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TITLE PAGE

Assessment of awareness of Farmers on agricultural information services in Mara Region, Tanzania

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Abstract

This study assessed awareness of farmers on agricultural information services in Mara region in Tanzania. Quantitative approach was adopted and data collection used single structured questionnaire. Awareness scales measured three factors; awareness knowledge; agricultural information needs and lastly use of ICTs in accessing agricultural information services. The results indicated that majority (93.2%; 280) of respondents had little knowledge of awareness, (91.3%; 272) of the response, needed improved seed varieties and the average, (60%; 180) of respondents have low use of ICT in accessing agricultural information services. It was concluded that agricultural stakeholder needs more improvement and strategies on agricultural information services access and knowledge. In its' significances the really situation of farmers' on knowledge awareness, their needs and use of ICT was revealed in Tanzania. Lastly, the study recommended that agricultural-stakeholders need to develop strategies, initiatives and efforts to overcome the bridge gap created by digital divide on ICT use.

Keywords: Agriculture, information, agricultural information service, awareness, Tanzania

1. Introduction

Awareness of agricultural information services flow to farmers within and outside the boundaries of agricultural structures and systems because of their needs. A well-built agriculture information services increase awareness to farmers by accessing different services (Acker & Gasperini, 2009). According to Reitz, (2006) rural areas have limited access of agricultural information services as neglected to services deliverance from agricultural structures. Bowker et al. (2010) found that the information infrastructure is composed of information services, communication systems that process, and transport data inside and outside national boundaries to create awareness of farmers. According to Odi (2014) states that insufficient information; poor infrastructures, poor agricultural systems and illiteracy have contributed lack of awareness in rural areas. According to Word Bank, (2000) farmers live, earn their living in rural areas with agriculture as the mainstay of their living, and have knowledge gap of agricultural information services. Shetto (2008) indicated that agriculture information awareness is a challenge related to knowledge flow and agricultural information service to farmers. Shortage of agricultural information services increase a gap to farmers of awareness as result of poor information (Aker,

2010). African countries have not made significant attempts efforts to create awareness and publish information, particularly to farmers who live in rural areas (Rutatora & Mattee, 2001). Mtega et al. (2015) indicated that if agricultural technologies and developments do not reach farmers, transforming agriculture and farmers' livelihoods remains impossible. Thus, access to agricultural information is a factor for change and progress in creating awareness in agricultural sector. In Tanzania, both governmental and non-governmental organizations are involved in the provision of agricultural information awareness (Rutatora and Mattee, 2001). Shetto (2008) emphasized that enhancing agricultural awareness, agricultural extension agents from the public and private sector need to provided access to radio and TV networks, and print resources to facilitate awareness on agricultural information. Reitz (2006) indicated that developed agricultural information services centers, research institutions, agricultural universities, government offices, agricultural libraries collections and extension officers need to create awareness to farmers' supports the idea. In rural areas, ICT use in creating agricultural awareness is largely attributed to the weak linkages to farmers because of some challenges like income and technological challenges. According to Shetto (2008), advancement of ICT, use to farmers in the world has improved the farming activities and systems in developing countries. According to Raza, Khan, Shahbaz & Saleem, (2020) the development attained in the information and communication technologies (ICTs) gives a chance for developing countries to connect, distribute and utilize agricultural information. ICT has a chance of speeding up awareness in agricultural information services through sharing and linking agricultural stakeholders who may improve agricultural production in various ways. ICT invention to farmers in rural areas has unfortunately increased digital divide created by illiterate and low income, which creates a gap between groups or individuals with ability and inability to use ICTs effectively. Nevertheless, the emergence of low operation cost of ICTs tools like radio, cell phones, computers and the media increase a gap on creating awareness to farmers.

Aim of study

This study examined awareness of farmers on agricultural information services in Mara region, Tanzania.

