

**AGRICULTURAL INFORMATION NEEDS AND THEIR ACCESSIBILITY TO
SESAME PRODUCERS IN MOROGORO DISTRICT, TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

A study was carried out to assess the agricultural information needs and their accessibility for improving production among smallholder farmers growing sesame in Morogoro district, Morogoro region. Data were collected from 120 respondents using interview schedule. Checklist was used to collect data from Focus Group Discussions (FGDs) and from interview with key informants. Quantitative data were analysed using the International Business Machines Corporation Statistical Package for Social Sciences (IBM SPSS) software version 16.0 and qualitative data were summarized and analysed using content analysis. The findings show that the main sources of agricultural information to smallholder farmers growing sesame were personal experience, friends, neighbours and brokers. Extension agents and mass media were less used by smallholder farmers growing sesame as source of information. Also it was found that from all the information needs, information on pest and disease management, market information and improved seed varieties were highly demanded information needs. In addition low level of income, inadequate contact to extension agents, ignorance to information source (lack of awareness of information sources) and distance to information sources were the major challenges facing smallholder farmers growing sesame in accessing agricultural information for sesame. It is recommended that all smallholder farmers growing sesame should be encouraged to access agricultural information on improved technologies from formal sources such as extension agents and mobile phones therefore, the Department of Agricultural Extension should focus on information need of the farmer when motivate them to use more formal sources for getting agricultural information's for better farming outcome. Also it is recommended that emphasis should be given to establish more formal information sources based on the information needs of farmers.

DECLARATION

I, PETER JOHN MAKAWIA, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor concurrently being submitted in any other institution.

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Date

The above declaration is confirmed by;

Dr. S. Nyamba
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Date

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LIST OF ABBREVIATIONS AND ACRONYMS

ARI	Agricultural Research Institute
ASFG	African Smallholder Farmers Group
CBOs	Community Based Organizations
CRTs	Cocoa Rehabilitation Technologies
DAICO	District Agriculture, Irrigation and Cooperative Officer
DED	District Executive Director
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistical Database
FARMESA	Farming Systems Approach to Technology Development and Transfer
FFSs	Farmer Field Schools
FGDs	Focus Group Discussions
IAALD	International Association of Agricultural Information Specialists
ICTs	Information and Communication Technologies
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
Kg	Kilogram
MAFS	Ministry of Agriculture Food Security and Cooperative
N	Number
NGOs	Non-government Organizations
PMO-RALG	Prime Ministers' Office Regional Administration and Local Government
SACCOS	Savings and Credit Cooperative Society

SPSS	Statistical Package for Social Sciences
TAHA	Tanzania Horticultural Association
TOA	Tanzania Osaka Alumni
TZS	Tanzanian Shilling
UN	United Nations
URT	United Republic of Tanzania
VAEO	Village Agricultural Extension Officer

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Information acts as a backbone and foundation for any economic or development activity (Msoffe, 2015). Every rational being including a farmer needs some information for his or her day-to-day existence and well-being. Judamat *et al.* (2010) and Msoffe (2015) emphasised that access to current, accurate and relevant information can provide invaluable support to farmers. Likewise Mtega (2012) and Meena and Singh (2013) found that farmers should access information more efficiently using modern and available technologies to meet their needs. Agricultural information is needed for overall development of agriculture for the improvement of living standard of farmers. It is also a key component in improving small-scale agricultural production and in linking increased production to remunerative markets, thus leading to improved rural livelihoods, food security and national economies (Masuki *et al.*, 2010).

Adio *et al.* (2016) stated that agricultural information can be made available to farmers through radio, television, extension workers, cooperative societies, friends and colleagues, newspapers and magazines, books/leaflets, phones, libraries and institutes. This means that there are very many sources from which farmers access agricultural information. However, smallholder farmers in their efforts to access agricultural information from available sources for better farming and improved agricultural yield are confronted with certain constraints. Wambura *et al.* (2012) indicated that for many years, Tanzanian farmers accessed agricultural information from extension workers mainly through face-to-face contact. However, this seems to be difficult, if not impossible, given that smallholder

farmers are scattered across the rural landscape, absence of penetrable roads, and lack of transport for extension workers.

The major function of information is to increase the knowledge of the user, to reduce his or her level of uncertainty or reduce the varieties of choices available to the users of information. An informed mind is an enriched mind and if one is not informed he or she will be deformed (Adio *et al.*, 2016). An informed smallholder farmer can make reasonable choices on what type of inputs among a range of such inputs as improved seeds, pesticides and fertilizers to be applied to the farm and when to plant in order to get high production and good markets. That is why Siyao (2012) reported that information is a critical resource for socio-economic development because it empowers people to make informed choices for attaining better livelihoods. Lwoga (2010) adds that quick access to relevant knowledge and information can enable smallholder farmers to make informed decisions regarding their agricultural production activities, marketing of their agricultural produce for better profits, and benefiting from health, disease prevention and advice.

Despite the need for agricultural information among smallholder farmers, information asymmetry remains a tenacious problem in the agricultural sector of developing countries. Smallholder farmers often do not have access to all the relevant and available information necessary for them to make optimal decisions. Many farmers cannot or do not make the clear distinction between relevant and irrelevant information. A combination of low awareness of the relevance of information on the demand side, weak market linkages between market actors and poor information dissemination systems are constraints of the perfect information condition (Wilson, 1997). Furthermore, Lwoga *et al.* (2011) noted that only a small proportion of agricultural information is accessible to rural farmers despite

the large body of knowledge that exists in research institutions, universities, public offices and libraries. Without sufficient information to smallholder farmers, there will be lack of awareness about new technologies within the agricultural sector and this may lead to poor productivity and consequently a danger to the survival of the nation. The inability of the smallholder farmers to seek and access information may result in poor production output, food insecurity and inability to feed the nation. The productivity of farmers depends largely on the availability and access of accurate and reliable agricultural information. However the value of information can only be realized if it is accessed and understood (Siyao, 2012).

Agricultural information is one of the essential resources in farm production which is not given reasonable recognition in farm planning and operation (Olawoye, 1996). Farmers are forced to learn from little experience existing around them. It is argued that farmers do not adopt an improved technique because they have not heard or did not know anything about the practice. This implies that adequate information enhances rapid technology adoption hence improved production (Salau *et al.*, 2013). Despite the great role of information in disseminating important agricultural innovations, smallholder farmers in Morogoro District still have difficulties in accessing information from diverse sources in such a way that they can realize its potential in order to make informed decisions for better farming. The gap between agricultural development and available technologies for sustainable development could be attributed by poor accessibility of agricultural production information by smallholder farmers. Lwoga *et al.* (2011) observed that there are still gaps in access to information and knowledge among the rural people which need to be filled. According to Benard *et al.* (2014) information is a very important resource for all agricultural activities including improving crop productivity. Therefore if agricultural

production information is available and accessed at the right time, it will assist smallholder farmers growing sesame in Morogoro District to plan and to make decision in response to farming practices.

In Morogoro district, farmers growing sesame have failed to attain optimum yield, and the available data indicate that the average yield per hectare is 500 kg (DAICO Morogoro, Personal communication, 2016). According to Naliendele Agricultural Research Institute (2008), under improved sesame varieties, yield could be increased to 1 500 kg per hectare. Obidike (2011), reported that low yield is attributed to farmers' failure in accessing the necessary agricultural information to promote production. Therefore, this study intended to assess farmers' accessibility to sesame production information for promoting productivity.

1.2 Problem Statement and Justification

At farm level most farmers have inadequate access to and usage of the most important agricultural information services needed for production and post-harvest activities leading to dismal growth of the agricultural sector and prevalence of poverty among households whose livelihoods rely solely on agriculture (Benard *et al.*, 2014; Mtega and Benard, 2013; United Republic of Tanzania, 2011). Ajayi *et al.* (2010) reiterated that even when farmers are exposed to information, cursory observation has revealed that most disseminated information is usually given without needs assessment and identification. However various studies on information needs and accessibility of agricultural information for improving production of different crops among smallholder farmers have been carried out worldwide (Galadima, 2014; Yaseen, 2016 and Ikwuakam *et al.*, 2016).

There is little understanding about agricultural information needed by smallholder farmers growing sesame and their involvement in sesame production and how they go about in

accessing this information. In Tanzania, studies on information need and accessibility of agricultural information for improving production among smallholder farmers have also been carried out (Mtega, 2012; Ugulumu and Inanga, 2014 and Temba *et al.*, 2015). Despite all these studies little has been studied on agricultural information needs and their accessibility to sesame smallholder farmers in Morogoro district. According to (Food and Agriculture Organisation, 2013) sesame productivity in Morogoro district is 500 kg per hectare while in other places in Africa it reaches 3 000 kg per hectare. Hence, this study aims to fill the existing gap regarding agricultural information needs and their accessibility for improving production among smallholder farmers growing sesame in Morogoro district.

