

**ACCESS AND USE OF POULTRY MANAGEMENT INFORMATION IN SELECTED
RURAL AREAS OF TANZANIA**

BY

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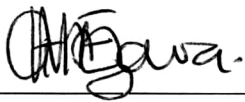
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DECLARATION

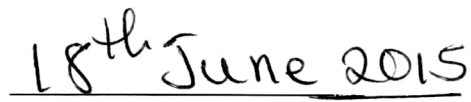
I declare that “Access and use of poultry management information in selected rural areas of Tanzania” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



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Date

ABSTRACT

Access and use of information facilitate the improvement of agriculture in rural areas. It is therefore important to ensure that adequate and appropriate information flows to the rural areas, and that farmers are able to utilise it. This study investigated the access and use of poultry management information in three rural districts of Tanzania, namely Iringa Rural, Morogoro Rural and Mvomero. The survey method, supplemented by methodological triangulation, was used to collect both quantitative and qualitative data. A semi-structured questionnaire was used to collect data from 360 poultry farmers in the selected rural communities. Sixteen focus group discussions were conducted, in which 160 farmers participated. Twenty-two information providers were interviewed. The SPSS® software was used to analyse quantitative data, while qualitative data was analysed using content analysis.

The findings indicated that poultry farmers needed information on poultry disease control, poultry protection, shelter for poultry and poultry production. There was very low identification and prioritisation of farmers' information needs by the information providers. Farmers accessed information that had a direct impact and was deemed relevant to their farming activities. It was revealed that farmers accessed information mainly from interpersonal sources. Likewise, farmers preferred interpersonal and informal sources to formal sources of information. The extension officers were considered to be the most effective information source, followed by family, friends, and neighbours. Various factors, such as lack of awareness, unavailability of extension officers and poor infrastructure, influenced access and use of poultry management information.

It was concluded that most of the information providers were not aware of the farmers' information needs, and as a result they were not in a position to disseminate relevant information. In addition, farmers were used to an oral culture, which means that they would probably continue to depend on interpersonal sources of information, regardless of the availability of formal channels and modern sources. The study recommended several measures, including the use of multiple sources of information and delivery of information in a variety of formats, in order to accommodate various categories of farmers. The study also suggested some areas for further research. Furthermore, a model for effective dissemination of poultry management information in rural areas was proposed.

KEYWORDS

Tanzania; information access; information use; information needs; information seeking behaviours; information sources; information sources preference; rural areas; poultry; rural farmers; poultry management; farmers' satisfaction; information dissemination.

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DEDICATION

This thesis is dedicated to the closest and most loving people in my life. The completion of this thesis is because of the love and support from my husband, Peter Msoffe, and the warmth and love from my children, Gloria, Pascal and Peace. In loving memory of my mother, Etwinka Mnzava, whose unconditional love made me who I am today.

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LIST OF ABBREVIATIONS AND ACRONYMS

BBC	British Broadcasting Corporation
CBOs	Community-Based Organisations
CIA	Central Intelligence Agency
DALDO	District Agriculture and Livestock Development Officer
DMM	DeLone and McLean's Model
DRD	Department of Research and Development
FADECO	Family Alliance for Development and Cooperation
FAO	Food and Agriculture Organisation of the United Nations
FEPU	Farmers' Education and Publicity Unit
FGD	Focus Group Discussion
GDP	Gross Domestic Product
HDI	Human Development Index
ICTs	Information and Communication Technologies
IDU	Information and Documentation Units
IFAD	International Fund for Agricultural Development
IICD	International Institute for Communication and Development
IIRR	International Institute for Rural Reconstruction
ISP	Information Search Process
IST	Information Sciences and Technology
ITU	International Telecommunication Union
MVIWATA	Swahili abbreviation for the National Network of Farmers' Groups in Tanzania
NARS	National Agricultural Research System
NGOs	Non-Governmental Organisations
PCT	Personal Construct Theory
PMI	Poultry Management Information
QUF	Quadratic Usage Framework
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Product and Service Solutions
SUA	Sokoine University of Agriculture
TCRA	Tanzania Communications Regulatory Authority

TLSB	Tanzania Library Services Board
TTCL	Tanzania Telecommunications Company Limited
UNDP	United Nations Development Programme
UNISA	University of South Africa
URT	United Republic of Tanzania
USD	United States Dollars
ZCC	Zonal Communication Centers

CHAPTER ONE: BACKGROUND TO THE STUDY

1.1 Introduction and background to the study

Information acts as a backbone and foundation for any economic or development activity. Information must be available and accessible to all, and it is useful only if it is available and if users have access to it in the appropriate form and language (Mundy & Sultan, 2001). Access to current, accurate and relevant information can provide invaluable support to farmers. However, rural areas in developing countries lack access to information (Ballantyne, 2005; Mchombu, 2001). Poultry farmers, just like other farmers living in rural areas, typically lack access to information about health, production, nutrition, prices, credit facilities, market opportunities and other valuable information to make informed decisions about their farming activities. Insufficient information and communications technology (ICT) infrastructure, high access costs and illiteracy (making it impossible to access and use printed information) have contributed to the disadvantaged position of the poor in rural areas (Kiplang'at & Ocholla, 2005). Although poultry researchers and information intermediaries have made efforts to reach out to the rural farmers, there are still constraints to accessing information. Some of these constraints include the following: low literacy levels of rural communities, lack of access to ICTs, lack of skills to access information from ICTs, poor linkage among agricultural actors such as community-based organisations (CBOs) and non-governmental organisations (NGOs), high levels of poverty and lack of appropriate and effective mechanisms to disseminate information to end-users (Kiplang'at, 1999). Access to relevant information can remedy such information asymmetries and stimulate rural people's knowledge base, which will help them to make informed decisions regarding their farming activities.

Agriculture plays a very important role in the social and economic development of most African countries and contributes to the gross domestic product (GDP), employment creation and foreign export earnings (Munyua, Adera & Jensen, 2009; Muyepa, 2002). The sector has been described as the engine for economic growth and improved livelihoods in Africa (World Bank, 2006; Diao *et al.*, 2007). About 70 to 80 percent of the population in Africa lives in rural areas or depends on rural activities for much of their livelihoods (Ballantyne, 2005). In Sub-Saharan Africa, the majority of the population lives in rural areas and depends directly or indirectly on agriculture

(Diao *et al.*, 2007). Agriculture accounts for more than 30% of gross domestic product and 60% of total employment in Sub-Saharan Africa, excluding South Africa. In Tanzania, 80% of the population lives in rural areas, and they are directly dependent on agriculture (URT, 2005a; 2005b; World Bank, 2014). The contribution of the agricultural sector to the gross domestic product (GDP) of Tanzania is also very substantial. The sector accounts for an average of 25.7% of GDP and constitutes 30.9% of the export earnings (URT, 2010). Poultry keeping has been a prominent part of rural agricultural activities. Poultry farming plays an important role in improving rural livelihoods, by providing additional income to poor farmers and supplying food with high quality protein. At the turn of the century, the poultry industry in Tanzania was estimated to be 40.5 billion Tanzania shillings, worth USD 50.6 million (Minga *et al.*, 2000). Thus, improved poultry production can help to increase the economy and per capita income, and overcome the problem of malnutrition (Ngulube, 2005).

Agricultural information is a crucial tool for rural agricultural activities. Information helps to provide opportunities for rural farmers to improve their farming activities, while also helping to improve their livelihoods (Ballantyne, 2005). Farmers' decisions are greatly assisted by the amount of information that is available to them. Thus, timely dissemination of appropriate information to poultry farmers is a critical input for improving poultry production, health and management (World Bank, 1994). Based on this, the assumption can be made that access to poultry management information by poultry farmers at the right time would enable them to carry out their poultry farming activities in a better way. This would lead to better and more efficient poultry management, which would in turn lead to increased poultry productivity.

Information needs of rural farmers are changing over time (Elly and Silayo 2013). Adequate knowledge about the information needs and information seeking behaviour of farmers is essential to assist policy makers, researchers and information intermediaries in meeting the information needs of farmers. However, the information needs of rural communities have received little consideration, and information flows to rural farmers from research and extension are inadequate (Rees *et al.*, 2000). Studies have revealed that there is a positive relationship between the increased flow of information and improvement in farming activities (Fawole, 2008; Mchombu, 2001; 2003; Rees *et al.*, 2000). There is therefore a need to respond to the

information needs of farmers, in order to improve understanding, decision making, innovation, problem solving and the management of farming activities. An understanding of farmers' information needs is important, in order to facilitate the designing of strategies for addressing their needs (Musi *et al.*, 2004). Thus, knowledge about the information needs and information seeking behaviour of poultry farmers is essential for meeting their information needs effectively. This knowledge may also lead to the discovery of new information behaviour and user profiles that can be used to enhance existing information models or even develop new ones (Munyua, 2000). This will result in more efficient and effective systems of information dissemination. For instance, if there is a pattern to the poultry farmers' information seeking behaviour, information dissemination activities could be designed to enable farmers to obtain the required information from preferred information sources. Farmers would be able to obtain reliable information more quickly and easily, thereby saving time and minimising frustration (Solano *et al.*, 2003). The assumption is that knowledge about the information needs and information seeking behaviours of poultry farmers in the study area may provide baseline information for future planning and improvement of poultry information dissemination in rural areas.

Furthermore, the advancements in information and communication technologies (ICTs) provide an opportunity for developing countries to access and use information that can improve productivity in various sectors, including agriculture (Lwoga, Stilwell & Ngulube, 2011). ICTs provide new and faster ways of delivering and retrieving information, and can also facilitate rapid, efficient and global exchange of information and knowledge (McNamara, 2003). They have the potential of getting vast amounts of information to rural areas in a more timely, comprehensive and cost-effective manner. Thus, the use of ICTs in disseminating poultry management information to rural areas can promote fast access to relevant information, which may lead to improved productivity, reduced poverty and improved livelihoods (Bertolini, 2002; Kenny, 2002). Fast access to relevant information can enable farmers to make informed decisions regarding their farming activities. It is thus important to assess the information source preferences of rural poultry farmers, so as to devise information dissemination strategies which take into account the farmer's preferences, as well as taking advantage of ICT tools.

1.2 Definitions of key terms and concepts

This section provides operational definitions of the key terms and concepts used in this study. These include the following: information, access to information, information use, information need, information seeking, information seeking behaviour, rural areas, information and communications technologies (ICTs), poultry and poultry management information (PMI).

1.2.1 Information

Information is data presented in a readily comprehensible form, to which meaning has been attributed within the context of its use (Reitz, 2006). In a more dynamic sense, information includes facts, data, knowledge and ideas in any medium or form that can be communicated, in order to enable people to perform their livelihood activities. Information is very useful in decision making, as its availability enables individuals, groups or organisations to make rational decisions and reduce their level of uncertainty (Kari, 2010). Therefore, sound decision making is dependent upon the availability of comprehensive, timely and up-to-date information. When an individual absorbs new informational content that was previously unknown to him or her, a difference is made in his/her knowledge base (Todd, 2005). This means that an individual will act differently or think differently after absorbing an informational content, and this will aid in making informed decisions. Information for agriculture is therefore a crucial tool in agricultural development, and helps farmers to improve their farming activities and reduce their vulnerability, while also helping to improve livelihoods (Ballantyne, 2005).