The study objectives were specifically to:

- i. To test awareness of farmers on agricultural information services
- ii. To asses farmers' agricultural information needs in the study area

- iii. To examine how farmers access the agricultural information services with the use of ICT

Related Literature

Information and agricultural information

Information is a basic resource for improve their condition of living to human being and is essential for development of agriculture. Information is the message or idea being conveyed for useful purpose (Kirimi, 2013). According to Emmanuel (2012) view information as power and an important working tool for the advancement of human and society. In a more dynamic sense, information includes facts, data, knowledge and ideas in any medium or form revealed through a written or a spoken statement, in order to enable people to perform their livelihood activities.

According to Kirimi, (2013) and Tadesse, (2008) agricultural information is defined as various sets of messages that are relevant to agricultural production activities of farmers such as crop production and protection, livestock production, management crops, natural resource production and conservation, marketing and processing. For the purpose of this study, agricultural information therefore refers to data, facts, ideas and knowledge in any medium or form that can be communicated, in order to enable farmers to perform their livelihood activities and for effective decision making in farming related activities. There are various types of agricultural information on related activities. These could include information on farming protection, fertilizer availability and application, agricultural credit facilities, improved seeds varieties, weather and marketing. Ikwuakam et al. (2016) stated that provision of right type of information that revolves around modern agricultural technology, credit, erosion control, soil fertility, improved seeds varieties and seedlings, plant protection chemicals, water, markets, machinery and equipment are germane if the levels of growth and benefits in production are to be improved and sustained. MacFarlane and Leigh (2014) identified the following as characteristics of good information: (i) relevance for its purpose, (ii) sufficiently accurate for its purpose, (iii) complete enough for the problem, and (iv) reliable and targeted to the right person. Good information should also be communicated in time for its purpose, contains the right level of detail and is communicated by an appropriate channel, i.e. one that is understandable to the user. Other scholars (Salau et al., 2013) reported that the quality of any agricultural information rests solidly on three pillars: accuracy, timeliness and relevance.

Accuracy implies that information is free from bias. Timeliness means that recipients can get information when they need it, while relevance implies whether the piece of information specifically answers the user's questions of what, when, where, who and how. The use of information in agriculture sector is enhancing farming productivity in a number of ways. Providing information on weather trends, best practice in farming and timely access to market information helps farmers, to make correct decisions on crops cultivation and where to sell their produce and buy inputs among others. Agricultural information is targeted at improving the knowledge, skills and ability of the farmers to produce more than enough for themselves. Agricultural information is as important as other resources for agricultural production. This is because in farm management, decisions are guided by information. Acquisition, allocation, coordination and utilization of farm resources may be influenced by the nature and adequacy of information in the farming communities (Salau et al. 2013). Therefore, farmers need information to know the various techniques for improving and increasing agricultural productivity for instance, the use of fertilizers, useful pesticides, high quality seeds, access to agricultural credit facilities, and good marketing of their agricultural produce. Similarly, Yusuf et al. (2013) indicated that farmers still require agricultural information that will enhance efficient and effective utilization of the land, manage soil and water, control pests and diseases and help solve other problems emanating from the farm.

Access to agricultural information

Access to agricultural information refers to the ability of receiving information related to any agricultural production activity from different sources such as radio, TV, extension agents, print materials and mobile phones. Salau (2013) states that farmers are expected sources such as mobile phones and even the Internet (for literate ones) to access agricultural information. Reitz (2006) access to agricultural information is influenced by the information infrastructure needed for information dissemination. Bowker et al. (2010) found that the information infrastructure is composed of information and communication systems that process and transport data inside and outside national boundaries. Salau (2013) found that insufficient information, poor infrastructure, high access costs and illiteracy have contributed to poor production including agricultural production in rural areas. Lack of access to basic agricultural information by farmers, which may be a result of certain constraints, has made these farmers to stick to their

old traditional methods of farming system, hence resulting in poor crop productivity. Despite the contribution of the agricultural sector in Tanzania, Lwoga et al. (2011) found that limited access to agricultural information has been mentioned as one of the factors limiting agricultural productivity in Tanzania.