The findings of the study are expected to provide useful information to improve transfer of agricultural information services to the smallholder farmers for better sesame productivity in the study area. Furthermore, the findings are expected to be used by different agricultural stakeholders like researchers, extensionists, agro-dealers, policy makers and other relevant key players for sustainable agricultural development in the study area and other districts in Tanzania.

1.3 Objectives

1.3.1 Overall objective

To assess the accessibility of agricultural information needs for improving production among smallholder farmers growing sesame in Morogoro district.

1.3.2 Specific objectives

The specific objectives were;

- i. To identify sources of agricultural information used by sesame-growing smallholder farmers in Morogoro district.

- ii. To determine agricultural information needs among smallholder farmers growing sesame in the study area.
- iii. To examine challenges in accessing agricultural information among sesame growers in the study area.

1.3.3 Research questions

- i. What are the main sources of agricultural information that smallholder farmers used to access information on sesame-growing?
- ii. What types of agricultural information are needed by smallholder farmers-growing sesame in the study area?
- iii. What are challenges in accessing of agricultural information among sesame - growers in the study area?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Key Concepts

2.1.1 Smallholder farmers

Smallholder farmers are defined in various ways depending on the context, country and even ecological zones, due to different factors such as crop types, area cultivated and production. Often the term ‘smallholder’ is interchangeably used with ‘small-scale’, ‘resource poor’ and sometimes ‘peasant farmer’. In general terms smallholder only refers to their limited resource endowment relative to other farmers in the sector. According to FAO (2014) smallholders are small-scale farmers, pastoralists, forest keepers, fishers who manage areas varying from less than one hectare to 10 hectares. These smallholders are characterized by family-focused motives such as favouring the stability of the farm household system, using mainly family labour for production and using part of the produce for family consumption. However Department of Agriculture, Forestry and Fisheries (2012) defined it as those farmers owning small plots of land on which they grow subsistence crops and one or two cash crops relying almost exclusively on family labour. In Tanzania a farmer operating less than 50ha or 50 heads of cattle (local breed) is considered to be small depending on the crop (African Smallholder Farmers Group, 2011). Smallholder farmers in Tanzania dominate the agricultural sector, cultivating 5.1 m hectares annually (United Republic of Tanzania, 2015). Other scholars such as Babu *et al.* (2010) consider smallholder farmers as people who can participate in the day to day activities by providing labour and management of the farm/livestock. This study adopted the definition by DAFF (2012).

2.1.2 Information and agricultural information

Information is viewed as a basic resource used by all people to improve their condition of living and is essential for development (Emmanuel, 2012). Conceptually, information is

the message or idea being conveyed for useful purpose (Kirimi, 2013 and International Telecommunication Union, 2010). Apata and Ogunrewo (2010) 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 and management, and 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 people to perform their livelihood activities and for effective decision making in sesame farming related activities. There are various types of agricultural information on sesame related activities. These could include information on sesame 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 sesame 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.

Bachhav (2012) reported that 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 make correct decisions about what crops to plant and where to sell their produce and buy inputs among others. That is why Oyewole (2017) argued that 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, according to Mapatara (2012), farmers (including those growing sesame) 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.

2.1.3 Access to agricultural information

Access to agricultural information can be defined as 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) argued that farmers are expected to use modern channels such as mobile phones and even the Internet (for literate ones) to access agricultural information. According to 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. Masuki *et al.* (2010) and Odini (2014) 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 smallholder 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 organisations are involved in the provision of agricultural knowledge (information) (Rutatora and Mattee, 2001). That is why Shetto (2008) emphasised 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. According to Kughur (2015) 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 (Mgbada, 2006). 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 (Denyes, 2014). According to Koskei (2012) agricultural information accessed by smallholder tea 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 where crop farming like sesame growing is practiced (Lwoga *et al.*, 2011).

2.2 The Role of Information in Agriculture

In agriculture, the role of information in enhancing agricultural development cannot be over emphasized. Bachhv (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 what crops to

plants and where to sell their product and buy inputs. Accurate and timely information enables farmers to make informed decisions regarding 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. Olorunda and Oyelude (2003), add that information is essential for planning, decision making and the implementation of agricultural programmes. Achugbue and Anie (2011) spoke out that information as 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 smallholder farmers is a major factor constraining efforts to improve production in agriculture including sesame production.

2.3 Agricultural Information Sources for Smallholder Farmers

According to Bates (2012) 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 (Bitso, 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 Farooq *et al.* (2010) 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. Also, observation of people organizations, speeches, documents, picture and art work can also be described as information sources. However, Mugwisi *et al.* (2012) mentioned the following as the sources of information, libraries, internet, colleagues, personal, departmental collections, workshops and seminars. According to Ajuwon and Odeku (2012), information sources come in great diversity and various forms such as print and non-print forms. Therefore smallholder farmers including those growing sesame can obtain information from a number of sources, comprising extension workers, 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; Hassan *et al.* 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 sesame farmers in Nigeria were personal experience, radio/television and

friends. However, Benard *et al.* (2014), 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 (Unguja) 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 sesame smallholder farmers in Morogoro district before deciding for an information source to address their information needs.

2.4 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 smallholder 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 smallholder farmers need agricultural information to enhance or boost their productivity and also 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 may be 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 smallholder farmers. Food technology: Information on post-harvest food technology is needed by the farmers to get optimum benefit from their crop.

Since farmers are clearly not a homogenous group, the understanding of their specific 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; International Food Policy Research Institute, 2011 and Zarmai *et al.*, 2014). Njelekela and Sanga (2015) stated that farmers need different types of information from farm preparation to post-harvest and marketing to make informed decisions. Smallholder farmers need agricultural information to improve their farming practices and hence to improve their productivity and also 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.

Sesame farmers need different types of information for their agricultural activities. According to a study done on information needs of sesame 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, Farm Africa (2014) have reported that 920 sesame 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, intercropping 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 smallholder farmers growing sesame in Morogoro district is a first step towards satisfying their needs.

2.5 The Challenges Facing Smallholder Farmers in Accessing Agricultural Information

Various factors are known to hinder agricultural information accessibility among smallholder farmers in Tanzania (Lwoga *et al.*, 2011; Mwakaje, 2010; Saleh and Lasis, 2011). Masuki *et al.* (2010) and Mtega *et al.* (2013) reported that the problems facing farmers in rural areas in accessing agricultural information include: illiteracy, ignorance of production information sources, language barrier, widespread poverty, lack of time to access production information, unreliable agricultural information, lack of reading culture and geographical position. Also poor infrastructure, impassable roads, limited access to telecommunication networks and poor electrification are among the challenges. Babu *et al.* (2011) conducted a study on farmers' information needs and search behaviors in Tamil Nadu and showed that the major constraints facing farmers in accessing agricultural information were poor availability, poor reliability, lack of awareness of the information sources available among farmers and untimely provision of information. Illiteracy affects

one's ability to access important agricultural market information (such as price updates) and fair marketing commitments. Illiteracy does not involve inability to read and write only, but also inability to interpret agricultural market information.

2.6 Production of Sesame

Globally, sesame is produced over an area of 9.4 million hectares and annual production stands at around 4.8 million metric tonnes with average productivity of 506 kg/ha; whereas in Africa, average productivity ranges from 300 to 500 kg/ha in pure stand; but under good management it reaches as high as 3000 kg/ha (FAO, 2013). In 2014, India was the largest producer of sesame seed followed closely by Sudan. China was third in production, followed by Myanmar and Tanzania (FAO, 2015).

Sesame is one of the important oilseed and export crop in Tanzania and a source of income for many smallholder farmers, also earning the country foreign currency. Mtwara and Lindi regions currently are the main producers of sesame seeds in Tanzania. Other main producing areas in Tanzania include: Morogoro, Manyara, Dodoma and Singida regions (FAO, 2012).

The crop is gaining considerable importance in Morogoro on account of its economic value, especially its export potential, as a nontraditional export crop. According to Faty *et al.* (2012) sesame is relatively an important cash crop in Morogoro district council and it performs well in Ngerengere, Bwakila, and Mvuha areas. It is one of valuable crops which could benefit the farmers. Sesame market in Morogoro is dominated by middlemen who in turn sell the produce to Indian merchants in Dar es Salaam. Improvement in agriculture, including sesame production will facilitate poverty reduction strategies and hence improve

people's livelihoods in Morogoro. Therefore in order to improve agriculture, smallholder farmers growing sesame in Morogoro district need to access accurate agricultural information.