1.2.2 Access to information

This refers to the ability to obtain information from different information sources. It involves availability of information infrastructure, which includes communication channels, delivery systems and access points needed for the acquisition, processing and use of information (Reitz, 2006). Access to information is both physical and intellectual. Physical access is getting to the actual information source, while intellectual access implies other skills and processes such as literacy for the comprehension and sustainable use of information. Farmers' access to different information sources helps them to get a variety of information. Access to information can be influenced by availability, physical distance, costs, convenience, skills and perceived relevance

of the information. People seek information that they perceive to be relevant to their context and tend to use sources that are accessible physically and technically (Koller *et al.*, 2001). To ensure access to reliable information, there is a need to understand the kind of information thought to be important and necessary for decision making, and the information seeking behaviour of the target population (Beveridge *et al.*, 2003; Bryant, 2000; Edejer, 2000).

1.2.3 Information use

Information use refers to “the physical and mental acts involved in incorporating the information found into the person’s existing information base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge” (Wilson, 2000:50). Information use is an indicator of information needs, because it leads an individual to the use of information in order to meet his or her information needs (Meho & Haas, 2001). It is often linked to the concept of information need, since information is needed in order to be used. It is mainly concerned with what happens with the information once it has been obtained, and how it is applied to accomplishing a specific task or goal (Bartlett & Toms, 2005). The concern is whether or not the information that was needed and sought has been used to meet a specific objective. Information use is the final step in the information seeking process, which starts with the emergence of a need, then locating the information to solve that need, and finally, the information’s ultimate use (Meyer, 2005; Choo, 2002). Information use is a dynamic, interactive social process of inquiry that may result in the construction of meaning or making of decisions (Choo, 2007). Thus, an informed person is able to make better decisions in order to accomplish a certain task or solve a problem. There are three basic categories of information use: internalising information, processing information/knowledge and externalising knowledge. Internalising is when an individual incorporates outside information into his or her existing knowledge. Processing entails considering or transforming either information objects (e.g. texts) or one’s own knowledge (what one knows). Finally, externalising means that an individual distributes some of his/her information objects to other entities, or expresses some of his/her knowledge to other people (Kari, 2008).

1.2.4 Information need

An information need is the recognition that one's knowledge is inadequate to satisfy a goal that needs to be achieved (Case, 2002). An information need arises when an individual senses a problematic situation or information gap, in which his or her internal knowledge and beliefs and model of the environment fail to suggest a path towards the satisfaction of his/her goals (Case, 2007:333). The level of similar information needs may differ between persons or groups of persons, depending on a variety of factors, such as demographic factors of education, age and social and economic background, or those that are resource based, such as availability, awareness of availability, acquaintance with and ease of use of information sources (Kaniki, 2001). As part of the search for the satisfaction of these needs, an individual may engage in information seeking (Wilson, 1981). Information needs are thus a requirement that may lead farmers to engage in an information seeking process to fill their knowledge gaps.

1.2.5 Information seeking

Information seeking is described as a conscious effort to acquire information in response to a need or gap in one's knowledge (Case, 2002). Such an identified information need may lead to information seeking and the formulation of requests for information (Ingwersen & Järvelin, 2005:20). Information seeking encompasses purposive and passive activities that are performed in order to satisfy an identified need. This includes the purposive reception of information such as face-to-face communication with others, and passive reception of information, such as watching television advertisements (Case, 2002; Ikoja-Odongo, 2002). The process requires an information seeker, his or her knowledge and skills in relation to the problem or task domain, knowledge and skills specific to an information system, and knowledge and skills related to information seeking (Ikoja-Odongo & Ocholla, 2004). In the process of information seeking, an individual can either approach formal channels of information provision, such as libraries and media agencies, or informal channels, such as colleagues, neighbours and friends. Once the need has been satisfied by any of the information provision agencies, the individual becomes passive until the need for information arises again (Aina, 2004).

1.2.6 Information seeking behaviour

Information seeking behaviour is the purposive seeking for information as a consequence of a need to satisfy a specific goal. This occurs when an individual recognises a gap in his/her knowledge that needs to be filled in order to achieve a certain goal or resolve a problem. Thus, efforts to satisfy the perceived need result in information seeking behaviour (Ikoja-Odongo & Mostert, 2006). In an effort to satisfy the perceived need, the information seeker may interact with people, manual information systems such as libraries and information centres, or computer-oriented information systems such as the Internet (Wilson, 2000; Singh & Satija, 2006).

1.2.7 Rural areas

Rural areas are sparsely populated places away from the influence of large cities and towns. Such areas are distinct from more densely populated urban and suburban areas (Johnson & Strange, 2005). In sub-Saharan Africa, rural areas are characterised by poverty, geographical isolation and being poorly served by agricultural workers, education, health, transport, communication and other services (Kiplang'at, 2001). In the Tanzanian context, rural areas comprise villages outside district and regional headquarters, which often have an underdeveloped social infrastructure and services such as roads, clean water, reliable electricity, education, healthcare, regular transport and ICTs. Most of these rural areas have a low population density, low per capita income, and low levels of economic activity, which are mainly based on agriculture, fishing or handicrafts (ITU, 2000).

1.2.8 Poultry

Poultry refers to all domesticated birds used for the production of meat and/or eggs for consumption, production of other commercial products, restocking, supply of game, or for breeding these categories of birds (FAO, 2009). They include but are not limited to chickens, ducks, turkeys and geese. In the context of this study, poultry is limited to the traditional scavenging poultry, which means that they are permitted to roam freely instead of being contained in any manner, thus enabling them to move around and forage for their natural diet, with minimum human input. They are sometimes referred to as family poultry, local poultry or village poultry. This category of poultry is inherently pro-poor and farming is practised primarily

by poorer groups, and specifically by women. Thus, rural farmers are more comfortable about keeping family poultry, as they require few resources and are therefore affordable.

1.2.9 Poultry management information

This refers to various types of information and messages that are relevant to poultry management activities. They include information on poultry health, production, nutrition, housing, markets and security, which when given to farmers, help them in making informed decisions on poultry farming (FAO, 2002). The development of agriculture is highly dependent on new knowledge and information. Similar to other farmers, poultry farmers need a wide variety of information in order to increase their knowledge about poultry farming. Therefore, information is a basic element in any poultry farming activity, and it must be available and accessible to all farmers in order to improve their knowledge about poultry management (FAO, 2002). This improved knowledge will lead to better management of poultry, which will in turn improve poultry farming activities.

1.2.10 Information and communication technologies

Information and communication technologies (ICTs) encompass a range of technologies that facilitate the production, storage and exchange of information by electronic means. They include instruments, processes, tools and methodologies that enable people to communicate and meet and share experiences, lessons and knowledge by electronic means (Chapman, Slaymaker & Young, 2005). ICTs can be divided into two categories, namely old ICTs such as radio, television, landline telephones and telegraphs, and new ICTs such as computers, the Internet and mobile phones. The old ICTs use analog transmission mechanisms and mostly provide one-way communication. On the other hand, the new ICTs use digital transmission mechanisms, allow two-way communication with greater interactivity, wider geographical coverage, cost effectiveness and availability on a 24/7 basis (Greenberg, 2005). Nevertheless, there is a convergence between the new ICTs and old ICTs (Michiels & Van Crowder, 2001). This means that new ICTs such as digital cameras, personal digital assistants and mobile telephones are compatible with old ICTs such as radio and television. For this reason, the new ICTs can be linked to old ICTs in order to share and exchange information. Therefore, ICTs can be used to

collect, store and share information between people using multiple devices and multiple media (Chapman & Slaymaker, 2002).

1.3 Background to the statement of the problem

The agricultural sector is the backbone of the economies in many developing countries. In Tanzania, agriculture accounts for more than 25% of the GDP (URT, 2010). Most of the population (80%) lives in rural areas and depends primarily on agriculture and related activities for their livelihoods - agriculture provides the bulk of their income and is their main source of nutrition (IFAD, 2001). Information is an essential requirement for agriculture and rural development (Garforth, Khatiwada & Campbell, 2003). Thus, access to relevant information is very important, in order to improve agricultural performance and livelihoods in rural areas (Lwoga, Stilwell & Ngulube, 2011). However, dissemination of information to rural areas, where most of the agricultural activities take place and 80% of the population lives, is still inadequate (Adomi, Ogbomo & Inoni, 2003). Studies by various scholars (Matovelo, Msuya & de Smet, 2006; Lwoga, Stilwell & Ngulube, 2011) have shown that there is lack of access to agricultural information in the rural areas of Tanzania. The lack of access to agricultural information has enhanced poverty and ignorance within the rural population. On the other hand, there is a large body of knowledge that exists in research institutions, universities, public offices and libraries, but only a small amount of agricultural information is accessible to rural farmers (Matovelo, Msuya & de Smet, 2006). According to Mundy and Sultan (2001), information is useful only if it is available and if users have access to it in the appropriate format and language. Thus, such knowledge, which exists in various institutions, could be useful to farmers if it was accessible to them.

The lack of access to agricultural information in rural areas is caused by many factors, including lack of appropriate and effective mechanisms to disseminate information to end-users (Kiplang'at, 1999; Rees *et al.*, 2000; Tire, 2006). The mechanisms used for information delivery to rural communities represent a top-down approach (Chapman & Slaymaker, 2002). Information dissemination should be more participatory, allowing for the voices of the rural poor to be heard. It is therefore important to assess the information source preferences of the local

communities before disseminating information to rural areas. This will enable information providers to devise strategies that will take farmers' preferences into account.

Previous studies have been conducted to assess the dissemination of poultry management information (Conroy *et al.*, 2004; 2005). Other studies which are relevant to this study have investigated the information needs of farmers (Aina, 1991; Byamugisha, Ikoja-Odongo & Nasinyama, 2010; Chisenga, Entsua-Mensah & Sam, 2007; Kalusopa, 2005; Meitei & Devi, 2009; Ozowa, 1995b), access to agricultural information (Adomi, Ogbomo & Inoni, 2003; Lwoga, Stilwell & Ngulube, 2011; Matthewman, Ashley & Morton, 1998) and farmers' information sources and usage (Fawole, 2008). For example, Chisenga, Entsua-Mensah and Sam (2007) found that the globalisation process and liberalisation have had an impact on the information needs and flow of information to small-scale poultry farmers in Ghana. Adomi, Ogbomo and Inoni (2003), Conroy *et al.* (2004) and Lwoga, Stilwell and Ngulube (2011) revealed that most written media for disseminating agricultural information have low usage due to their unavailability and the absence of a reading habit, which means that information in print format may not reach rural farmers or may be regarded by them as not being useful. These authors suggested the use of multiple sources of information in delivering information to farmers in the rural areas. Furthermore, Lwoga, Stilwell and Ngulube (2011) found that only a small amount of agricultural information was accessible to rural farmers in Tanzania, while information existed in research institutions, universities, public offices and libraries. They recommended mapping and creating awareness of information and knowledge sources available in rural communities. Other studies conducted in Eritrea (Garforth, 2001), India (Conroy *et al.*, 2004), Kenya (Rees *et al.*, 2000) and Uganda (Ramirez & Quarry, 2004) found that there were significant variations in information sources and media preferences among rural farmers. These studies have highlighted the need to design a dissemination strategy that takes such variations into account. In addition, Adomi, Ogbomo and Inoni (2003), Conroy *et al.* (2005) and Leckie (1996) found marked gender differences in farmers' access to information sources and their preferred format for receiving agricultural information.

