African countries (Muhammad *et al*., 2004; Bhattacharjee, 2005). Farmers need reliable electricity to operate electric equipment such as radio and TV to receive information disseminated timely. Studies by Aina (1990) and Ozawa (1997) corroborates with the findings of this study, which indicates poor electrification as one of the major barriers in the provision, access and use of information in rural areas. Additionally, Murthy (2009) observed that mobile phones and other electronic devices have opened new avenues for easily and

conveniently disseminating agricultural information. But the absence of electricity reduces the farmers' ability to communicate and learn various innovations through the mobile phone due to lack of charger in devices.

Inadequate Number of Extension Officers

The results of the study show that the shortage of extension officers was one of the obstacles farmers had to contend with when accessing agricultural research information from extension officers. These findings indicate that inadequate number of extension officers in the study areas resulted in limited provision of extension services to the farmers. In fact, most of the wards in Iringa District have one extension officer who provides services in several villages. Due to an extensive area to be covered by one extension officer, they fail to reach farmers effectively and on timely basis. Depending on other variables, farmers' access to extension services is more likely to influence farmers to produce more. Extension officers can also facilitate the unpacking of the research reports and repackaging them into information products for easy consumption by the farmers. On a similar note, agricultural extension officers assist farmers to improve their livelihood by providing them with technical information and advice which are crucial in farming decision-making (Pangani, 2007).

Inadequate number of extension officers has been pointed out by other scholars. A study in Tanzania by Ronald *et al.* (2015) support the current study findings which also found inadequate extension services as one of the main challenges farmers face in accessing agricultural research information disseminated. Furthermore, studies by Ozawa (1995) in Nigeria, Isinika and Mdoe (2001) in Tanzania and Aina (2006) in Africa also observed that inadequate agricultural extension workers affect the farmers' ability to access new agricultural information. Despite the farmers indicating inadequate number of extension officers as a least barrier, the presence and contacts between farmers and

researchers could have contributed to farmers rating the extension officers last. As the findings of this study indicate a fairly frequent contact between farmers and extension officers, farmers' response to insufficient services provided by extension officers might reflect the kind of assistance farmers received from researchers through frequent contact with them in demonstration plots and field schools for farmers as compared to extension officers.

Recommendations

Based on the findings of this research, the study makes the following recommendations towards enhancing the dissemination of agricultural research information to the farmers:

- To raise the extent of agricultural research information disseminated to the farmers in the country. The study suggests that key stakeholders such as researchers, extension officers, policy-makers and other actors in agricultural sector work together to strategise on how research information can widely be disseminated to the users, especially in the rural areas.
- The government and other private stakeholders should work jointly to minimise barriers affecting the farmers' access to agricultural research information by allocating adequate funds to the agriculture sector (abiding by and benchmarking the Abuja Declaration), constructing information centres, having less interference in the technical issues with politics, improving the power supply in rural areas and proper training and distribution of adequate extension officers to villages.

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