Mtega et al. (2015) indicated that if agricultural technologies and developments do not reach farmers, transforming agriculture and farmers' livelihoods remains impossible. Thus, access to agricultural information is a factor for change and progress in the agricultural sector. In Tanzania, both governmental and non-governmental organizations are involved in the provision of agricultural knowledge (information) (Rutatora and Mattee, 2001). That is why Shetto (2008) emphasized that for enhancing access to agricultural knowledge, agricultural extension agents from the public and private sector, access to radio and TV networks, and print resources are important. The ultimate goal of agricultural extension is to make agricultural information available or accessible to farmers who are in dear need of it. Despite the involvement of many stakeholders in provision of agricultural information to farmers, the level of access to agricultural information among farmers in Tanzania is still low (Lwoga, 2010). Access to adequate agricultural information is very essential to increased agricultural productivity. However, Lwoga et al. (2011) indicated that access to relevant agricultural information is important for improving the agricultural performances and livelihoods in the rural areas. Several studies have shown that access to agricultural information ensures that stakeholders in the farming system can make informed decisions towards increasing agricultural productivity. According to Koskei (2012), information ensures that stakeholders in the farming system can make informed decisions towards increasing agricultural productivity (Lwoga, 2011). According to Koskei (2012) agricultural information accessed by farmers from Bureti district, Kenya contributed to increased yield. Therefore, access to relevant agricultural information is very important, in order to improve agricultural performance and livelihoods in rural areas.

The Role of Information in Agriculture

In agriculture, the role of information in enhancing agricultural development cannot be over escaped due to its roles. Bachhav (2012) stated that the use of information in agriculture sector enhances farming productivity in a number of ways, information on weather, best practice in farming and access to market helps farmers make correct decisions about type of crops to grow and where to sell their product and buy inputs. Accurate and timely information enables farmers

to make informed decisions on production especially what and when to produce, sources of inputs and marketing of outputs. Good information enables farmers to manage their lives successfully to cope with everyday problems and to realize opportunities through which sustainable agricultural development can be achieved (Bachhav, 2012). Similarly, Lawallro et al. (2014) argued that agricultural information interacts with and influences agricultural productivity in a variety of ways. It can help inform decisions regarding land, labour, livestock, capital and management. Agricultural productivity can arguably be improved by relevant, reliable and useful information. Odini (2005) add that information is essential for planning, decision-making and the implementation of agricultural programmes and information an enterprise is important for the production process especially for agricultural production and marketing of agricultural produce, and become more productive. Kari (2010) observed that information is very useful in decision making, as its availability enables individuals, groups or organizations to make rational decisions and reduce their level of uncertainty Therefore lack of access to accurate and relevant agricultural information by farmers is a major factor constraining efforts to improve production in agriculture including production.

Agricultural Information Sources for Farmers

The fact is an information source is anything that human beings can interact with or observe. In other words, it is understood as something that contains and or stores information (Bates, 2012). Likewise Adio et al. (2016) have indicated that information sources are tools that can possibly meet the information needs of different categories of users. They are the information carriers Koyenikan (2011) categorized the information sources as formal and informal. According to him, formal information sources include radio stations, local and international print media (such as newspapers, newsletters, and journals) and seminars/workshop, while informal sources are farmers, family friends and personal assessments and judgment. Another related study carried out by Bates (2012) specifically highlighted the role of Agricultural Research Institutes and Agricultural officers as information sources. Adio et al. (2016) identified radio, television, extension workers, cooperative societies, friends and colleagues, newspapers and magazines, books/leaflets, phones, libraries and institutes. In addition, observation of people organizations, speeches, documents, picture and artwork can also be described as information sources. However, Emmanuel, (2012) mentioned the following as the sources of information,

libraries, internet, colleagues, personal, departmental collections, workshops and seminars. According to Bates, (2012) information sources come in great diversity and various forms such as print and non-print forms. Therefore farmers can obtain information from a number of sources, comprising extension workers, colleagues, radio, television, farmer to farmer visit through their social network involved in agricultural activities, print materials like farm magazines, newspapers, brochures and leaflets (Aker, 2010).