Studies have revealed that there is a positive relationship between the increased flow of information to farmers and agricultural development (Fawole, 2008; Mchombu, 2001; 2003;

Rees *et al.*, 2000). Thus, improved systems for dissemination of poultry management information to rural areas can improve poultry farmers' access to information, which will help them to make informed decisions about their farming activities. In so doing, there will be an improvement in poultry production and rural livelihoods. In order to make poultry management information accessible to all rural farmers, it is important to understand their information needs and information seeking behaviour. It is against this background that the researcher viewed it as essential to assess the information needs and information seeking behaviour of poultry farmers in rural areas. Given the fact that there are differences in terms of accessibility to agricultural information in rural areas, it is also important to identify the factors affecting access and use of poultry management information in rural areas.

1.4 Statement of the problem

Although poultry researchers and information intermediaries have made efforts to reach out to poultry farmers, there are constraints to accessing information in rural areas of Tanzania (Matovelo, Msuya & de Smet, 2006). Some of these constraints include low literacy levels; lack of access to information; lack of access to ICTs; lack of skills to access information from ICTs; poor linkage among agricultural actors; high levels of poverty; and lack of appropriate and effective mechanisms to disseminate information to end-users (Kiplang'at, 1999; Kiplang'at & Ocholla, 2005). Poultry farmers require adequate and comprehensive information in order to improve their knowledge about poultry farming activities. Thus, access to information is a key factor contributing to increased poultry productivity.

A few studies (Chisenga, Entsua-Mensah & Sam, 2007; Conroy *et al.*, 2004; 2005) have attempted to evaluate access and use of poultry management information. It is evident, however, that very little is known about access and use of poultry management information. In order to make poultry management information accessible to all rural farmers, it is important to understand farmers' information needs and information seeking behaviours (Chisenga, Entsua-Mensah & Sam, 2007). In this regard, it is imperative to investigate the information needs and information seeking behaviour of poultry farmers in the rural areas of Tanzania. Knowledge about these needs and behaviours of poultry farmers could play a vital role in understanding their information needs and meeting them effectively. The findings of this study could be useful in

adjusting information dissemination strategies in order to take the needs of poultry farmers in rural areas into account.

1.5 Purpose of the study

This study aims to evaluate access and use of poultry management information in rural areas of Tanzania, in order to recommend the best ways of disseminating information for poultry management.

1.5.1 Objectives of the study

1. To assess the information needs of poultry farmers.
2. To assess the information seeking behaviours of poultry farmers.
3. To establish the most preferred information sources.
4. To assess the effectiveness of various information sources.
5. To determine the factors related to access and use of poultry management information.
6. To recommend a model that could be used for dissemination of poultry management information in rural areas.

Research questions and possible sources of data related to the specific objectives mentioned above are presented in Appendix 1.

1.6 Originality of the study

The originality of a study is a key element of research (Pearce, 2005). It involves the extent to which the study makes a significant and original contribution to knowledge of facts and/or theories in the field of study (Phillips, 1993 cited in Phillips & Pugh, 2005). Originality entails the following: looking at areas that researchers in the field of study have not looked at before; being cross-disciplinary; using different methodologies from those commonly used; trying out something in a particular country that has previously been done in other countries; and/or applying existing theory in a narrative way to a different population (Blaxter, Hughes & Tight, 2006).

This study was based on studies which have been conducted in the field of information science focusing on access and use of agricultural information in rural areas. The study was unique in the sense that no study like it has previously been done in Tanzania. It specifically focused on poultry farmers' access and use of information for the improvement of poultry management. This was a research area which had not been explored before as far as the information science field is concerned. Furthermore, this study was cross-disciplinary, as it linked the fields of information science and poultry management. Therefore, the study was original in the field of information science and provided an original contribution to the existing body of knowledge.

1.7 Significance and contribution of the study

This study sought to investigate access and use of poultry management information in selected rural areas of Tanzania, in order to recommend the best ways of disseminating information for poultry management. This study was of significance because it provided a better understanding of the topic based on empirical evidence. A detailed discussion on the significance and contribution of this study is presented in Chapter Seven.

1.8 Assumptions of the study

This study was guided by the following assumptions:

- Understanding the information needs and information seeking behaviour of poultry farmers was crucial to effectively satisfy the identified information needs, by taking them into account when disseminating poultry management information.
- Knowledge about poultry farmers' information source preferences would assist information providers in delivering information through the preferred channels.
- Understanding the factors which promote and hinder access and use of poultry management information would assist in improving information dissemination to the rural areas.

1.9 Theoretical framework

This study used a theoretical framework that is based on the Information Search Process (ISP) model (Kuhlthau, 1991; 1993). This model takes into account the information seeker's emotional, cognitive and physical experiences at different stages of the information seeking

process. Two other models, namely the DeLone and Mclean Model of Information Systems Success and the Quadratic Usage Framework (QUF) were also used (DeLone & McLean, 1992; DeLone & McLean, 2003; Petter, DeLone & McLean, 2008). DeLone and McLean's model of Information Systems Success helped to represent the construct of poultry information dissemination success. On the other hand, the quadratic usage framework was used to explain the factors that underlie the acceptance and usage of poultry management information, and not just factors that lead to the intention to use (Mardis, Hoffman & Marshall, 2008). The QUF seeks to explain the dynamics of usage, incorporating personal characteristics and environmental factors. The theoretical framework is discussed in detail in Chapter Three.

1.10 Methodology

This study used a quantitative approach, which was supplemented by methodological triangulation. Triangulation strengthens a study by combining methods - this involves using several kinds of methods or data, including both quantitative and qualitative approaches (Patton, 2002:247). A combination of quantitative and qualitative approaches can be used for the purposes of providing a better understanding of the research problem (Creswell & Plano-Clark, 2007:5), as well as ensuring corroboration, facilitation and complementarity (Dixon-Woods *et al.*, 2004:2). This approach is also suitable for balancing the limitations and weaknesses of qualitative and quantitative methods (Bryman, 2006). The advantages of using both approaches are participant enrichment, instrument validity and reliability, treatment integrity and significance enhancement (Collins, Onwuegbuzie & Sutton, 2006). This methodology brings together qualitative and quantitative research approaches in order to provide a more comprehensive understanding of the phenomenon under investigation, and/or to explain certain anomalies in the data (Morse, 2003).

Multiple methods were employed for the purpose of obtaining qualitative and quantitative data. The survey research method was used to determine the characteristics, opinions, actions, feelings, attitudes and previous experiences of the population (Pinsonneault & Kraemer, 1993). In addition, focus group discussions were conducted with groups of farmers, in order to clarify certain issues. Semi-structured interviews were conducted with information providers to get a

better understanding of their views. A detailed discussion of the research methodology used in this study is presented in Chapter Four.

1.11 Scope and limitations of the study

The scope and limitations of a study provides boundaries for the research problem and “builds a fence” around the research findings, for instance the locations selected, environmental factors and variables that cannot be controlled (Perry, 2002). This study focused on access and use of poultry management information among rural poultry farmers in the Morogoro Rural and Mvomero districts of the Morogoro region, and the Iringa Rural district in the Iringa region of Tanzania. The findings may not be generalised to other areas where the material conditions may be different. The study dealt with only the information aspects of poultry management, and involved poultry farmers, extension officers, researchers, and village leaders.

1.12 Ethical considerations

Ethics in this context refers to a code of conduct or expected societal norms of behaviour while conducting research (Neuman, 2006). The following research ethics need to be considered when conducting a study such as this one: privacy and confidentiality of research data, honesty with professional colleagues, informed consent, protection from harm, and accuracy (Powell & Connaway, 2004; Leedy & Ormrod, 2005). These ethical issues need to pervade each step of the research process, including data collection, data analysis and reporting, as well as the dissemination of information (Neuman, 2006). All the ethical issues were applicable to this study and the researcher adhered to all of them during each step of the research process, as mentioned above. This study also adhered to the research ethics policy of the University of South Africa (UNISA). Furthermore, the researcher requested ethical clearance for the research and complied with UNISA’s code of conduct for research throughout the study. Ethical issues are discussed in more detail in Chapter Four.

1.13 Outline of the thesis

The structure of this thesis was guided by the principles and suggestions provided in the literature (Babbie & Mouton, 2001; Dunleavy, 2003; Leedy & Ormrod, 2005; Neuman, 2006;

Phillips & Pugh, 2005; Sekaran, 2003; Welman, Kruger & Mitchell, 2005). Chapter One includes general background information, statement of the problem, objectives of the study, and the significance of and justification for the study. It also discusses the scope and limitations of the study, methodology and ethical issues. Chapter Two describes the study areas and the rationale for selecting those particular areas for the study. Chapter Three provides a review of the literature related to the study. This chapter outlines what has previously been researched on the topic, in order to provide a theoretical foundation for the study.

Chapter Four discusses the research methodology that was used in the study. This includes the research design and methodologies, data collection methods and statistical procedures used in data analysis. Chapter Five presents the findings of the study in the form of tables, figures and explanations. Chapter Six presents the interpretation of the findings with respect to the research questions. It also provides explanations for the findings. Chapter Seven presents the summary, conclusions and recommendations of the study. It also includes the significance and contribution of the study, suggestions for further research and a proposed model.

1.14 Summary

This chapter introduced the research problem, provided general background information to the study, and presented the statement of the problem and objectives of the study. The chapter also discussed several issues, including the significance, originality and assumptions of the study, and scope and limitations of the study, as well as providing a brief outline of the methodology and ethical issues pertaining to the study. The important issue highlighted in Chapter One was that poultry farmers require adequate and comprehensive information in order to improve their knowledge about poultry farming activities. Thus, access to information is a key factor contributing to increased poultry productivity. Despite poultry researchers and information intermediaries' efforts to reach out to rural farmers, there is inadequate access to poultry-related information in the rural areas of Tanzania. Furthermore, very little is known about access and use of poultry management information in the rural areas of Tanzania. It is thus important to investigate access and use of poultry management information in the rural areas of Tanzania.

CHAPTER TWO: STUDY AREA

2.1 Introduction

This chapter gives an overview of the context of the study. The chapter describes the study area and puts the study in the Tanzanian context. It provides a short description of Tanzania, as well as an overview of the agricultural and poultry sectors and agricultural information services in Tanzania. It also discusses the status of information and communication technology (ICT) sector development in Tanzania, access to ICTs in the rural areas of Tanzania and the role of ICTs in disseminating poultry management information. It also provides an overview of the three districts involved in the study.