2.7 Conceptual Framework

This research was guided by the conceptual framework presented in Fig. 1, modified from Bystom and Javelin's (1995). The framework illustrates how smallholder farmers go about accessing agricultural information. It shows the inter-link and relationships between task category, category of information needed and the sources of information consulted. The task category in this study is sesame farming. Task category influences the type of category of information needed by the smallholder farmers growing sesame. The category of information needed in turn determines the sources of information that the smallholder farmers growing sesame consult. Included in the framework are situational factors such as the level of education, economic status, age, farm size and farming experience of farmers growing sesame. These are situational since they change and differ from one farmer to another. Additionally the situational factor strengthens farmers' ability to identify the types and sources of information needed.

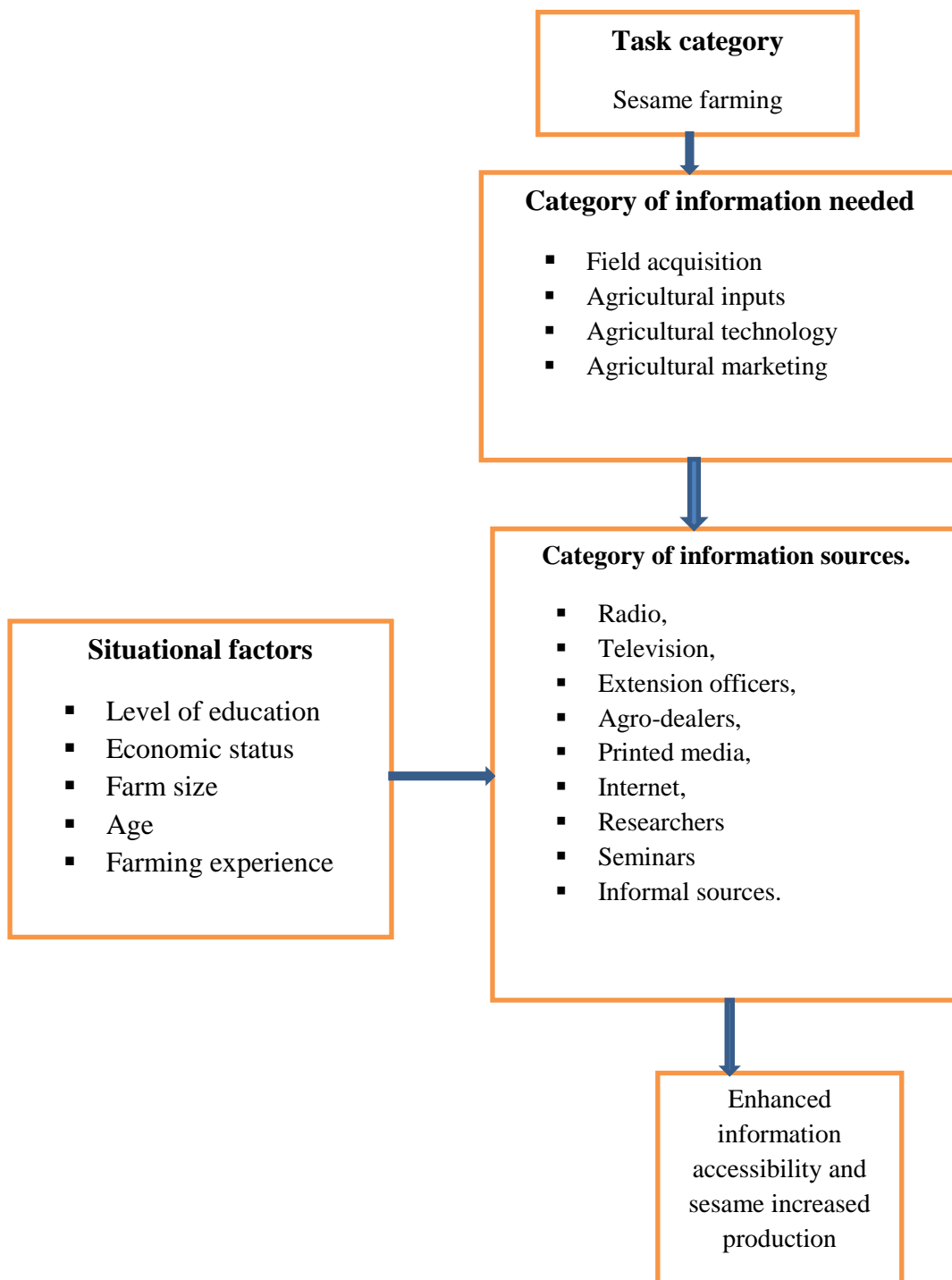


Figure 1: Conceptual framework for farmers' information needs and their accessibility.

Adapted from Bystrom and Jarvelin (1995)

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1 Location

The study was conducted in Morogoro district which is one of the six districts of the Morogoro Region of Tanzania. The District is located North East of the region and lies between Latitudes 6° and 8° South of Equator and Longitudes 36° and 38° East of Greenwich; it occupies a total area of 11 925 km² or 16.34% of the total area of Morogoro Region which has 72 973 km². It is bordered to the East by Bagamoyo and Kisarawe district (Coast region), to the South by Kilombero District, to the southwest by Kilosa District and to the west by Mvomero District. Administratively, Morogoro district is divided into 6 divisions of Mikese, Ngerengere, Mkuyuni, Matombo, Mvuha and Bwakila, 31 wards, and 151 villages. The population of Morogoro district is about 286 248 people, out of whom 140 824 are males and 145 424 are females (URT, 2013). The main food crops grown in the district are maize, rice, sorghum, cassava, sweet potatoes, legumes/pulses and vegetables. Sesame is grown as a cash crop. Cattle, goats, pigs and poultry are the main livestock kept in the district (URT, 2007).

The district is selected because of being potential for sesame production (DAICO Morogoro, Personal communication, 2016 and Faty *et al.*, 2012). The crop is grown as a cash crop and grows best in all divisions except in some villages of Matombo and Mkuyuni divisions. It is a highly drought resistant crop and is gaining considerable importance in Morogoro district on account of its economic value, especially its export potential, as a non-traditional export crop.

3.1.2 Climate

Annual average temperatures range from 20.0°C to 30.0°C. Average rain ranges from 600 - 3 000 mm per annum. There are two rain seasons, short and long rain seasons. Short rains fall in October –December, long rain season start from March and ends in May, with dry spell between January and February. August to November is usually a dry and hot season. Morogoro district is endowed with an extensive land with fertile soils. The types of soils vary from sandy soils, clay soils, and loam soils. It has about 75 321 ha of arable land for different crops (Faty *et al.*, 2012).

3.1.3 Topography

Morogoro District is divided into three agro-ecological zones, namely the High mountainous zone, Low mountainous zone and Savannah zone. High mountainous zone covers 25% of the whole area of this District which is found on Uluguru ranges above 1 200 m.a.s.l. In this zone the total annual rainfall is 1 000 – 3 000 mm. This area is favourable for legumes/pulses, spices coffee, banana, tea, vegetables and fruits (Faty *et al.*, 2012).

Low Mountainous Zone covers 20% of the whole area of the district. It ranges from 600 m to 1 200 m above sea level. The average annual rainfall is between 1 000 – 2 000 mm and has a maximum temperature of 29°C. This zone is dominated by sandy soils which are suitable for maize, cassava, sorghum and sesame. The area is also conducive for livestock keeping (Faty *et al.*, 2012).

Savannah Zone covers 55% of the whole area of the district. The area elevates between 600 to 800 m above sea level. The average annual rainfall is between 900 to 1 200 mm.

and is endowed with a number of rivers originating from the higher zones. These are Mgeta kafa, Ruvu, Wami, Msongozi, Mbulumi, and Ngerengere Rivers. These rivers provide livelihoods option for communities downstream. The zone is dominated by deposited alluvial soils suitable for maize, vegetables, fruits, sorghum, sesame and rice production (Faty *et al.*, 2012).

3.2 Research Design

A cross-sectional research design was adopted for this study. This design allows for collection of information at one point in time, from a selected sample of respondents and can be used for a descriptive study as well as for determination of relationship between variables (Babbie and Mouton, 2005).