Egge et al. (2011) conducted a study to identify the information sources used by sorghum farmers and determined the relative importance of different information sources to farmers in the Awbere district of Somali Regional State. The findings revealed that the three sources of information in order of preference were fellow farmers, family members and the office of agriculture. Likewise, Adeogun et al. (2010) found that the sources of information for farmers in Nigeria were personal experience, radio/television and friends. However, Benard et al. (2015), who conducted research on assessment of the information needs of rice in Kilombero district showed that personal experience family/parents and neighbours or friend were the most preferred sources of information. Other study conducted in Tanzania (Ungula) by Benard et al. (2015) on preference sources of information used by seaweeds farmers indicated that, neighbours and or friends constituted the most preferred sources of information to the respondents, followed by radio, family/parents, personal experience; village leaders, agricultural inputs suppliers, television and the least sources were internet and leaflets. Therefore, provided that each farmer prefers certain information sources over others, it is important to assess the preference of information sources by the farmers before deciding for an information source to address their information needs.

Agricultural Information Needs for Farmers

Devadson and Lingam (1996), defines information needs as the knowledge gap, which needs to be filled in order to carry out a certain task. Emmanuel (2012) revealed that farmers need information to improve their farming practices and these information needs may include use of fertilizers, pest and disease control, higher yield/agricultural production, planting at the right time, weed control, improved seeds, post-harvest losses/preservation techniques, agricultural credits, agricultural cooperation. The researcher further observed that farmers need agricultural information to enhance or boost their productivity and to be informed of modern

farming systems in order to meet up with challenges that may arise in their occupation. Meitei and Devi (2009) reported that information needs of farmers is divided into the following six groups: field acquisition, agricultural inputs, agricultural technology, agricultural credit, agricultural marketing and food technology. In terms of field acquisition, farmers are required to know different type of schemes, subsidies purchasing of agricultural land. Agricultural inputs: Farmers need information such as improved variety of seeds, pesticides, agricultural equipment, weather conditions, harvest and post- harvest technology. Agricultural technology: Farmers should be fed with innovative technology in their farming. Agricultural credit: Farmers needs information such as credit facilities and terms of loans. Agricultural marketing: Day to day market trend and price of different variety of crops are necessary for the farmers. Food technology: Information on post-harvest food technology is needed by the farmers to get optimum benefit from their crop information needs is a first step towards better targeting of extension programmes and advisory services that facilitate information sharing and improvement in their production (Ajayi et al., 2010). Njelekela and Sanga (2015) stated that farmers need different types of information from farm preparation to post-harvest and marketing to make informed decisions. Farmers need agricultural information to improve their farming practices and hence to improve their productivity and to be informed of modern farming systems in order to meet up with challenges that may arise in their farming activities. Yusuf et al. (2013) have indicated that scientifically researched information needs on some of the challenges militating against good farming practices in crops and livestock, impact of climate change, storage and market hint is required towards helping rural farmers to satisfy their needs. Farmers need different types of information for their agricultural activities. According to a study done on information needs of farming households in Nigeria by Ikwuakam et al. (2016), majority had high level of information needs with fertilizer/manure, pest/diseases management practices, agricultural insurance. In Tanzania, it was reported that farmers from Babati district were trained in good agronomic practices (after conducting need assessment), including land preparation, planting in rows, regular weeding, application of fertilizer, pest control, inter- cropping and improved harvesting techniques that have led to increased yields, a reduction in wastage (from 40% to 20%) and an improvement in purity (from 80% to 98%). Therefore a better understanding of the agricultural information needs of farmers in Mara region is a first step towards satisfying their needs.