2.2 Overview of Tanzania

The United Republic of Tanzania is located in Eastern Africa (See Figure 1). It is the largest among the East African countries, covering an area of approximately 945,087 square kilometres (CIA, 2011; URT, 2011b). According to the 2012 population and housing census, Tanzania has a population of 44.9 million people, with an average growth rate of 2.7% per annum (URT, 2013b). It is estimated that the population will reach 63.5 million in 2025 (World Bank, 2010). The majority of the population (80%) lives in rural areas - this makes Tanzania one of the most rural countries in Africa (World Bank, 2014). The life expectancy at birth for a Tanzanian is 61.5 years and the literacy rate is on average 67.8% for adult (15 years and older), and 74.6% for youth (15 – 24 years) (UNDP, 2014). Tanzania has approximately more than 130 ethnic groups (CIA, 2011). The official languages are English and Swahili.



Figure 1: Administrative Map of Tanzania

Source: Nations Online Project (www.nationsonline.org)

Note: Location of the districts with study sites shown in text boxes in red

Economically, Tanzania is a developing country with a total gross domestic product (GDP) of \$33.23 billion, a GDP per capita income of \$694.77, and a GDP growth rate of 7.3%, making Tanzania one of the fastest growing economies in Sub-Saharan Africa (World Bank, 2013). About 28.2% of the Tanzanian population lives below the poverty line of one USD per day (UNDP, 2014). The income poverty has declined marginally due to the slow growth of the agricultural sector, which employs the majority of the poor (CIA, 2011; URT, 2010). In 2013, the country ranked 159 out of 187 countries and territories in terms of the Human Development Index (HDI), with a HDI of 0.488 (UNDP, 2014). The Tanzanian economy depends heavily on agriculture, which accounts for about a quarter (25%) of the GDP, provides 85% of exports, and employs 80% of the workforce. For instance, the sector contributed 24.6% in 2009 and 25.7% in 2008 (URT, 2010). Other economic activities include fishing, which contributes 1.4% of the GDP; hotels and restaurants (2.3%); industry and construction (22%); manufacturing (8.6%); trade and repairs (11.8%); and services (43.6%). Further economic activities are transport (5%); communication (2.1%); financial intermediation (1.7%); real estate and business services (9%); mining and quarrying (3.3%); electricity and gas (1.7%); water supply (0.4%); education (1.4%) and health (1.6%) (URT, 2010). In response to economic conditions, Tanzania has designed strategies to strengthen the contribution of various sectors to economic development. The main goal of these strategies is to change the Tanzanian economy from one of low productivity to a semi-industrialised one, thereby transforming Tanzania from a least developed country to a middle income country by 2025 (URT, 2001b; 2010).

2.2.1 Agricultural sector in Tanzania

Agriculture has the largest share of the Tanzania economy, whereby the sector accounts for an average of 25% of the gross domestic product (GDP) (URT, 2010). The agricultural sector consists of crops, livestock production and forestry. Agriculture in Tanzania is smallholder based, with most (60%) of the households having farms of less than 2 hectares and a few (20%) with two to three hectares (World Bank *et al.*, 2011). Livestock production is one of the major agricultural activities and an integral part of the Tanzania's economy. It contributes about four percent of the Gross Domestic Product (GDP) and provides food which is consumed in the form of meat, milk, milk products and eggs (Njombe & Msanga, 2009; URT, 2010). The subsector contributes about 30% of the agricultural GDP, of which, about 30% originates from poultry

production (URT, 2011a). Livestock are a common asset among farmers, with 40% of farmers partly depending on livestock for their livelihoods. The majority (99%) of the livestock keepers are mixed crop livestock farmers, and a few (1%) practice livestock only farming (World Bank *et al.*, 2011). Tanzania is estimated to have approximately 21.4 million cattle, 15.2 million goats, 5.7 million sheep, 46.1 million poultry and 1.6 pigs (NBS, 2009).

The poultry production in Tanzania comprises commercial poultry production with broilers and layers, and traditional poultry production, which is sometimes called scavenging production, made up of various types and sizes of birds. Commercial poultry production is mostly practiced in urban and peri-urban areas. Traditional poultry production is the largest, contributing about 70% of the flock and supplying 100% of poultry meat and eggs consumed in rural areas and 20% in urban areas (Boki, 2000; URT, 2006b). This type of poultry production is an important farming activity in the rural areas because it can be afforded by the poor rural farmers. Poultry keeping is an important part of Tanzania's rural economy and plays an essential role in improving household income and nutrition. The rural poor survive through various forms of subsistence farming, and the only livestock enterprise available to all farming households, even the poorest, is poultry production (Msami, 2000). Traditional poultry production has begun to receive attention from various stakeholders, including policy makers, researchers and development workers. This is due to an increasing urban demand for traditionally kept poultry, which is stimulating trade from rural areas to urban areas and creating opportunities for rural farmers to sell more poultry at a better price. In turn, this creates opportunities for improving traditional poultry production in Tanzania.

Despite the importance of the agricultural sector for economic development, there has been low agricultural growth. For instance, the agricultural sector grew by 4% in 2007, 4.6% in 2008 and 3.4% in 2009, despite the projected growth of 5% per annum (URT, 2010). Low agricultural growth is caused by various factors, including most (93%) of the arable land being dominated by small scale farmers; over-reliance on rain-fed agriculture; poor research-extension-farmer linkages; low participation of farmers in decision making; low status of agro-processing industry; poor post-harvesting systems; poor policies and lack of access to reliable and timely agricultural information (Chaila, 2001; URT, 2001a; 2006a). Other factors include impediments to food

market access; limited capital and access to financial services; inadequate technical support services; poor rural infrastructure; infectious diseases and outbreaks of plant and animal pests and diseases; and erosion of the national resource base and environmental degradation (CIA, 2011; 2011b; Sife, Lwoga & Chilimo, 2004; URT, 2001a).

In response to low agricultural growth, the Tanzania government formulated various policies related to agriculture which could be used as guidelines for agricultural activities in the country. These policies include the Agricultural and Livestock Policy of 1997, the Cooperative Development Policy of 1997, the Local Government Reform Programme (LGRP) of 1998, the Land Policy of 1995, the National Water Policy of 2002 and the National Forestry Policy of 2002 (URT, 1997a; 1997b; 2006a). The government also formulated the Agricultural Sector Development Strategy (ASDS) of 2001, the Agricultural Sector Development Programme (ASDP) of 2006 and the Rural Development Strategy (RDS) of 2002 to support the implementation of the policies and national strategies (URT, 2002; 2006a). These policies and strategies have opened up the agricultural sector to private investment in the production and processing, input importation and distribution, and agricultural marketing (URT, 2011a).

2.2.2 Agricultural information services

Farmers' agricultural knowledge has been responsible for improving agricultural productivity in Tanzania (Rutatora & Mattee, 2001). Reliable access to relevant information is a prerequisite for improved farmers' knowledge. It is thus important to recognise the need for improved access to information, in order to achieve increased agricultural productivity in the country. Poultry production, as one of the most important agricultural activities, can only be improved if poultry farmers have reliable access to relevant poultry management information.

Agricultural information services have mostly been provided by the government through extension services, library and documentation services, research and training (URT, 2011a). Agricultural research has a major role to play in increasing the productivity and profitability of the sector through development of scientific knowledge to generate improved technologies for production systems. Agricultural extension complements this effort by transferring information and technologies developed by research institutions to farmers (Kapange, 2008). Library and

documentation services have also been instrumental in disseminating useful information and knowledge to farmers. Training offers knowledge and skills to professionals and farmers, which help them in implementing various agricultural activities.

Agricultural research in Tanzania falls under the Tanzanian National Agricultural Research System (NARS), which has the responsibility of coordinating all agricultural activities in the country. NARS comprises both public and private organisations. Public organisations include the Department of Research and Development (DRD), Tropical Pesticides Research Institute (TPRI), Sokoine University of Agriculture (SUA), and the Tanzania Forestry Research Institute (TAFORI) (Kapange, 2008; Sempeho, 2004). The private sector includes non-governmental organisations (NGOs). The DRD of the Ministry of Agriculture and Food Security is the leading institution of the Tanzanian NARS, with the public role of conducting, coordinating and directing agricultural research within the country. Other organisations contribute to research and the dissemination of research findings to farmers. It has been recognised that strong linkages between major institutional actors in agricultural knowledge and information systems are essential for an effective flow of technology and scientific information between research, extension and farmers (Kapange, 2008; Sempeho, 2004). Research and extension have been brought closer to one another through the decentralisation of extension services under local government authorities, in order to better serve farmers and enhance their participation. At the national level, research and extension have strong informal linkages in the sharing and exchange of information through their respective Information and Documentation Units (IDU). These partnerships have been formed as far down as the zones, where Zonal Communication Centres (ZCC), located at zonal centres, serve the broad array of agricultural research information consumers. ZCCs are the medium for disseminating research outputs to farmers (Kapange, 2008; Sempeho, 2004).

Extension services play an important role in the provision of agricultural information and technologies to farmers. In Tanzania, the main provider of extension services is the government. Ninety to ninety five percent of the extension services are provided through the District Councils and specifically the District Agriculture and Livestock Development Office, headed by the District Agriculture and Livestock Development Officer (DALDO). Different sections under the

DALDO supply the needed extension services to farmers in the villages (Shao, 2007). The private sector, such as NGOs, private agribusiness companies, farmers' groups and donor funded projects participate in the dissemination of agricultural information and technologies (Rutatora & Mattee, 2001). For instance, the National Farmer Groups Network, known as MVIWATA, documents and disseminates agricultural information from research institutes and extension services to farmers through written materials, radio programmes and newsletters (Kaburire & Ruvuga, 2006). However, the extension services are poor due to weak coordination and linkages between research organisations, public and private extension services, and farmers; weak integration of livestock and crop specialists; and an insufficient level of farmer involvement. Other factors include the lack of proper prioritisation of problems; technology not being adapted to farmers' conditions; research outputs not being available in an appropriate, usable and accessible form to farmers; lack of awareness of available technologies; and lack of training for farmers (Sempeho, 2004; Shao, 2007). Despite these problems, extension services are still the main method used for disseminating agricultural information to farmers in the rural areas of Tanzania (Dulle & Aina, 1999).

Library and documentation services in Tanzania are categorised as follows: public libraries, academic libraries, special libraries and documentation centres. Academic libraries serve teaching and research communities in various training institutions. In most cases, special libraries belong to research institutions, government departments, international organisations and industries. Special libraries are sometimes also referred to as documentation or information centres (Kaungamno, 1985). Public libraries fall under the Tanzania Library Services Board (TLSB), which is a national institution that operates under the Ministry of Education and Vocational Training. The TLSB has a mandate to promote, establish, equip and develop libraries, information centres and documentation centres in Tanzania (TLSB, 2009). TLSB has the role of ensuring that it provides information to all groups of people, including children, youth, adults and disadvantaged groups. In carrying out the above responsibilities, TLSB acquires, organises and distributes books, non-book materials and other forms of information material to individuals, schools, institutions and the public (TLSB, 2009). One agricultural library is mandated to serve the agricultural community in the country. The Sokoine National Agricultural Library (SNAL), which is a university library of the Sokoine University of Agriculture, also serves as a national

agricultural library (SUA, 2011). However, SNAL has not been effective in serving farmers' needs, due to limited resources. The library has not received enough support to facilitate the provision of agricultural information services to the farmers in rural areas. Thus, despite the mandate given to SNAL, rural communities still depend on public libraries to access agricultural information services (Manda, 2002). Furthermore, dissemination of agricultural information in Tanzania has been affected by poor communication between the main information custodians: the Sokoine National Agricultural Library, the Commission for Science and Technology (COSTECH), the University of Dar es Salaam, IDU, and other DRD research institute libraries (Kapange, 2008; Sempeho, 2004).