3.3 Study Population, Sampling Procedure and Sample Size

This study targeted all smallholder farmers involved in sesame production in Morogoro District.

3.4 Sampling Procedure

Simple random sampling was used in selecting two wards out of 20 wards growing sesame. The selected wards were Tununguo and Bwakila Chini. One village was randomly selected from each randomly selected ward to make up two study villages from eight villages growing sesame in sampled wards. These were Mlilingwa and Bwakila Chini. From the two villages, a list of all smallholder farmers growing sesame was prepared with the assistance of village leaders and village extension officers and from these a total of 60 farmers were randomly selected from each village to form a total sample of 120 farmers. Simple random sampling particularly lottery method was used

because it allows each member in the study population to have an equal chance of being included in the sample.

3.5 Sample Size

The sample size consisted of 120 respondents who were randomly selected. According to Matata *et al.* (2001) a sample size of 80-120 respondents is adequate for most socio-economic studies in Sub-Saharan Africa.

3.6 Data Collection Instruments

Interview schedules with open and close ended questions, checklists and researcher's diary were the instruments used to collect data. Interview schedules were used to collect data from individual respondents, checklists were used to collect relevant data from Focus Groups and key informants. The researcher's diary was used to collect any observed relevant data.

3.6.1 Pre-testing of the interview schedule

A pilot survey was conducted prior to the actual study to test the interview schedule in order to ensure understanding and its accuracy (to check whether the questions were clear, specific and relevant to the study objectives). This instrument was developed by the researcher in collaboration with the supervisor. Twenty randomly selected smallholder farmers growing sesame from Sinyaulime village in Morogoro district participated in the pre-testing. Thereafter the initial draft of the interview schedule questions was revised basing on the pre-test results.

3.6.2 Primary data collection

Primary data were collected from the respondents who were smallholder farmers growing sesame. The interview schedules were administered to respondents by the researcher and

researcher assistants. The primary data collected covered the questions measuring sesame information sources, sesame information needs and challenges encountered in accessing sesame information. Direct observation was made in order to verify and supplement some of the information given during the interview and FGDs.

3.6.3 Secondary data collection

Secondary data collected include information about sesame production trend, sesame growing seasons, institutions involving in providing sesame information to growers, challenges facing sesame growers, various agronomic practices adopted during sesame production and information needed to improve sesame production. The above data were obtained through different reports from DAICO Morogoro district.

3.7 Data Processing and Analysis

Data collected through interview schedule were summarized and coded for computer analysis using the International Business Machines Corporation Statistical Package for Social Sciences programme (IBM SPSS) computer software version 16. Descriptive statistics such as frequencies, mean, percentages and standard deviation were computed and are presented in this report. Qualitative data from FGD and key informant interviews were summarized and analyzed manually using content analysis.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the results of the study. The chapter is divided into four sections namely, socio-economic characteristics of the respondents, sources of agricultural information used by sesame-growing smallholder farmers, the agricultural information needs among smallholder farmers growing sesame, lastly challenges in accessing agricultural information among sesame growers in the study area.

4.1 Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents, described in this study include age, sex, level of education and marital status. Others are size of land cultivated, farming experience, annual income and sources of income. These basic characteristics were considered important because they have a certain influence on development initiatives introduced in a given social setting. They also give the general information about the selected sample and the population from which they were drawn.

4.1.1 Sex

Findings presented in Table 1 show that 70.8% of the respondents were male and 29.2% were female. These findings are similar to other studies on information behaviour in most parts of developing countries. A study on agricultural information needs and sources of rural farmers in Tanzania noted that more men (57%) were involved in the study than women (43%) (Elly and Silayo, 2013). The findings imply that sesame farming in the study area is dominated by male farmers. This is in line with FAO (2017), Word Bank *et al.* (2009) and Joyce Lyimo-Macha and Mdoe (2002), who reported that there is a

tendency of male members of most families to engage themselves in cash crops rather than food crops which is left to female members. This is in line with finding by Peterman *et al.* (2011) that in Africa men dominate the production of cash crops while women are primarily responsible for the supply of food to the family.

Table 1: Sex, education level and marital status of respondents (n=120)

Characteristics	Number of respondents	Percentage
Sex		
Male	85	70.8
Female	35	29.2
Total	120	100.0
Education level		
None	21	17.5
Adult literacy	3	2.5
Primary school	93	77.5
Secondary school	2	1.7
College	1	0.8
Total	120	100.0
Marital status		
Single	6	5.0
Married	96	80.0
Divorced	11	9.2
Widow	7	5.8
Total	120	100.0

4.1.2 Level of farmers' education

The overall data on level of education in Table 1 indicate that 77.5% of the respondents had attained primary education and 1.7% had attained secondary school level of education while 2.5% had attended adult literacy level. In addition, 0.8% of the respondents had attained college level education. However a considerable number of respondents (17.5%) had not attended school at all. This implies that majority of the sesame smallholder farmers had attained primary level education. Their level of education affects information accessibility, comprehension and adoption of new agricultural innovations and practices (Aina *et al.*, 1999). Education and training equip smallholder farmers with skills that enable them to live and positively contribute towards the development of their society and

therefore well-educated farmers can easily access agricultural information from different sources, and can be able to create knowledge out of those sources which will have positive impact on their sesame production (Benard *et al.*, 2014). However, it should be understood that these farmers have very little education - most of them attended primary school. Aina (2004) stressed that because of inadequate education, poor income and lack of basic facilities in rural areas, farmers may not be able to access the information in print, electronic and other sources.

4.1.3 Marital status

The marital status of respondents is presented in Table 1 where it shows that 80% were married, 9.2% were divorced, 5.8% were widowed and 5.0% were single. The result is line with that of Ikwuakam *et al.* (2016) on Information Needs of sesame farming households in selected agricultural zones of Katsina state, Nigeria, the study revealed that the majority of the respondents were married (89.3%) and 10.7% were single. From these findings most of sesame smallholder farmers are married. It is assumed that couples usually help one another for various farming activities, share experience from accessing recommended agricultural technologies (Swanson, 2010). Therefore marital status could contribute to enhance sesame production through accessing agricultural information.

4.1.4 Age

Age is a very important variable determining the state of participation for both women and men in any economic activities like farming. It is also very easy to determine the labour force of the community and country at large. For example, in Tanzania people aged 15-64 are regarded as productive age group or working age population (URT, 2013). Study results presented in Table 2 reveal that the age of the respondents ranged from 22 to 89

years with a mean age of 44.3 years. This shows that majority of the respondents falls under a group of working age and are still in their active age, have the ability to supply the labour required and capable of undertaking rigorous activities in sesame farming production.

4.1.5 Farms size

The size of land planted with other crops such as maize and rice apart from sesame was ranging from 0.4 ha to 6.9 ha with a mean of 2.2 ha (Table 2). On the other side, the average sesame farm size cultivated was 0.8 ha; the maximum was 3.2 ha and minimum 0.2 ha. The findings show that sesame smallholder farmers are also engaged in farming of other crops such as maize, rice, sorghum, and various vegetables, probably for improvement of their income. Sesame production during the last season ranged from 0 kg to 3 000 kg per farmer with a mean of 151.09 kg. The farm gate prices for sesame seeds per kilogram were TZS 900 to TZS 2 100 and the average was TZS 1 476.9.

Table 2: Age, sesame farm size cultivated, land size cultivated, sesame farming experience, sesame production level, and price of sesame seeds (n=120)

Characteristics	Minimum	Maximum	Mean
Age	22.0	89	44.3
Sesame farm size cultivated	0.2	2.8	0.8
Land size cultivated of other crops	0.4	6.9	2.2
Sesame farming experience	2.0	54	13.1
Production level in season (2015/2016)	0.0	3 000	151.09
Price of sesame seeds (2015/2016)	900	2 100	1476.9

4.1.6 Sesame farming experience

Farming experience is gained over time as one continues to engage in farming. Farming experience is therefore related directly one's age among other factors. The study done by

Anigbogu *et al.* (2015) on socio-economic factors influencing agricultural production among cooperative farmers in Anambra state, Nigeria had revealed that, over 80% of the respondents had above ten years of farming experience, which invariably was expected to impact positively on agricultural production. Accordingly, farming experience is measured as the number of years in farming. According to the study findings in Table 2, the mean of farming experience among respondents was 13.1 years. The most experienced farmer had 54 years of farming experience and the least experienced had farmed for two years. The results (the mean) imply that the respondents are very much experienced in sesame farming activities. Experience in farming may influence the ability of sesame farmer to access relevant information that will help them in boosting crop production.