Conceptual Framework

The conceptual framework presented here under has been used to guide this study. This conceptual framework presented in Fig. 1, was modified from Bystom and Javelin's (1995). The framework illustrates how farmers go about awareness and access of agricultural information services. It reflect the association between information system, need, agricultural information services and various factors that work for its effectiveness. It shows the inter-link and relationships between category of agricultural information needed and the sources of agricultural information services consulted. The task category in this study is Agricultural information system. Task category influences the type of category of agricultural information needed by the farmers. The category of information needed in turn determines the sources of agricultural information sources that the farmers consult. Included in the framework are situational factors such as level of education, economic status and farming experience. These are situational since they change and differ from one farmer to another. These are situational factors strengthens farmers' ability to identify the types and sources of information needed

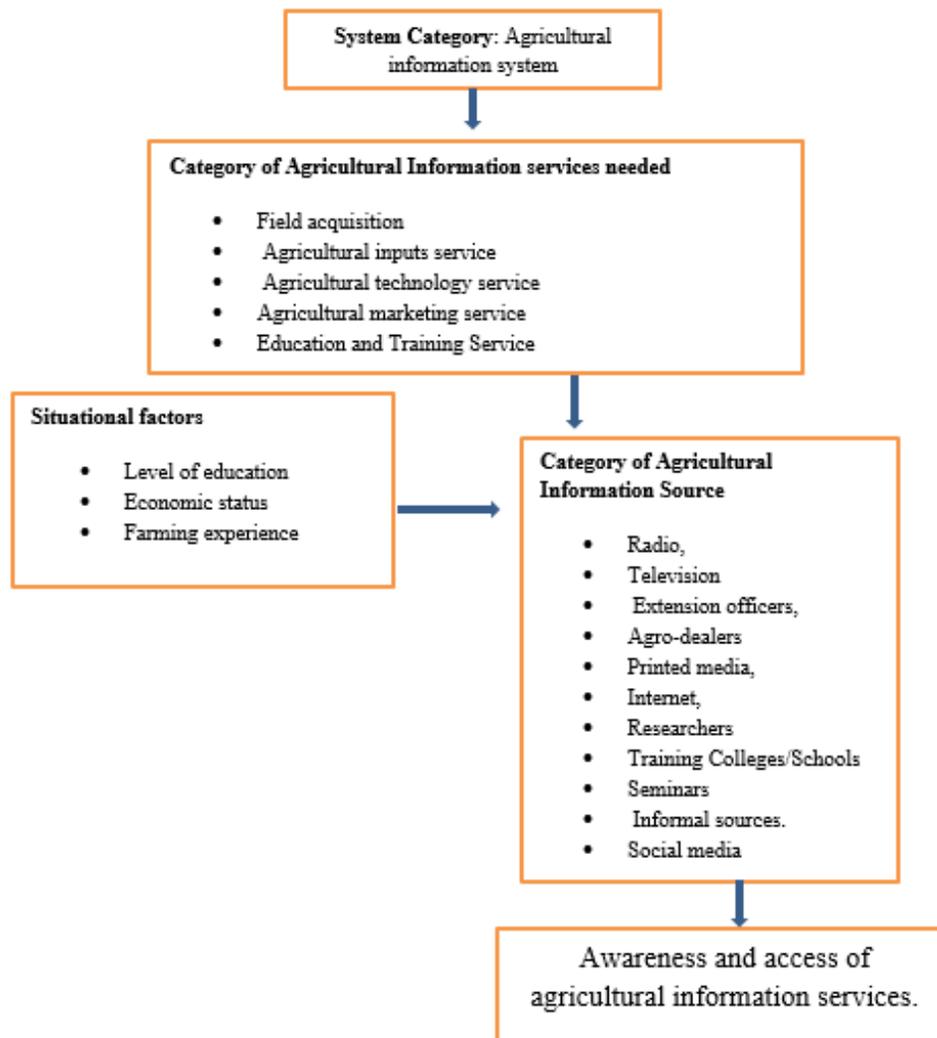


Figure 1: conceptual framework

2. METHODOLOGY

This study was done in Mara region, Tanzania. The study adopted a survey methodology. A detailed literature review was undertaken which helped in framing questions for the primary data collection. The study was conducted in two districts of Mara region, which were Tarime and Butiama. These districts were selected based on agriculture production activities and the really situation of ICTs services available in those districts like radio, Television, internets use and telephones phones. Conducting research that involves human participants requires ethical approval. To have an in-depth understanding of the study involved qualitative data, which were