Formal agricultural training in the country is mainly conducted by public institutions, including the Ministry of Agriculture Training Institutes (MATIs), Livestock Training Institutes (LITIs), Sokoine University of Agriculture (SUA), and the Moshi University College of Cooperative and Business Studies (MUCCOBS) (URT, 2001a). Private extension services such as NGOs also participate in training farmers and farmer groups on various issues (Heemskerk & Wennink, 2004). For instance, in 2009, a total of 1,058 extension officers and 75 extension workers from the private sector were recruited in order to extend services to farmers (URT, 2010). Trained extension staff, farmers and other agricultural professionals form the link between researchers and farmers, and at the same time serve as information intermediaries in local settings.

The Tanzanian government, through the World Bank, has been implementing different approaches for improving information services to farmers. Such approaches include the agricultural services support programme, where the Farmers' Education and Publicity Unit (FEPU) was established under the national agricultural extension programme. FEPU developed and strengthened initiatives such as farmers' training centres, farmers' newsletters and radio programmes, and placed some educational material for farmer on videotapes (Rutatora & Mattee, 2001). Despite the government's efforts to improve information services, farmers still face problems when accessing information in rural areas of Tanzania. Thus, in order to improve access to information in rural areas, there is a need to devise effective information dissemination strategies which take the information needs and information seeking behaviours of farmers into account.

2.2.3 Information and communication technology sector in Tanzania

Information and communication technology (ICT) is an important sector for socio-economic development in Tanzania. The country has made remarkable progress in deploying ICTs. These remarkable improvements in ICTs partly result from significant government reforms, privatisation, telecommunication sector liberalisation, official development assistance, and the emerging private sector and entrepreneurship (URT, 2010). For instance, there were about 150,073 fixed lines and 28.73 million mobiles in use by June 2014 (IST-Africa, 2014). Despite these rapid improvements, Tanzania's ICT environment is still somewhat challenged. ICTs are concentrated in the urban areas, especially in big cities such as Arusha, Dar es Salaam and Mwanza, with little deployment or access in rural areas. In addition, very few educational institutions have fully implemented the use of ICTs. In most cases, the ICT facilities are insufficient to meet the demand (IST-Africa, 2014).

In response to these challenges, the government formulated various ICT related policies to guide the development and use of ICTs in the country. These policies include the Information and Communication Technology Policy (2003), Information and Broadcasting Policy (2003), Telecommunications Policy (1997) and the Tanzania Communication Regulatory Authority Act (2003). The ICT Policy was formulated in 2003 to provide a national framework for ICTs, so as to contribute towards development goals and transform Tanzania into a knowledge-based society (URT, 2003a). The Information and Broadcasting Policy was formulated in 1993 and revised in 2003. Its main objective was to create an enabling environment for flourishing information and broadcasting sectors (URT, 2003b). The Telecommunication Policy was formulated in 1997 to ensure the provision of adequate, sustainable and efficient telecommunication services, and to put in place a reliable telecommunications infrastructure (URT, 1997c). The Tanzania Communications Regulatory Authority (TCRA) Act of 2003 was formulated in order to regulate the telecommunications and broadcasting sectors in the country. The development of these ICT related policies supports the increased access to and application of ICTs in order to accelerate productivity in all fields of work, as reflected in the National Strategy for Growth and Reduction of Poverty (NSGRP) (URT, 2001b; 2005a). They also reflect national goals, objectives and aspirations, as expressed in the Tanzania Development Vision 2025, which outlines the digital opportunities that Tanzania can exploit in order to achieve the goals of Vision 2025. Generally,

these reforms have abolished the monopolistic provision of telecommunication and broadcasting services in Tanzania.

The development of these ICT related policies has facilitated a significant increase in ICT availability throughout the country. Radio and television broadcasting stations have increased substantially (TCRA, 2010), and teledensity penetration by June 2014 was 64% (IST-Africa, 2014). Access to Internet services has increased in urban areas where Internet service providers exist. Unfortunately, the availability of the Internet is still limited, particularly in rural areas. The main reason is that the cost of connectivity is very high, which creates barriers to the spread and use of the Internet, which is a key means for the transfer of data and access to information (IST-Africa, 2010).

In its efforts to boost ICT development in the country, the government removed all taxes and duties on computers and their peripherals. Furthermore, rural community telecentres have been established in many parts of the country, with the aim of providing the rural areas with access to communication tools, information and knowledge through a low cost, sustainable and shareable infrastructure (IST-Africa, 2010). Despite significant ICT developments in the country, the rural areas are still lagging behind in terms of ICT infrastructure. The reasons for this include the high cost of ICT services, low incomes in the rural areas, low literacy levels and the limited number of service providers (Sheriff, 2007; URT, 2005a; Sife, Lwoga & Chilimo, 2004). However, further efforts are ongoing to build ICT infrastructure for all districts and regional headquarters in the country. The government is building the National ICT Optic Fibre Cable (OFC) infrastructure Backbone (NICTBB). Several ICT initiatives are underway to improve the ICT infrastructure in the country (IST-Africa, 2014).

2.2.3.1 Access to ICTs in rural areas of Tanzania

In Tanzania, the majority of people are found in rural areas, but most ICT services are concentrated in urban areas. Despite the tremendous improvements in ICT developments, ICT services have not penetrated the rural areas of Tanzania to any significant extent. This situation is mainly caused by the various challenges facing ICT infrastructure development in the rural areas of Tanzania. For instance, the purchasing power of rural dwellers is low because rural incomes

are very low, at less than one-third of urban incomes (IST-Africa, 2010; URT, 2005a). Thus, in most rural areas, the majority of people cannot afford ICT services, mainly due to high initial costs, such as the cost of acquiring satellite dishes for accessing television and for the purchase of mobile phones. This is because in small towns and rural areas, people have to use satellite dishes to receive television signals (Isamuyo, 2006). Other factors, such as lack of reliable sources of power due to low coverage of electricity and lack of other basic services such as transport, make rural ICT connectivity difficult. The Tanzanian government therefore has a difficult task in addressing rural ICT access, considering the inability of current policies to enable the private sector to deliver ICT services to the rural areas.

2.2.3.2 The role of ICTs in disseminating poultry management information

ICTs have an important role to play in facilitating communication and access to information for improvement of poultry production. Development of networks and the use of low-cost ICTs can enhance timely access to accurate and reliable information. Since poultry is an important activity for economic development, it is one of the potentially beneficial areas for the application of ICTs for economic development. It therefore calls for the allocation of part of the country's limited resources to ICT development. In Tanzania, there have been various government and private initiatives to facilitate the use of ICTs for provision of access to agricultural information, including poultry management information. These initiatives include the use of community radios, telecentres and mobile phones for accessing agricultural information in rural areas (IICD, 2007; IST-Africa, 2010; URT, 2003b).

The radio is a powerful communication tool. It has proved to be the most effective media in promoting agriculture and development in rural areas (Nazari & Hasbullah, 2010). Community radios have been effective tools for quick delivery of information to the rural areas of Tanzania. Some of the community radios operating in Tanzania include FADECO in Karagwe district, Orkonerei in Simanjiro district, Kwizera in Ngara district, and Sengerema in Mwanza region (Mascarenhas & Maghimbi, 2005; Sekiku, 2009). For instance, through the use of Orkonerei radio programmes, farmers have been able to sell their livestock and to report livestock disease breakouts, which facilitated a quicker response from the relevant parties (Development Associates Limited, 2005). Thus, the use of the existing community radios for dissemination of

poultry management information can prove very beneficial in improving farmers' knowledge about poultry management, while at the same time enhancing communication between farmers and information providers. However, community radios have not spread throughout the country because of high operation costs, inadequate human resources, insufficient equipment, lack of electricity and limited resources (Development Associates Limited, 2005).

Telecentres have also been useful in disseminating information to farmers in rural areas. Through telecentres, farmers can access printed and electronic information material (Mascarenhas & Maghimbi, 2005). A good number of telecentres are now operating in Tanzania. Some of the telecentres include the Sengerema multipurpose community telecentre in Mwanza, Ngara rural and Kasulu telecentres in Kigoma, Bagamoyo and Lugoba telecentres in the Coast region, Dakawa and Kilosa telecentres in Morogoro, Hanang telecentre in Arusha and Wino ward telecentre in Ruvuma (IICD, 2007; Chilimo, 2008; Mascarenhas & Maghimbi, 2005). These telecentres bring affordable computer-based telecommunication services to rural and semi-urban communities and offer a range of ICT services (Chilimo, 2008; IICD, 2007). However, inadequate ICT skills, language barriers and poor infrastructure have limited farmers' ability to acquire and share information and knowledge through telecentres (Chilimo, 2008).

The use of mobile phones has also been very beneficial in improving access to agricultural information (Myhr, 2006). For instance, the use of mobile phones has increased fishermen's bargaining power and improved access to knowledge about market opportunities, as well as making it possible for them to work more efficiently (Myhr, 2006). However, Tanzania's rural farmers still face some challenges in relation to the use of mobile phones, which include the following: high cost of acquiring mobile phones, low level of knowledge in the use of Short Messaging Service (SMS), inadequate coverage of mobile networks, and lack of electricity supply (Kora, 2006). It is therefore important to improve infrastructures, in order to enable ICTs to be fully exploited for the improvement of access to agricultural information, including poultry management information. With an improved ICT infrastructure and ICT skills, mobile phones can be very effective in disseminating poultry management information, particularly through the use of SMS.

ICTs can play an important role in improving access to poultry management information in rural areas countrywide. The choice of ICT tool in each context depends on the available infrastructure and level of literacy and education prevailing in a specific situation. Access to information makes it possible to improve poultry production, which will in turn improve rural livelihoods.

2.3 Rationale for selecting the study areas

This study was conducted in selected rural areas of Tanzania. The study areas include three rural districts, namely Iringa Rural in the Iringa region, and Morogoro Rural and Mvomero in the Morogoro region. These particular study areas were selected because poultry health and management programmes have been widely implemented there. Furthermore, the project which supported this research has been implementing poultry programmes in the study area (Knueppel *et al.*, 2010; Msoffe *et al.*, 2010a; Msoffe *et al.*, 2010b). In addition, the literature reviewed indicates that no similar study has been conducted in Tanzania. The following sections provide a description of the three districts involved in this study.