4.1.7 Respondents income generating activities

Respondents were asked to indicate their sources of income apart from sesame production. The findings in Table 3 show that 74.2% of the respondents indicated that their source of income was other crops such as rice and maize. Also 20% of the respondents indicated small scale business such as charcoal selling, local brew selling, operating kiosk and food selling (*mama lishe/mghahawa*). Findings further show that 5.8% of the respondents reported livestock keeping such as goats, pigs as their source of income. Likewise, respondents were asked to indicate their main goal for growing sesame. The results in Table 3 show that 90.8% grow sesame for commercial purposes, while 9.2% grow sesame for both commercial and home consumption. The findings suggest that, sesame production is considered a commercial crop in the study area, where majority of the sesame smallholder farmers depend on it for cash earning.

Furthermore 92.5% of the respondents sold their sesame produce at farm gate. According to these findings 7.5% of the respondents had nothing to sell due to poor yield gained.

During FGDs it was noted that the smallholder farmers in the study area sell their produce at farm gate through brokers at unreasonable price (low price).

Table 3: Goal for growing sesame, sources of income excluding sesame and sesame market (2015/2016) (n=120)

Farm activities	Frequency	Percentage
Goal for growing sesame		
Commercial	109	90.8
Both commercial and home use	11	9.2
Total	120	100.0
Sources of income excluding sesame		
Other crops	89	74.2
Livestock	7	5.8
Small scale business	24	20.0
Total	120	100.0
Where did you sell your produce last season		
At farm	111	92.5
Did not sell anywhere	9	7.5
Total	120	100.0

They added that; sometimes farmers are paid in advance from brokers for informal agreement that the sesame seeds should be sold to them soon after harvesting. During structured interviewing one respondent from Mlilingwa village said:

“It happened one day some years back when I tried to transport my sesame harvest to Dar es Salaam market but at the end of the day I got a very big loss, which was contributed by a lot of levy/taxes and other obstacles in between before I reached the market place. I will never repeat it as it is better to sell my produce through brokers/middlemen rather than going far for searching good market”.

This implies that giving farmers low prices of sesame seeds does not motivate them to access agricultural information which could in turn help the farmer improve production of sesame.

Results in Table 4 show that the annual income of respondents from sesame production was TZS 60 000 as minimum, TZS 1 800 000 as maximum and TZS 422 222 as mean. On the other hand minimum, maximum and mean income from other sources was TZS 160 000, TZS 9 350 000 and TZS 1 515 080 respectively. The income level of the sesame growers is lower than the Tanzania per capita income which is TZS 2 131 299 (URT, 2017).

Table 4: Annual income from sesame and from other sources in 2015/2016

Sources of annual income	Minimum	Maximum	Mean
From other sources	160 000	9 350 000	1 518 050
From sesame production	60 000	1 800 000	422 222.2
Total	220 000	111 550 000	1 940 272

Level of income is among the factors influencing farmers choice of source of information; farmers with low level of income have poor use of different sources of agricultural information within sesame growers, and this might affect production of sesame negatively. The farmer with higher income would tend to look for more information from different information sources (Benard *et al.*, 2015). Benard *et al.* (2014) stated that the impact of high income is to access agricultural information by any cost. The other scholar Koskei (2012) found that the higher the income earned the more the farmers' financial capacity which increases the probability of investing in new agricultural technologies.

4.2 Sources of Information on Sesame Production

The study investigated various sources of information from which farmers in the study area access sesame information and the results are presented in Table 5. The results in Table 5 show that 98.3% of the responses indicated personal experience as a source of information, 94.2% used friends and neighbours, 92.5% used brokers, 66.7% consulted

agro-dealers and 52.5% used extension officers. However none of the respondents were using researchers, posters and workshops as the source of sesame information in the study area. The findings agree with previous studies that farmers can access information from a number of sources, including, among others, their own experience and from members of their social network (Ikwaakam *et al.*, 2016; Titus, 2016; Aker, 2010). Lwoga (2010) reported that sources of agricultural information for farmers were mainly local such as neighbours, friends and family members. The findings contradict with Daudu *et al.* (2009) who observed that agricultural information was mostly accessed from agricultural extension agents.

Table 5: Sources of Information on Sesame Production (n=120)

Sources of sesame information	Number of responses	Percentages
Own experience	118	98.3
Friends/neighbours	113	94.2
Brokers	111	92.5
Agro-dealers/stockists	80	66.7
Extension officer	63	52.5
Radio	40	33.3
Farmer magazines/Books	5	4.2
Cell phone	4	3.3
Interment	4	3.3
Television	3	2.5
Agricultural show	3	2.5
NGOs/CBOs	3	2.5
Newsletter	1	0.8
Researchers	0	0
Posters	0	0
Workshops	0	0

NB: Percentage not adding to hundred because it is a multiple response

In addition, the use of internet as the source of sesame information in the study area was 3.3%. The findings are similar to Dankwah (2014) who stated that Internet usage requires

some skills which may make it unpopular within farming communities. Benard *et al.* (2015) found that low level of internet use as source of agricultural information among farmers was contributed by unavailability of these sources, low level of education and lack of awareness on the use of internet.

4.3 Distribution of Respondents by Sources of Sesame Agricultural Information

Production management practices in the context of this study refer to the information that explains specific techniques of given sesame agronomic practices. Respondents were asked to indicate the sources of agricultural information related to various sesame production aspects.

4.3.1 Sources of information accessed about proper planting time

Findings in Table 6 show that 97.5% of the responses rely on personal experiences, 13.3% rely on friends/neighbours and 4.2% rely on radio as the source of information on proper planting time. Other sources of information from which sesame farmers access information on proper planting time were television (0.8%), agro-dealers (0.8%), agricultural show (0.8%) and NGOs/CBOs (0.8%).

Table 6: Sources of information on proper planting time (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Proper planting time	Personal experience	117	97.5
	Friends and neighbours	16	13.3
	Radio	5	4.2
	Television	1	0.8
	Agro-dealers	1	0.8
	Agriculture show	1	0.8
	NGOs/CBOs	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.2 Sources of information on recommended plant spacing

Sources of information from which respondents accessed recommended plant spacing information are shown in Table 7. The findings revealed that 89.2% of the responses cited personal experience, 19.2% cited extension officers, and 19.2% cited friends and neighbours while 2.5% cited NGOs/CBOs as the source of information on recommended plant spacing.

Table 7: Sources of information accessed about recommended plant spacing (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Recommended plant spacing	Personal experience	107	89.2
	Extension officers	23	19.2
	Friends and neighbours	23	19.2
	NGOs/CBOs	3	2.5
	Agricultural show	2	1.7
	Internet	2	1.7
	Agro-dealers	1	0.8
	Farmers magazines/books	1	0.8
	Radio	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.3 Sources of information on improved methods of weeding

Table 8 shows sources of agricultural information on improved methods of weed control. Findings indicate that 97.5% of the responses rely on personal experience, 7.5% on friends and neighbours, 2.5% on extension officers, 2.5% on NGOs/CBOs, 1.7% on farmers magazine/books and 0.8% rely on agricultural show as the source of information for improved methods of weeding.

Table 8: Sources of information accessed about improved methods of weeding

Sesame production information	Sources of information	Number of responses	Percentages
Improved methods of weeding	Personal experience	117	97.5
	Friends and neighbours	9	7.5
	Extension officers	3	2.5
	NGOs/CBOs	3	2.5
	Farmer magazine/leaflets/books	2	1.7
	Agricultural show	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.4 Sources of information accessed on fertilizer application

Table 9 shows sources of agricultural information on fertilizer application. Findings indicate that 2.5% of the responses rely on extension officers, 0.8% on farmers magazine and books, 0.8% on agricultural show and 0.8% on NGOs/CBOs as the source of information on fertilizer application. However during interviewing with village extension officer from Milingwa village about fertilizer application, he said sesame farmers do not apply inorganic fertilizers in their farms believing that the soil fertility is adequate and application of this fertilizer could harm or destroy the soil. During FGD it was confirmed that the use of inorganic fertilizer in sesame farming will destroy the soil fertility in such a way that without fertilizer application no subsequent production is possible.

Table 9: Sources of information accessed about fertilizer application (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Fertilizer application	Extension officers	3	2.5
	Farmer magazines/books	1	0.8
	Agricultural show	1	0.8
	NGOs/CBOs	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.5 Sources of information on pest control

Findings in Table 10 shows source of information on pest control. Findings indicate that 70.0% of the responses depend on their friends and neighbours, 66.7% depend on agro-dealers, 52.5% depend on extension officers and 26.7% depend on their personal experience to access sesame information on pest control. During focus group discussion it was reported that farmers went to agro-dealers to buy pesticides for controlling pests which were destroying sesame plants. It was also noted that sesame farmers went to extension officers to ask for recommended chemicals and their application for controlling pests.