obtained through observation, and quantitative data were collected through a single structured questionnaires. Questionnaires were administered face to face three hundred (300) farmers in the study area. A purposive sampling technique was used select farmers in districts. Data from the returned copies of the questionnaire were analyzed and interpreted, using frequency count and percentages.

3. FINDINGS AND DISCUSSION

Respondents demographic

A total number of 300 farmers participated in the research (172 male, 128 female). The average age was 38, where the majority (73.3 %; 220) of the respondents were between 30 to 65 years. The majority of respondents (72%; 216) were primary school graduates and only (28%; 84) were collage graduate with diplomas in different field and all college graduates were men which indicate gender imbalance which exist in Mara region; and about (100%; 300) farmers could read and understand simple instructions as translated in Kiswahili language.

The finding is attributed to the fact that majority of men are always associated with farming in this area. Similarly, findings of Odini's (2014) revealed that women also play an important role in rural areas, despite most of them lacking resources such as information, technology and knowledge to assist them to increase productivity in farming.

Knowledge of farmers on Agricultural information services to farmers

The study findings showed that there was huge knowledge gap to the farmers on agricultural information services in the studied area. The majority (70%; 210) of the respondents had little awareness on what is agricultural information services, only (30%; 10) respondents were aware of agricultural information services while (20%; 60) farmers were not sure of what they know was exactly what agricultural information services meant. The presented data implies that, there is high deficit of knowledge to farmers on agricultural information services to farmers in Mara community, as majority farmers have little knowledge of agricultural information services. Based on that fact, farmers could not mention exactly agricultural information services when were asked to do so, the situation indicated poor involvement of farmers in agricultural services like agricultural trains, seminars, workshops from extension officers. In addition, absence of agricultural education programmes to farmers in the study area. Their results were more

predominated and influenced by their own tradition persistence systems of farming where farmers in region use informal systems. The study indicated that the studied communities are not aware of modern technologies in agriculture, which demand advanced agricultural information services. The above result are similar and alike to research on access and use of agricultural information and knowledge done by Lwoga, 2016 in Tanzania.

Table 1: Farmers’ knowledge on agricultural information services (N=300)

Awareness	Respondents in Districts			Total Percentage
	Butiama DC	Tarime DC	Combined Total of the Districts	
Awareness on Agricultural information services	14	16	30	10%
Have little awareness on Agricultural information services	120	90	210	70%
Not aware of Agricultural information services	40	20	60	20%
Total	174	126	300	100%

The Farmers’ Information Needs

Farmers have a variety of agricultural information services needs as Table 2 indicates that 91.3%;274 of the response needed improved seed varieties, 90.6%;272 needed pest and disease management information, 81.6% needed market information, 64.6%;140 needed storage methods information while 60.3%;181 needed access to credit facilities. Additional needs that were identified include weather information 58.6%,;176 sowing and planting techniques 44%,;132 Control methods 35.3%,106 conservation weed 33.3%,;100 land preparation Soil 11.3%;34 and fertilizer management 26%,78 crop rotation practices 9.6%;29 seed selection 3.3%; information on irrigation 3.4;11. Below is Table 2 indicating the data above

Table 2: Agricultural Information services needs

Agricultural Information services needs	Number of Response (Frequency)	Percentages
Diseases and pests control	272	90.6
Market information	245	81.6
Improved seed varieties	274	91.3
Access to credit facilities	181	60.3
Weather information	176	58.6
Sowing and Planting techniques	132	44
Land preparation Soil	34	11.3
Conservation Weed	100	33.3
Control methods	106	35.3
Fertilizer management	78	26
Storage methods	140	64.6
Crop rotation practices	29	9.6
Seed selection	10	3.3
Information on irrigation	11	3.4