2.3.1 Iringa Rural

The Iringa Rural district is one of the seven districts in the Iringa region. The other districts are Iringa Urban, Kilolo, Ludewa, Makete, Mufindi and Njombe. Iringa Rural district covers an area of 19,897.5 square kilometres. It is bordered to the north by the Dodoma region, to the east by the Kilolo district and Iringa Urban district, to the south by the Mufindi district, to the southwest by the Mbeya region and to the northwest by the Singida region. Administratively, the Iringa Rural district consists of six divisions. The divisions are sub-divided into 20 wards and 119 villages (URT, 2007a). Based on the 2012 population census, the total population of Iringa Rural district was about 254,032 (URT, 2013b). The dominant ethnic group in the district is the Hehe. The rainfall pattern is monomial, with a single rainy season from November through to May, and dry conditions during the rest of the year. It has a large number of perennial streams with great potential for agricultural production during the dry season under irrigation. The main economic activity in the district is agriculture. Land is mainly used for farming and livestock keeping. Maize is the main staple food crop, and other food crops include round potatoes, sweet potatoes

and beans. Tobacco, sunflower, coffee, onions, tomatoes, fruits and vegetables are the main cash crops commercially grown in the district. Farmers also raise dairy and indigenous cattle, goats, sheep and poultry (URT, 2007a).

2.3.2 Morogoro Rural

Morogoro Rural is one of the six districts in the Morogoro region, located in the north east of the region. The other districts are Morogoro Urban, Mvomero, Kilombero, Kilosa and Ulanga. The district is bordered by the Coast region to the east, Mvomero district to the west and north, and Morogoro Urban district to the south. Morogoro Rural covers a total area of 11,731 square kilometres, which is about 16.3% of the total area of Morogoro region. Administratively, the district is divided into six divisions, 25 wards and 132 villages (URT, 2007b). According to the 2012 Tanzania population census, the population of Morogoro Rural district was 286,248 (URT, 2013b). The dominant ethnic groups in the district are the Waluguru, Wakutu, Wazigua, Wanguu and Wakwere, and the main economic activities are farming and livestock keeping. The main food crops grown in the district are maize, rice, sorghum, cassava, sweet potatoes, legumes/pulses and vegetables. Cattle, goats, pigs and poultry are the main livestock kept in the district (URT, 2007b).

2.3.3 Mvomero

Mvomero district is located in the Morogoro region, which lies in the eastern zone of Tanzania. Mvomero is one of the six districts in the Morogoro region. The other districts are Morogoro Urban, Morogoro Rural, Kilombero, Kilosa and Ulanga. It is bordered to the north by the Tanga region, to the east by the Coast region, to the southeast by the Morogoro Rural district and to the west by the Kilosa district. The district has 7,325 square kilometres of land area, and is divided into four divisions, 17 wards and 101 villages (URT, 2007b). According to the 2012 Tanzania population census, the population of Mvomero district was 312,109 (URT, 2013b). The district is dominated by the Waluguru, Wakaguru and Wakwere ethnic groups (URT, 2007b). Rainfall in the district is bimodal, with a long wet season from March to May and a short wet season from October to December. Average annual temperatures in Mvomero range from 20-30°C. The main economic activity in the district is agriculture, and the district's agricultural sector is dominated

by peasant farmers. About 79% of the district's total population depends on agriculture for its livelihood. The main crops grown in the district include rice, sorghum, maize, cassava, sweet potatoes, legumes/pulses, fruits and vegetables, as well as large-scale sugar cane and sisal plantations. Cattle, goats, sheep, poultry and pigs are the main livestock kept in the district (URT, 2007b).

2.4 Summary

This chapter provided a brief overview of Tanzania, and described the agricultural and ICT sectors' development in the country. The chapter went on to examine the status of agricultural research, extensions services and agricultural information services in the rural areas of Tanzania. Other issues discussed in this chapter include the state of access to agricultural information (including poultry management information), access to ICTs and the role of ICTs in disseminating poultry management information in the rural areas of Tanzania. Finally, the chapter provided an overview of the three districts (Iringa Rural, Morogoro Rural and Mvomero) selected for the study. The main theme which emerged in this chapter is that rural farmers have limited opportunities to access poultry management information. This chapter therefore provided an introduction to the context of the study, paving the way for the next chapter, which contains the literature review.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

This chapter presents a review of the literature and theoretical foundations of the study. The purpose of the literature review was to explore the available knowledge, in order to understand the relationship between this study and the available knowledge on the research topic. The literature review is guided by the objectives of the study. Issues discussed in this chapter include: information needs and information seeking behaviour, preferences with regard to information sources, effectiveness of various information sources in delivering information to rural areas, and factors affecting access and use of information.

3.2 Purpose and significance of the literature review

The literature review is an attempt to summarise the existing state of knowledge about a subject and to determine the research's expected contribution to the body of existing knowledge (Knopf, 2006:128). It is a critical and evaluative account of what has been published on a chosen research topic. Its purpose is to summarise, synthesise and analyse the arguments of other researchers. A good literature review should be exhaustive, representative, directly related to the research problem and indicate different views, agreements, disagreements and schools of thought on the research topic (Peters, 1994; Stilwell, 2000). It reveals similarities and differences, consistencies and inconsistencies, research gaps and controversies in previous research (Blaxter, Hughes & Tight, 2006; Bryman, 2004). It can identify a theoretical framework upon which the research study is to be based. It also identifies different methodologies and approaches that have been used by other researchers to study similar research problems (Bryman, 2004; Leedy & Ormrod, 2005).

Various researchers have highlighted the significance of conducting a literature review (Bryman, 2004; Creswell, 2003; Kaniki, 2006; Knopf, 2006; Pickard, 2007; Sekaran, 2003). According to Leedy and Ormrod (2005), the significance of conducting a literature review includes informing the researcher about previous studies; showing how methodological issues were handled in similar studies; interpreting the findings in the context of previous studies; and strengthening the researcher's confidence in the value of researching the topic. The literature review enables the

researcher to acquire knowledge on the study topic, identify related research and place the study in the context of what has already been done in relation to the research problem (Knopf, 2006; Trochim, 2001). This knowledge helps the researcher to avoid unnecessary duplication of research results (Mugenda & Mugenda, 2003). It can also generate definitions of key concepts that need to be operationalised in the research (Kaniki, 2006). It further provides a benchmark against which the researcher can compare and contrast the research results (Aina, 2002; Gray, 2004).

A literature review can be presented in different forms. Various scholars have provided guidelines for different forms of a literature review, and little consensus exists regarding the preferred form (Creswell, 2003; Kaniki, 2006; Neuman, 2006; Pickard, 2007). These scholars have suggested that the literature review can take three forms; integrative, theoretical and methodological reviews. In an integrative review, the researcher summarises broad themes in the literature; a theoretical review focuses on theories that relate to the problem of the study; and a methodological review focuses on methods and definitions. Kaniki (2006) proposed four forms of a literature review, namely historical, thematic, theoretical and empirical reviews. A historical review considers the chronological development of the literature; a thematic review is structured around different themes and focuses on debates between different schools; a theoretical review traces theoretical developments in a particular area and looks at how each theory is supported by empirical evidence; and an empirical review summarises the empirical findings in relation to different methodologies.

Neuman (2006) suggested six forms of presenting literature. The context review links a specific study to a larger body of knowledge. The historical review traces an issue over time, while the integrative review presents and summarises the current state of knowledge on a topic, highlighting agreements and disagreements within it. The methodological review compares and evaluates the relative methodological strength of various studies and shows how different methodologies account for different results. The self-study review demonstrates an author's familiarity with a subject area, while the theoretical review presents several theories or concepts related to the same topic, and compares them on the basis of assumptions, logic, consistency and scope of explanation (Neuman, 2006). In conducting the literature review, this study adopted a

thematic approach. In view of this, the literature review was organised in terms of the themes or topics covered by the research objectives and questions.

3.3 Map of the literature review

A literature map is a visual summary of the research that has been conducted by others in the researcher's area of study (Creswell, 2003). This visual representation can take many forms, but the most common forms of structuring a literature review are thematic, chronological or methodological. In this study, the thematic form of literature mapping was used. Mapping of the literature review uses the idea of concept maps developed by Novak in the 1960's, in an attempt to visually represent the structure of information (Novak, 1991:45). The concept maps are two-dimensional representations of cognitive structures showing the hierarchies and interconnections of concepts involved in a discipline or sub-discipline (Martin, 1994:11). They provide a visual, conceptually transparent, graphical representation of a person's understanding of the whole or part of a knowledge domain at a particular point in time (Novak & Gowin, 1984). Concepts are usually enclosed in circles or boxes, and relationships between concepts are indicated by connecting lines that link them together. These links could be one-way, two-way or non-directional. Words on the linking lines specify the relationship between the concepts. The cross-links show the relationship between or among concepts that are in different domains in the concept map. Concepts are represented in a hierarchical manner, with general concepts at the top of the map and less general concepts below (Coffey *et al.*, 2003). Concept mappings are used for two purposes: to summarise the information obtained from an individual source, and to synthesise information obtained from different sources (Alias & Suradi, 2008). Figure 2 below presents a map of the literature review for this study.