Table 10: Sources of information accessed about Pests control (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Pests control	Friends and neighbours	84	70.0
	Agro-dealers	80	66.7
	Extension officers	63	52.5
	Personal experience	32	26.7
	Cell phone	3	2.5
	Radio	2	1.7
	Farmer magazines/leaflets/books	2	1.7
	Agriculture show	2	1.7
	Internet	2	1.7
	NGOs/CBOs	2	1.7

NB: Percentage not adding to hundred because it is a multiple response

4.3.6 Sources of information on harvesting methods

Table 11 shows sources of information on harvesting methods. Findings indicate that 92.5% of the responses depend on their personal experience, 7.5% get information through friends and neighbours, 2.5% responses accessing sesame information through extension officers.

Table 11: Sources of information accessed about harvesting methods (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Harvesting methods	Personal experience	111	92.5
	Friends and neighbours	9	7.5
	Extension officers	3	2.5
	Farmer magazines/books	1	0.8
	Internet	1	0.8
	NGOs/CBOs	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.7 Sources of information on improved methods of post-harvest handling

The results in Table 12 show sources of information on improved methods of post-harvest handling. Findings indicate that 94.2% of the responses depend on their personal experience, 5.0% get information through friends and neighbours, 2.5% responses accessing sesame information through extension officers. Other responses get information on post harvesting through farmer magazine/books 0.8%, internet 0.8% and NGOs/CBOs 0.8%.

Table 12: Sources of information accessed about improved methods post-harvest handling (n=120)

Sesame production information	Sources of information	Number of responses	Percentages
Post harvesting methods	Personal experience	113	94.2
	Friends and neighbours	6	5.0
	Extension officers	3	2.5
	Farmer magazines/books	1	0.8
	Internet	1	0.8
	NGOs/CBOs	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.3.8 Sources of information on marketing

The results in Table 13 show sources of information on marketing. Results indicate that 93.3% of the responses depend on brokers, 63.3% get information through friends and

neighbours and 33.3% through radio. However other sources mentioned were cell phone 2.5%, personal experience 2.5% and each for television, researchers and NGOs/CBOs 0.8%. During FGD when asked to indicate sources of information accessed about marketing they replied that most of the farmers are getting market information through brokers (people/business men-*dalali* who buy sesame seeds from farmers and sell them to traders). It was also confirmed by extension officers from Mlilingwa and Bwakila Chini villages during key informant interviewing who said that sesame farmers are mostly getting market information through brokers and friends.

Table 13: Sources of information accessed about marketing (n=120)

Sesame production information	Source of information	Number of responses	Percentages
Marketing	Brokers	112	93.3
	Friends and neighbours	76	63.3
	Radio	40	33.3
	Cell phone	3	2.5
	Personal experience	3	2.5
	Television	1	0.8
	Researchers	1	0.8
	NGOs/CBOs	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

4.4 Sesame Information Needs

The second objective of this study was designed to identify the agricultural information needed by sesame farmers in the study area. In order to address this objective, data were collected through an interview schedule and focus group discussions. Respondents were asked to indicate the information they needed regarding sesame production, and they were allowed to give more than one answer. The study findings in Table 14 indicate that 99.2% of the responses on the needed information was on pest and disease management, 90.8%

were on market information while 89.2% were on improved varieties. Additional needs that were mentioned include weather information (59.2%), access to credit facilities (59.2%) and sowing techniques (58.3%). Likewise the following sesame information needs were also mentioned: land preparation (24.2%), soil conservation (20.0%), weed control methods (19.2%), fertilizer management (10.0%), improved storage methods (10.0%), thinning practices (9.2%) and post-harvest techniques (8.3 %).

Table 14: Sesame information needs

Information needs	Number of responses	Percentage
Diseases and pests management	119	99.2
Market information	109	90.8
Improved seed varieties	107	89.2
Access to credit facilities	71	59.2
Weather information	71	59.2
Sowing techniques	70	58.3
Land preparation	29	24.2
Soil conservation	24	20.0
Weed control methods	23	19.2
Fertilizer management	12	10.0
Storage methods	12	10.0
Thinning practices	11	9.2
Post-harvest techniques	10	8.3

NB: Percentage not adding to hundred because it is a multiple response

These results were supported by both FGDs from Mlilingwa and Bwakila Chini villages, that they were high demand on information on sesame seed marketing, improved sesame seed, pest and disease management, weather condition, access to credit facilities and sesame sowing techniques. During standardized interviewing one respondent from Bwakila Chini village had this to say:

“Pests and diseases was not a problem in previous years. But in recent years this is a big challenge for us. We request our government to help us to look for the solution of this problem because most of us we are going to shift to other cash crop if the problem will exist. (We are going to look for alternative crop)”

However, during FGDs in both villages Mlilingwa and Bwakila Chini, it was declared that sesame yield per unit area is decreasing year after year. Pests and diseases was one of the reasons mentioned to cause these changes, other reasons were unreasonable price for sesame seeds received from brokers and unavailability of agricultural inputs such as seeds, insecticides and fungicides which are obtained far away from the village.

Another respondent from Bwakila Chini village had also this to say:

“I do not prefer brokers because they use mozambique (this is a plastic bucket bigger than the standard one of 20l, probably this type of bucket is brought from Mozambique) as a measurement unit when buying sesame seed from us and gave us less price per mozambique but they used the standard one to traders for more price. (The price only favored brokers and traders)”

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 small scale 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 sesame farming households in selected agricultural zones of Katsina State, Nigeria proved that pest and disease management practices was among the sesame information highly needed by majority of small scale farmers.

On the other hand, the findings are similar to findings of Ogungbeni *et al.* (2013) and Benard *et al.* (2014) 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. The findings contrast that of Titus (2016) on information needs of smallholder sesame farmers in Bangladesh showed that fertilizer use and post-harvest methods and techniques were the most requested information needs.

4.5 Sources of Seeds for the Last Season

Findings in Table 15 show the sources of seeds for the last growing season (2015/2016). The findings indicate that 61.7% of responses used sesame seeds from their own source of production, this means that, the vast majority of sesame seeds sown each season derives from seed that farmers have saved from the previous harvest, and this is supported by the study made in Morogoro and Mvomero districts by African Centre for Biodiversity (2015) which revealed that 80% of farmers surveyed were practicing seed saving. However 25.0% of responses exchange with fellow farmers with other crops, 11.7% purchased seeds from stockists/agro-dealers, 2.5% purchased seeds from village market and 1.7% of the responses obtained seeds from research institutes. In general the findings show that sesame smallholder farmers had low level of accessing improved seeds from the stockiest/agro-dealers. The study implies that there is high risk of low yields, occurrence of pests and diseases frequently if farmers will persist in using uncertified sesame seeds. The sesame production could be adversely affected.

Table 15: Different sources of sesame seeds in last season

Sources of seeds	Number of responses	Percentage
Own source production	74	61.7
Exchange with fellow farmers	30	25.0
Stockiest/agro-dealer	14	11.7
Village market	3	2.5
Research institute	2	1.7

NB: Percentage not adding to hundred because it is a multiple response

4.6 Preferred Form for Receiving Information on Sesame Production

Respondents were asked to indicate the form in which they would prefer to receive sesame information; they were required to indicate more than one form. The findings in Table 16 show that 95.8% of the responses preferred mostly physical contact with the source, while 70.8%, 36.7%, 14.2%, 12.5% and 6.7% indicated they prefer mostly exhibition and displays, printed media, audio cassettes, film and drama respectively. Furthermore, results in Table 16 indicate that 35.8% of the responses did not prefer drama for receiving information on sesame production while 19.2%, 13.3% and 9.2% indicated printed media, film and audio cassettes respectively.

During FGDs, farmers confirmed that one of the most preferred form for receiving sesame information is physical contact with the source.

In addition during FGDs in Mlilingwa village one farmer quoted saying that:

“I prefer to access information from the Agricultural Extension Officer because he is knowledgeable and skilled, not only that but also you can ask him questions and get the answers on the spot”.