These findings are further supported by those of Lwoga, Stilwell and Ngulube (2011), who found that farmers were more concerned with information that affected their agricultural activities. A study in Tanzania by Lwoga (2009) established that 66.3% of the farmers interviewed needed information on controlling plant diseases and pests, 59.1% on marketing, 58.6% on credit facilitates, 54.7% on control of animal diseases and 29.3% on irrigation practices. Ikwuakam et al. (2016) study on information needs of farming households in selected agricultural zones of Katsina State Nigeria proved that pest and disease management practices was among the information highly needed by majority of farmers.

On the other hand, the findings are similar to findings of Ogungbeni et al. (2013) and Benard et al. (2015) who noted that farmers require information often on diseases and pest management, weather information, agricultural credit/loan, new/improved seed, soil and water conservation, storage of crops and market information so as to enhance crop production. Munyambonera et al. (2012) suggests that availability and access to adequate, timely information on low cost credit from different institutional sources is of great importance especially to small and marginal farmers.

Sources of agricultural information services

For the farmers to access their agricultural information needs, use various information sources Table 2 below presents the research findings that the main sources were colleagues (93.2 %; 280), radios (79.9%; 240) and (73. 6%; 210) extension officers. This finding is almost in agreement with that of Obesie (2016), who found that radio, colleagues and extension officers as major source of agricultural information. According to the results of this study, the extension officers were recognized as crucial source of agricultural information services and awareness because of their daily help, visits and interaction with the farmers' communities, as was revealed in the study by Adomi et al., 2003 in Nigeria.

The minimum used sources of agricultural information as were identified by respondents were television (45.4%; 137) agricultural seminars (47.2%; 142) and telephones (44.3%; 133) as important sources of agricultural information services in Mara region. The least used sources of agricultural information were books, newspaper, agricultural journals/ leaflet despite the facts can play crucial roles in enhancing agricultural productivity in Mara region. This indicates that there is still great challenge in access of agricultural information services to farmers' communities, which need to be addressed and strengthened in accessing agricultural information services

This concurs with Gorsyth (2005) who observed that libraries could be used to raising awareness and creating sustainable agricultural information services. Similarly, in their study in Bangladesh, Islam and Hasan (2009) observe that information centers and telecentres have been established in rural areas in order to provide agricultural information to farmers in order to improve food production.

Table 2: Sources of agricultural information services (N=300)

Sources of agricultural information services	Districts				Total	
	Butiama DC		Tarime DC		N	%
	N	%	N	%		
Extension officers	113	37.6	108	36	221	73.6
Colleagues/ fellow farmers	110	36.6	170	56.6	280	93.2
Radio	160	53.3	80	26.6	240	79.9
Televisions	70	23	67	22.3	137	45.4
Seminars	86	28.6	56	18.6	142	47.2
Newspaper/ Leaflets	70	23.3	60	20	130	34.3
Books/agricultural journals	17	5.6	22	7.3	39	12.9
Social media	32	10.6	50	16.6	82	27.3
Training Colleges/Schools	15	5	76	25.3	91	30.3
Agricultural centers	43	14.3	71	23.6	114	39.9
Internets	30	10	32	10.6	62	20.6
Telephones	50	16.7	83	27.6	133	44.3
Government agencies	20	6.6	43	14.3	63	20.9

From the research findings, sources of agricultural information services varied as were access in districts, as Table 2 indicate above, for instance, extension officers were main sources of agricultural information services and knowledge in Butiama (37.6 %;113), Tarime (36%;108) . Seminars were also important sources of knowledge in Butiama (28.6%; 86) and Tarime (18.6%; 56), while agricultural agencies were also significant in Butiama and Tarime. These results findings reflect the study done in Nigeria, which had the same results (Opara, 2008). The study suggest promoting more efforts on agricultural information services access strategies to farmers through various sources.