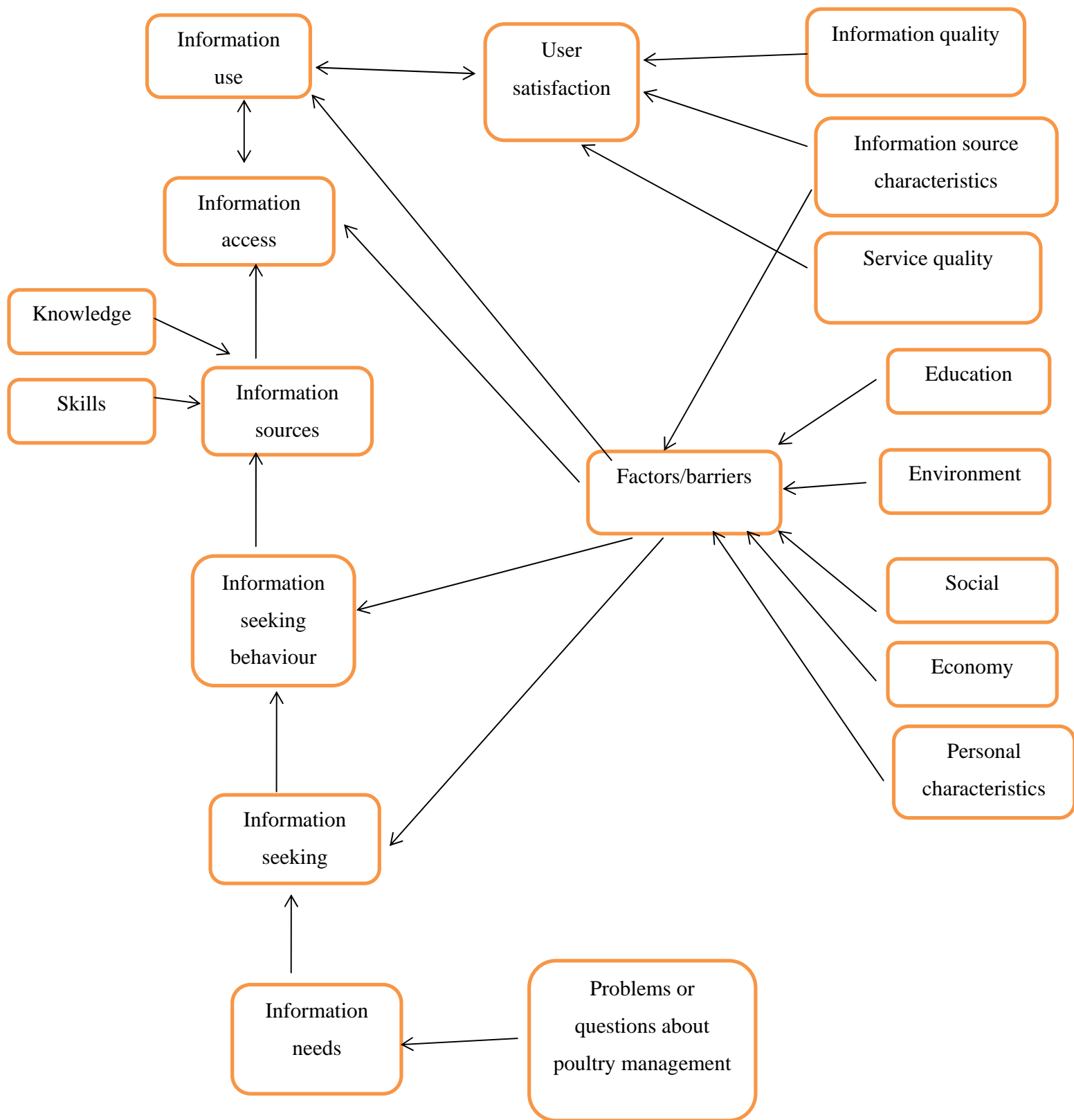


Figure 2: Map of the literature review on access and use of poultry management information

3.4 Theoretical framework

A theoretical framework is a conceptual model of how one theorises or makes logical sense of the relationships among factors that have been identified as important to the research problem being investigated (Sekaran, 2003:87). It is a logically developed, described and elaborated network of associations among the variables deemed to be relevant to the problem and identified through such processes as interviews, observation and a literature review. It guides research in order to determine what things it will measure, and what statistical relationships it should look for (Sekaran, 2003:97).

A theory is a system for explaining phenomena, which consist of constructs, and the laws that link the constructs to one another (Mugenda & Mugenda, 2003). A theory explains how and why variables are related, thus acting as a bridge between or among the variables (Creswell, 2003). Theories are a set of interrelated constructs (concepts, definitions and prepositions) that present a systematic view of the phenomena, by specifying relations among variables, with the purpose of explaining and predicting the phenomena (Kerlinger, 1979; Ruane, 2005; Stacks & Hocking, 1999; Welman, Kruger & Mitchell, 2005). Theories can incorporate facts, laws and tested hypotheses (Parker, 2007), and integrate all items of empirical data into a coherent conceptual framework for a wider applicability (Cohen, Manion & Morrison, 2000). Thus, theories are developed and tested to guide researchers on which relationships to observe, what variables are likely to affect what is being studied, and the conditions under which a causal relationship is likely to exist (Dulle, 2010).

The purposes of theory in scientific research include the following: to show commonalities in phenomena that may seem to be isolated at first glance; to help in making predictions and controlling events; to help organise isolated findings from different research studies into an explanatory framework; and to help researchers maintain consistency in any field of study (Cosby, 2001; Kemoni, 2008; Mugenda & Mugenda, 2003; Stacks & Hocking, 1999). A theory can help to decide what and how the research will be conducted. It can help researchers to measure and explain issues, and can also be crucial in transferring findings to new settings (Gorard & Taylor, 2004:163). It identifies critical areas for further investigation, discloses gaps in existing knowledge, and enables researchers to postulate the existence of previously unknown

phenomena (Cohen, Manion & Morrison, 2000). It can also enable researchers to draw new conclusions, improve actions and generate more sophisticated theories (Dale, 1998). In general, theories propose and connect abstract constructs/variables, and research transforms them into physical data (Whitworth, 2007).

A good theory should be compatible with both observations and previously validated theories. In simple terms, it should be able to demonstrate precision and universality, be consistent, provide means for verification and revision, and stimulate further research in areas that need investigation (Cohen, Manion & Morrison, 2000; McMillan & Schumacher, 2001). Katz and Harvey (1994) establishes the link between theories and models by quoting the great theoretical physicist, Stephen Hawking, who noted that a theory was a good theory if it satisfied two requirements: accurately describing a large class of observations on the basis of a model that contains a few arbitrary elements, and making definite predictions about the results of future observations.

A model is a simplified representation of a real situation, which includes the main features of the real situation that it represents (Kousoyiannis, 1979:3). A model is viewed as a representation of reality, and it delineates those aspects of the real world that scientists consider to be relevant to the problem being investigated. In addition, it highlights the significant relationships among those aspects, and enables the researcher to formulate empirically testable propositions regarding the nature of these relationships (Frankfort-Nachmias & Nachmias, 1996:44). It is constructed for the purpose of understanding, explaining, predicting or controlling a phenomenon being investigated (Burch, 2003:266).

The role of models in research is highlighted by various authors (Creswell, 2003; Cohen, Manion & Morrison, 2000; 2007; Kebede, 2002; Kousoyiannis, 1979; Mouton & Marais, 1990). According to Kebede (2002), models are useful for specifying what constitutes the phenomena of interest and identifying research focus areas. Mouton and Marais (1990) assert that models are the tools that provide questions, pointers and directions for inquiry which might, if pursued, lead to a better understanding of the case under investigation. Furthermore, accurately formulated

models help in achieving clarity and focusing on key issues related to the nature of a phenomenon (Creswell, 2003; Cohen, Manion & Morrison, 2000; 2007).

Based on the above background on theories and models, it is evident that the two terms are closely related. Due to their relatedness, most technology acceptance studies have used the two terms interchangeably. For instance, the most common technology acceptance theories and models are simply referred to as theories or models (Venkatesh *et al.*, 2003; Kripanont, 2006). However, models and theories have different meanings. While a theory emanates from a systematic and formalised expression of previous empirical generalisations and experimental testing, a model need not necessarily be derived from empirical generalisations and testing (Burch, 2003). A model is used to simplify and abstract, while a theory postulates real relationships between real phenomena or variables, and must therefore be empirically testable (Mouton & Marais, 1990). On the other hand, a theory is considered to emanate from a model that has undergone repeated tests and validation to support empirical generalisations. Thus, models can be used to explain theories.

3.4.1 The use of theory in quantitative, qualitative and mixed methods research

Quantitative studies use theories deductively and place them towards the beginning of the plan of study. Theories are used at the beginning of the study, with the objective of testing and verifying them, rather than developing them. The researcher advances a theory, collects data to test it, and reflects on the confirmation or disconfirmation of the theory by the results (Creswell, 2003). The hypotheses and research questions are often based on theories that the researcher seeks to test, and the theory is used to provide broad explanations and becomes the framework for the entire study (Creswell, 2003).

In qualitative research, theory can be used in various ways. According to Creswell (2003), there are three ways in which theories can be used in qualitative research. Theory can be used to provide broad explanations that inform the study, as in a quantitative study. Theory can also be used as a theoretical or advocacy lens or perspective to guide the researcher as to what issues need to be examined, the people who need to be studied, and the way in which the researcher should position him/herself in the qualitative research (Anfara & Mertz, 2006:189). Theory can appear at the end of the study, as a generated theory, pattern or generalisation that emerges

inductively from data collection and analysis (Creswell, 2003; 2007). The placement of the theory in a study depends on how the theory is used. Theory is placed at the end of the study if the inquirer generates a theory during the research process, such as in grounded theory. Theory is placed at the beginning of the study if it is used to provide broad explanations or act as an advocacy lens or perspective to guide the qualitative researcher (Creswell, 2003; Patton, 2002).

In mixed methods research, theories are found in the beginning sections, and act as orienting lenses that shape the types of questions asked, who participates in the study, how data are collected, and the implications drawn from the study (Creswell, 2009:208). The use of theories may be directed by the emphasis on either quantitative or qualitative approaches in mixed methods research (Creswell, 2003; 2009). This study used a mixed methods approach, where the quantitative approach was the dominant method. The theoretical framework was specifically used to provide a broad explanation and as a theoretical lens or perspective that guided the study. For this reason, the theoretical framework was placed at the beginning of the study.

3.4.2 Theoretical perspective that guides the study

Various models of the problem-solving processes in information seeking exist. This study adopted the Information Search Process (ISP) model to provide theoretical guidance for the research. Two other models, namely the Delone and Mclean Model of Information Systems Success and Quadratic Usage Framework (QUF), were also used.

3.4.2.1 The Information Search Process Model

The ISP model was developed from the common patterns that emerged within the context of the constructivist theory of learning. The theoretical foundation for the ISP model draws from psychology, using the Personal Construct Theory (PCT), as well as from information science. An information search is viewed as a “process of construction in which people build their view of the world by assimilating and accommodating new information” (Kuhlthau, 1989:1). The PCT, on the other hand, describes a series of feelings that are associated with the phases of construction.

The ISP model presents a view of information seeking from the user’s perspective in six stages: task initiation, selection, exploration, focus formulation, collection and presentation. The six-stage model of the ISP incorporates three realms of experience: affective (feelings), cognitive (thoughts) and physical (actions), which are common to each stage (Kuhlthau, 1988). According to Kuhlthau (1991; 1993), the ISP model comprises six stages and their accompanying tasks, as seen in Figure 3 below.