According to Lwoga *et al.* (2011), getting information through physical contact with the source of information is considered to be two way communications, for example, small-scale farmers are interested with the medium such as Agricultural Extension Officer which offers a two-way interaction exchange of information where someone can agree or ask question for the sake of more understanding for the needed information. In addition a study by Yusuf *et al.* (2013) found that the majority of farmers believed more in extension officers than any other source of information. This type of information source permits face to face contact and this might be the reason of being preferred. This study implies that, even though formal sources such as extension officers may not have been effective in accessing sesame related information, farmers still recognize them as good sources of information.

Table 16: Preference form for receiving information on sesame production

Preference forms	Most preferred		Preferred		Least preferred		Not preferred	
	n	%	n	%	n	%	n	%
Physical contact with the source	115	95.8	5	4.2	0	0.0	0	0.0
Exhibition and displays	85	70.8	33	27.5	1	0.8	1	0.8
Printed media	44	36.7	43	35.8	10	8.3	23	19.2
Audio cassettes	17	14.2	65	54.2	27	22.5	11	9.2
Film	15	12.5	61	50.8	28	23.3	16	13.3
Drama	8	6.7	39	32.5	30	25.0	43	35.8

NB: Percentage not adding to hundred because it is a multiple response

4.7 Challenges Encountered in Accessing Information Pertaining Sesame Production

Farmers were asked to indicate challenges encountered in accessing information pertaining sesame and to choose their answers from the checklist. Their responses are indicated in Table 17, showing that the challenges faced by respondents in accessing sesame information were; low level of income 75.0%, inadequate contact to extension agent 67.5%, ignorance to information source 64.2% and distance to information sources 54.2%. Furthermore, 44.2% declared lack of personal interest, 42.5% declared lack of rural electrification, 36.7% declared poor cell phone communication network while 14.2% mentioned illiteracy. Other challenges mentioned were; time to look for information 8.3%, inability and inaccessibility to get information 2.5%, inadequate transport facility 0.8%, poor television communication network 0.8% and language barrier in accessing information 0.8%.

The majority of the respondents cited low level of income in the study area was one of the challenges encountered by sesame smallholder farmers in accessing agricultural information related to sesame production. Additionally during focus group discussion it was revealed that some of the organizations such as TAHA were supporting farmer's

groups financially to attend trainings and seminars on various crops such as vegetables but none was conducted for sesame.

Table 17: Challenges encountered in accessing information pertaining sesame production

Challenges	Number of responses	Percentages
Low level of income	90	75.0
Inadequate contact to extension agent	81	67.5
Ignorance to information source	77	64.2
Distance to information sources	65	54.2
Lack of personal interest	53	44.2
Lack of rural electrification	51	42.5
Poor cell phone communication network	44	36.7
Illiteracy	17	14.2
Time to look for information	10	8.3
Inability and inaccessibility to get information	3	2.5
Inadequate transport facility	1	0.8
Poor television communication network	1	0.8
Language barrier in accessing information	1	0.8

NB: Percentage not adding to hundred because it is a multiple response

Moreover, farmers were interested in attending Morogoro agricultural show but due to financial problem they did not afford. This means that due to inadequate financial power, sesame smallholder farmers could not afford to access information related to sesame production.

The finding is supported by Daudu *et al.* (2009) who stated that financial problems, inadequacy of facilities and incomplete information were some of the problems encountered by farmers in Nigeria in accessing agricultural information. Similarly Diagne and Zeller (2001) who stated that insufficient capital and lack of access to credit have been explicitly recognized as one of the critical factors limiting the growth of the smallholder farmers in adopting basic agricultural technologies.

The findings further revealed the inadequate contact to extension agents as one of the challenges encountered farmers from accessing sesame information. For example, in the study area, one extension officer for crops was present in each village visited, however they did not have any means of transport such as motorcycle for visiting sesame farmers who were scattered all over the village. In addition Farmer Field Schools (FFSs) conducted through extension officers of both villages Mlilingwa and Bwakila Chini were only for food crops such as maize but not for sesame. The extension officer from Bwakila Chini said although sesame farmers are aware of having extension officer working in their area, but they are not consulting him for issues concerning sesame production, only few come to seek advice for pests and disease management. In view of this, it is not easy for extension officers to contact many sesame farmers frequently. This finding is supported by Ikwuakam *et al.* (2016) who stated access to sesame information by majority of selected agricultural zones of Katsina State, Nigeria was constrained by lack of extension agents' contacts, poor television communication network and lack of power supply.

Furthermore the study revealed that ignorance to information source (farmers were not aware on existence of information sources) was one of the challenges identified to encounter sesame smallholder farmers in accessing information in the study area. These findings are in line with Benard *et al.* (2014) who found that lack of awareness of information sources have caused smallholder farmers problems in accessing agricultural information properly. Similarly Lwoga *et al.* (2010) reported that the unavailability of extension officers, lack of awareness of information sources and long distances for consultations with extension officers were the key factors that hindered farmers from accessing information. There is therefore a need to create awareness regarding the available information and information sources.

This implies that farmers are unable to access reliable agricultural information from reliable sources as a result they found it difficult to adhere to improved technology in farming activities which could enable them to improve sesame productivity. It is therefore important to deal with all the factors which hinder access to sesame information, in order to enhance accessibility as well as productivity.

4.8 Factors Facilitating Access to Sesame Agricultural Information

Farmers were asked to indicate the factors that facilitate them to access sesame information. The findings presented in Table 18 show that 63.3% of responses indicated the availability of the source and cheaper in terms of cost (49.2%) were the main factors fascinating them to access sesame information. Other factors mentioned were: convenience of the source 30.8%, reliability of the information source 25.0%, and skills in using the information source 11.7%. During focus group discussions proved that the main factor facilitating sesame smallholder farmers to access agricultural information pertaining sesame production was availability of the source of information. One participant from Mlilingwa village quoted saying,

“Our extension officer should be provided with accommodation within the village boundary to make him to be available all the time instead of having his residential out of the village as it is now”.

The farmer meant that he will be motivated to access sesame information through extension officer if he is available all the times within the village boundary. These findings are in line with recent study by Msoffe (2015) which revealed that the availability of information, convenience and reliability of the information source, affordable cost of accessing information, and influence from fellow farmers were the major factors that motivated farmers to access poultry management information.

Table 18: Factors facilitating accessing of information

Factors	Number of responses	Percentages
Availability of the source	76	63.3
Cheaper in terms of cost	59	49.2
Convenience of the source	37	30.8
Reliability of the source	30	25.0
Skills in using the source	14	11.7

NB: Percentage not adding to hundred because it is a multiple response

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It can be concluded that access to agricultural information is very important for improvement of the sesame production and improve livelihoods among smallholder farmers growing sesame. The findings of the study show that majority of the farmers rely on informal sources of information from personal experience, friends, neighbours and brokers to access agricultural information for sesame. It was also found that most of the sesame growers do not use extension officers to access sesame information although they are aware of their availability. The study showed that although the smallholder farmers growing sesame had high level for information needs including pest and disease management, market information, improved seed varieties, weather information, access to credit facilities, improved sowing techniques and others, they had less access to this information. It was also discovered that the challenges encountered in accessing information pertaining sesame production were: low level of income, inadequate contact to extension agents, and ignorance to information source (lack of awareness of information sources); others include distance to information sources, lack of personal interest and lack of rural electrification.

5.2 Recommendations

Based on the findings of the study, the following recommendations were made:

- i. Adequate effort should be done by Morogoro District Council through the Department of Agricultural Extension to motivate and assist smallholder farmers growing sesame to access agricultural information on improved technologies

including market prices and weather condition from formal sources such as extension agents. Provision of leaflets and improving extension services could be one of the strategies for facilitating sesame smallholder farmers to access agricultural production information.

- ii. The Morogoro District Council should build the capacity of sesame farmers through training, sensitization and empowers them to access relevant information from multiple sources based on their information needs. This can increase their chances of accessing formal agricultural information that are relative to sesame farming.
- iii. There is the need for extension programme in the district to address sesame information needs appropriately before delivering extension services to farmers.
- iv. Also it is recommended that affordable credit/loan should be disbursed by government or any other related organisation to sesame farmers, so that they can improve their production information accessibility through modern information sources and hence improved productivity.

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APPENDICES

Appendix 1: The Interview Schedule for Smallholder Farmers Growing Sesame

Section A: Basic data

Tick the appropriate response (s) where alternatives are provided or fill the genuine answers in the spaces provided.

- A1. Date of interview.....
- A2. Interviewer.....
- A3. Village.....
- A4. Ward.....
- A5. Serial number of respondent.....
- A6. Respondent average sesame farm size cultivated.....
- A7. Total land size cultivated by respondent.....