Use of ICTs in accessing Agricultural information services

The study findings shows that the average (60%; 180) of all respondents have low use of ICT and poor access of agricultural information services. The figure 1 below indicate; computer use (3.6%; 11), telephone use (44.3%; 137), social media uses (27.3%; 82), email use (10%; 30), internet searching (20.6 %; 62) and Television (45.4%; 138). Although the use of ICT is still poor in general but the majority of farmers (76.9%; 240) use radios mostly to access agricultural

information services on farming systems. Radios were seen to be used most in accessing agricultural information services because of their oral nature, low cost of access and operation cost. Cell phones (43.3%; 137) were also identified as ICTs source to farmers, as they are used in seeking advice through calling and sending messages to extension officers, government agencies and advisors. The same results were reflected in (Njelekela, and Sanga, 2015) in Tanzania. The study findings also indicated that televisions (45.4%; 137) as an important ICT sources used by farmers to access agricultural information services to farmers. Conversely, there is a need to impact more on television by providing access to agricultural information services and knowledge by improving electricity supply to all farmers. The low use of ICT tools reflected in this study, seem to be low because of low-income to farmers, whereby most of farmers are not capable of buying, telephone (smart phone), computers, television and radios while digital divide created by ICT illiteracy was identified as second factor for the low use of ICT. The funding of this study was the same as the study done in India (Lokeswari, 2016)

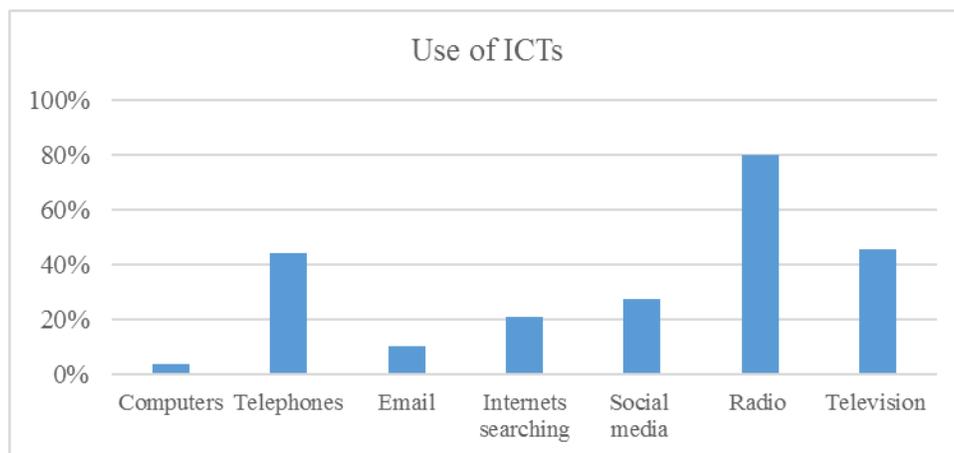


Figure 2: Access to agricultural information service through ICTs

4. CONCLUSION AND RECOMMENDATIONS

Awareness of agricultural information services needs more improvement on agricultural information access and systems as study indicated that farmers have little awareness on agricultural information services. Farmers needs improved seed varieties, pest and disease management information and market information. The main sources of agricultural information services for farmers in the studied area are colleagues/ fellow farmers, radios and extension

officers. In addition, televisions, telephones, seminars, government agencies, agricultural centers, were also mentioned as important sources of agricultural awareness in some areas. Printed documents like books and newspaper/ leaflets had low use by farmers due to their unavailability. ICT use in advanced technologies like computers, internet searching, emails and social media were used at low percentage because of income limitation in the farmers' communities and digital divide caused by technology advancement. The findings indicate that farmers may persist on use of radio use as source because of low cost and access. The study recommended that farmers should be given education on agricultural information services to create awareness. Stakeholders owning sources of agricultural information services need to play a crucial role in facilitate agricultural awareness to farmers. The government has to improve income of farmers and break ICT digital divide among farmers to facilitate access of agricultural information services.

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