Section B: Respondents' personal data and socio-economic characteristics.

- B1. Sex of the respondent. 1. Male [] 2. Female []
- B2. Age of the respondent ----- years
- B3. Marital status of the respondents
1. Single [] 2. Married [] 3. Divorced [] 4. Widow [] 5. Others.....
- B4. What is your highest level of education?
1. None 2. Adult literacy. 3. Primary education. 4. Secondary education
5. College. 6. Others (specify)
- B5. For how long have you been practicing sesame farming.....years
- B6. What is your main goal for growing sesame?
1. Commercial []; 2. Home use []; 3. Both commercial and home use [];
4. Others (Specify).....

B7a. What is your estimated annual income in Tshs.....

B7b. What is your estimated annual income from sesame production in Tshs.....

B8. What are other sources of income excluding sesame?

1. Other crops [] 2. Livestock [] 3. Business []

4. Small scale business [] 5. Others (specify) []

B9. What was the sesame production level for the last season (2015/2016)?

Season	Production level (kg)
2015/2016	

B10. Where did you sell your sesame produce last season?

1. At farm gate [] 2. Village market [] 3. Other
(Specify).....

B11. What was the price of sesame per kilogramme in last season?

Section C: Different sources of information on sesame.

Tick the appropriate response (s) where alternatives are provided or fill the genuine answers in the spaces provided.

C1. What were your sources of sesame seeds for the last season 2015/2016?

No.	Source of sesame seeds	Yes	No
1.	Purchased from stockiest/agro-dealers		
2.	Free purchased from village market		
3.	Purchased from individual or group (s) of seed farmer producers of QDS		
4.	Own source production		
5.	Exchange with fellow farmers		
6.	From research institute (specify		
7.	Others (specify		

1=Yes; 2=No

C2. Indicate sources of information used to access sesame information.

No.	Different sources of information	Source accessed	Preference	Planting time	Plant spacing	Weeding	Fert.appl.	Pests control	Harvesting	Post-harvest handling	Marketing
1	Radio										
2	Television										
3	Cell phone										
4	Extension officers										
5	Researchers										
6	Friends/neighbours										
7	Agro-dealers/stockists										
8	Farmer magazines/Leaflets/ Books										
9	Newsletter										
10	Agricultural show										
11	Internet										
12	Own experience										
13	NGOs/CBOs										
14	Posters										
15	Workshops										
16	Brokers										
17	Others (Specify)										

KEY.

A. Source accessed: 1=Yes; 2=No

B. Preference: 1=Most preferred; 2=preferred; 3=least preferred; 4=not preferred

C .Practices: 1=Yes; 2=No

Section D: Sesame information needs.

D1. Which additional information would you like to receive concerning sesame production?

No	Various information need	Yes	No
1.	Improved methods for land preparation		
2.	Improved seed varieties		
3.	Improved sowing techniques		
4.	Diseases and pest management practices		
5.	Weed control methods		
6.	Thinning practice		
7.	Manure and fertilizer management		
8.	Post-harvest techniques		
9.	Weather information		
10.	Market information		
11.	Better storage devices/methods		
12.	Access to Agricultural credit facilities		
13.	Soil conservation		

1=Yes; 2=No.

D2. In which form would you prefer receiving information on sesame production? (rate your preference)

No.	Different Forms of receiving information	Preference
1.	Printed media	
2.	Audio cassettes	
3.	Film	
4.	Drama	
5.	Exhibition and displays	
6.	Physical contact with the source, such as contact with extension officers	

A. Preference: 1 = most preferred, 2 = preferred, 3 = least preferred, 4 = not preferred)

Section E: Challenges encountered by smallholder farmers in accessing sesame information.

E1. Indicate the challenges encountered in accessing sesame information.

No.	Problems	Problems encountered	Factors facilitating accessing information
1.	Inadequate contact to extension agent		
2.	Low level of income		
3.	Inadequate transport facility		
4.	Lack of rural electrification		
5.	Inability and inaccessibility to get Information		
6.	Illiteracy		
7.	Poor television communication network		
8.	Poor radio communication network		
9.	Poor cell phone communication network		
10.	Language barrier in accessing information		
11.	Distance to information sources		
12.	Ignorance of information source		
13.	Time to look for information		
14.	Lack of personal interest		
15.	Others (Specify)		

A. Problem: Yes=1; No=2

B. Factors: 1= Availability of the source; 2= Convenience of the source; 3= Skills in using the source; 4= Cheaper in terms of cost; 5= Reliability of the source; 6= Other (please specify).....

THANK YOU VERY MUCH FOR YOUR COOPERATION.

Appendix 2: Checklist for Focus Group Discussion.

Section A

- A1 Name of the village
- A2 Name of the ward
- A3 Date of the discussion
- A4 Number of participants
- A5 What is sesame growing season in your area.

Section B

- B1. Do smallholder farmers growing sesame in this village access agricultural information pertaining sesame?
- B2. How do smallholder farmers growing sesame in this village access information pertaining sesame? (List sources of sesame information)
- B3. How do smallholder farmers growing sesame access to credit facilities in this village?
- B4. Which sources of information are most preferred by sesame smallholder farmers?
- B5. What are the reasons for preferring information sources mentioned above over others?

Section C.

- C1. Which information do you think is needed by smallholder farmers growing sesame in this village?
- C2. Which information do you think is lacking for enhancing sesame production in your area?
- C3. Do the information providers (sources) ask for your information needs before disseminating sesame production information?

C4. Do the information providers (sources) prioritize your sesame information needs in delivering information?

Section D.

D1. What are the limitations in accessing information pertaining sesame in your area?

D2. What are the factors facilitate accessing of information pertaining sesame in your area?

Section E

E1. What do you recommend in order to improve accessibility of information pertaining sesame in Morogoro district?

E2. What has been the trend of sesame yield in the last years?

1=Increasing [] 2= Decreasing [] 3=Stagnated []

E3. If the trend of sesame yield is decreasing or stagnant what are the reasons?

E4. Do you think that smallholder farmers differ in accessing of information pertaining sesame?

THANK YOU FOR YOUR COOPERATION

Appendix 3: Interview Schedule for Agricultural Extension Officer.

Section A: Information about respondent

A1. Date of the interview:

A2. Name of the Extension officer.....

A3. Sex: 1. Female [] 2. Male []

A4. What is your age in years?

A5. What is your level of education? 1. Certificate [] 2. Diploma [] 3. Bachelor [] 4. Masters [] 5. Others (specify).....

A6. How long have you been working as Agricultural Extension Officer?

A7. How many villages to you serve?

Section B: Access to information pertaining sesame.

B1. Do you deliver agricultural information to smallholder farmers growing sesame in your working place? 1. Yes [] 2. No []

B2. If yes, what type of agricultural information do you deliver to smallholder farmers growing sesame?

(a).....

(b).....

(c).....

(d).....

(e).....

B4. How do you disseminate agricultural information to smallholder farmers growing sesame?

No. Dissemination methods Yes No

1. Through Farmer Field School (FFS)

2. Farmer to farmer

- 3. Leaflets distribution
- 4. Office visit
- 5. Phone call
- 6. Other (Specify)

B5. What strategies do you use to make sure that smallholder farmers growing sesame get access to the information that you deliver to them?

- (a).....
- (b).....
- (c).....
- (d).....

B6. What are the other sources of information that are used by smallholder farmers growing sesame to access agricultural information in your working place?

- (a).....
- (b).....
- (c).....
- (d).....
- (e).....
- (f).....

Section C: Sesame information needs.

C1. Are you aware that smallholder farmers growing sesame need agricultural information? 1. Yes [] 2. No []

C2. Do you think that it is important to first inquire about agricultural information needs from smallholder farmers growing sesame? 1. Yes [] 2. No []

C3. If yes, why?

.....
.....

C4. Do you prioritize sesame smallholder farmers' information needs when delivering information to them? 1. Yes [] 2. No []

C5. As Agricultural Extension Officer do you think that you satisfy most of the sesame smallholder farmers' information needs? 1. Yes [] 2. No []

C6. If no, why not?

.....
.....

Section D: Challenges with accessing information pertaining sesame.

D1. In your opinion, what do you think are the limitations to smallholder farmers growing sesame on accessing information pertaining sesame in your working place?

- (a).....
- (b).....
- (c).....
- (d).....
- (e).....

D2. In your opinion, what are the factors facilitating smallholder farmers growing sesame to access information pertaining sesame in your working place?

- (a).....
- (b).....
- (c).....
- (d).....
- (e).....