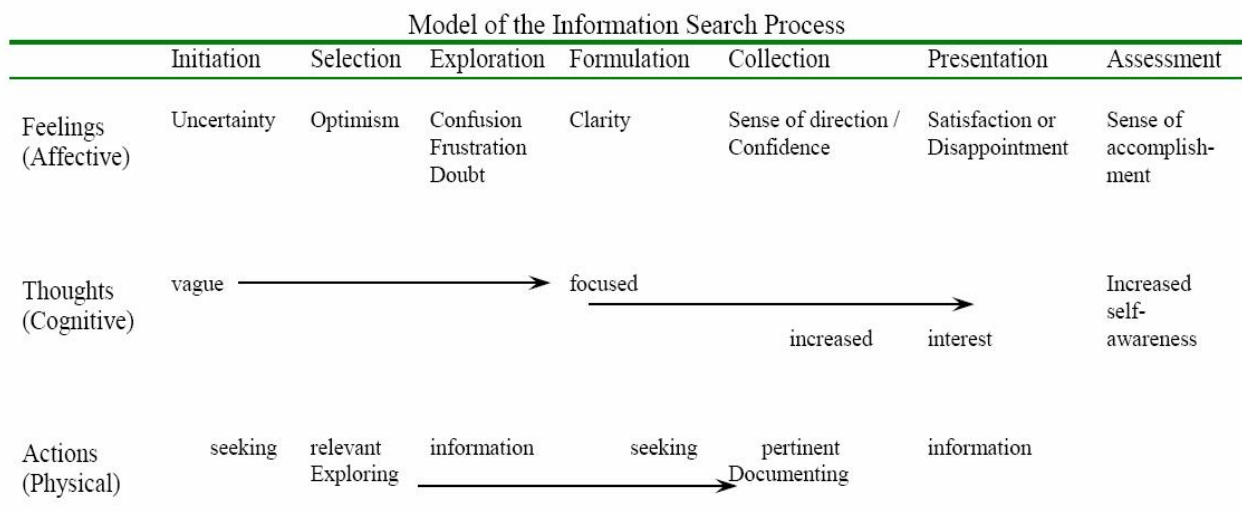


Figure 3: Model of the Information Search Process

Source: Kuhlthau (2004:82)

The first stage is **initiation**, where the task is to recognise a need for information, whereby the information seeker becomes aware of a gap in knowledge or a lack of understanding. Feelings of uncertainty and apprehension are common at this stage. Thoughts centre on contemplating the problem, comprehending the task, and relating the problem to prior experience and personal knowledge. Actions involve discussing possible avenues of approach or topics to pursue. The second stage is **selection**, where the task is to identify and select the general topic to be investigated and the approach to be pursued. Feelings of uncertainty often give way to optimism after the selection has been made and there is a readiness to begin the information search. Thoughts centre on evaluating the prospective topics against the criteria of task requirements, time allotted, personal interests, and available information. Typical actions are to confer with others or to make a preliminary search of information that is available, and then to skim and scan

for an overview of alternative topics. When, for whatever reason, selection is delayed or postponed, feelings of anxiety are likely to intensify until the choice has been made.

The third stage is **exploration**, where the task is to investigate information on the general topic, in order to expand personal understanding. Feelings of confusion, uncertainty and doubt frequently increase at this stage. Thoughts centre on becoming oriented and sufficiently informed about the topic, in order to establish a focus or personal point of view. Actions involve locating information about the general topic, reading to become informed, and relating new information to what is already known. Exploration is considered to be the most difficult stage in the ISP, as the information encountered can increase uncertainty, thereby resulting in a dip in confidence. **Formulation** is the fourth stage in the ISP. The task is to create a focus from the information that is encountered. Thoughts involve identifying and selecting ideas in the information from which to establish a focused perspective of the topic. Formulation is the turning point of the ISP, when feelings of uncertainty diminish and confidence increases. **Collection** is the fifth stage in the ISP, where interaction between the information seeker and the information system functions most effectively and efficiently. At this point, the task is to gather information related to the focused topic. Thoughts centre on defining, extending and supporting the focus. Actions involve selecting information relevant to the focused perspective of the topic and making detailed notes on that which pertains specifically to the focus. **Presentation** is the sixth stage, where the task is to complete the search process and prepare to present or otherwise use the information. Thoughts focus on culminating the search with a personalised synthesis of the topic or problem. Actions involve a summary search, in which decreasing relevance and increasing redundancy are noted in the information that is encountered. At this stage, feelings of relief are common, with a sense of satisfaction if the search has gone well or disappointment if it has not. After the completion of these six stages, Kuhlthau (1991) noted that assessing the information seeking process is important, as this is a time of reflection, where information seekers can assess their use of time and sources of information during their search process.

The information seeker moves from the initial stage of a recognised information need to the final stage of presentation during the process of information seeking. This movement is caused by a series of choices made through a complex interaction between three areas of activity: physical

(actions taken), cognitive (thoughts about the process and content), and affective (feelings experienced). The choices made by the information seeker are also influenced by environmental constraints, such as prior experience, knowledge and interests, available information, requirements of the problem, and available time (Kuhlthau, 1991). The three activities present during the information seeking process are needs which are interconnected. Psychological needs activate affective needs, which in turn activate physical needs (Wilson, 1999:252). Kuhlthau's ISP model is viewed as being suitable for the proposed study because the key concepts of the study are accommodated within the major elements of the framework in question, making it appropriate for guiding the study. Kuhlthau's model is relevant in this context because it relates the information seeking process of users to the process of learning and problem solving (Kuhlthau, 1994).

According to Kuhlthau (1991), the information seeking process is initiated by uncertainty resulting from a lack of understanding, a gap in meaning or a limited construction to solve a certain problem. This will change over time, concurrently with the seeker getting information and constructing meaning to solve the problem. During the initial stages of the information seeking process, the information seeker is usually feeling confused, frustrated and in doubt. However, in the final stages, he or she is usually satisfied, confident and relieved (Kuhlthau, 1991:366). The fundamental proposition is that the feelings of uncertainty associated with the need to seek information give rise to feelings of doubt, confusion and frustration. As the information seeking process unfolds and is increasingly successful, those feelings change - as relevant material is collected, confidence increases and is associated with feelings of relief, satisfaction and a sense of direction (Wilson, 1999). For instance, when a poultry farmer initially faces a problem, he or she may realise the need for information in order to solve the problem. This information need will compel him/her to seek information related to the problem. During information seeking, the poultry farmers will be applying the stages in Kuhlthau's Information Search Process model.

In operationalising the ISP model, the six stages of the ISP, as applied by poultry farmers, can be as follows: **Task initiation:** This is when a poultry farmer first recognises that information will be needed to solve the problem. **Selection:** During this stage, the poultry farmer identifies and

selects a topic which is related to the problem to be investigated and the approach to be pursued. **Exploration:** This stage involves exploring information to establish a focus. In this stage, poultry farmers start to gather information related to the problem. **Formulation:** A clear focus needs to be formed at this stage, and poultry farmers form a focus for the required information. Feelings of uncertainty diminish and confidence increases. **Collection:** This is when interaction between the poultry farmer and the information sources takes place. At this point, the task is to gather information pertaining to the focused topic. **Presentation:** This is the conclusion of the information seeking process and the starting phase of using the information. Poultry farmers may have completed the information seeking process, and have now begun to use the information. At this point, the farmer may feel satisfied if he or she obtained relevant information, or disappointed if he or she did not get relevant information to solve the problem.

3.4.2.2 DeLone and McLean's Model of Information Systems Success

This study adopted DeLone and McLean's Model (DMM) of Information Systems Success to represent the poultry information dissemination success construct. This model was chosen due to its strength in validity and reliability through continuous validation in many studies. DMM consists of six interrelated categories of success measurements (See Figure 4). Each category defines a set of success measures related to a broad information systems concept. The model has three quality dimensions: information quality, systems quality, and service quality. These quality dimensions further impact user satisfaction, intention to use and the usage of the system. These usage-related factors affect each other and have an impact on the net benefits. The realised and perceived net benefits then again impact the usage and user satisfaction of the system. The model therefore shows how the quality of a system has an impact on the usage of the system and the perceived benefits, and that the usage itself affects further usage through user satisfaction.

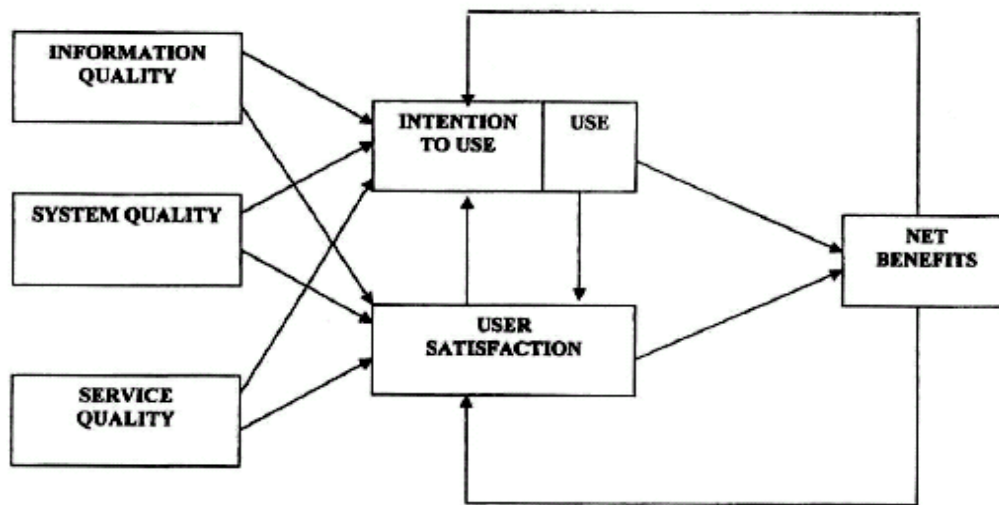


Figure 4: Updated DeLone and McLean Information Systems Success Model

Source: DeLone and McLean (2003)

According to DeLone and McLean, **System quality** refers to those characteristics that are needed or desired in an information system. Examples of system quality include the following: accessibility, ease of use, system flexibility, system reliability, ease of learning, intuitiveness, sophistication, and response times. **Information quality** refers to the quality of the information that the system produces, which includes accuracy, relevancy, precision, reliability, completeness, usefulness, currency and preferred format. **Service quality** refers to the overall support that the users of the system receive from the service provider (i.e. responsiveness and knowledge). **System use** is defined as the quantity and manner of utilisation of the system. In terms of operationalisation, system use is measured as the amount, frequency, nature, extent, and purpose of the use. **User satisfaction** captures how the user feels about the whole experience with the system, starting with the system itself, then moving to the output as an outcome of the system, and finally including the support services that are provided by the system. This is one of the most important dependent variables used in measuring the success of the information system. **Net benefits** covers how much the information system adds to the success of the individual, group, organisation, industry, or even nation (DeLone & McLean, 1992; 2003; Petter, DeLone & McLean, 2008).

In operationalising DeLone and McLean's model of Information Systems Success, the six dimensions of the model are defined as follows: **System quality** refers to the desired characteristics of the broad system of information dissemination: usability, availability, reliability, adaptability, and response time. **Information quality** refers to the content offered, which should be complete, relevant, easy to understand, and current. **Service quality** is the support that the information provider offers to the farmers. **Usage** refers to any type of interaction that farmers have with the information providers. **User satisfaction** measures the farmers' opinions on the information dissemination system. **Net benefits** are the impacts of the information dissemination system on poultry farmers and/or poultry management.

3.4.2.3 The quadratic usage framework

This study also adopted the quadratic usage framework (QUF) to explain the factors that underlie the acceptance and usage of information systems (Mardis, Hoffman & Marshall, 2008). The QUF seeks to explain the dynamics of usage, incorporating personal characteristics, and increasingly over time, accounts for more environmental factors. The model (see Figure 5) is explained as follows: (i) **technology**, which refers to factors based on access to or functionality of the artefact itself; (ii) **competence**, which consists of factors that affect the individual's skills, education, knowledge and experience, and which determine whether or not they know how to use the technology. These will vary from user to user; (iii) **culture-related values**, as reflected in policy structures. This includes impinging factors from the external environment, encompassing historic practices, organisational settings, institutional policies, as well as cultural norms and values; and (iv) **personal values**, which include preferences, beliefs, traditions and trust and are linked to the individual user's motivation and choices.

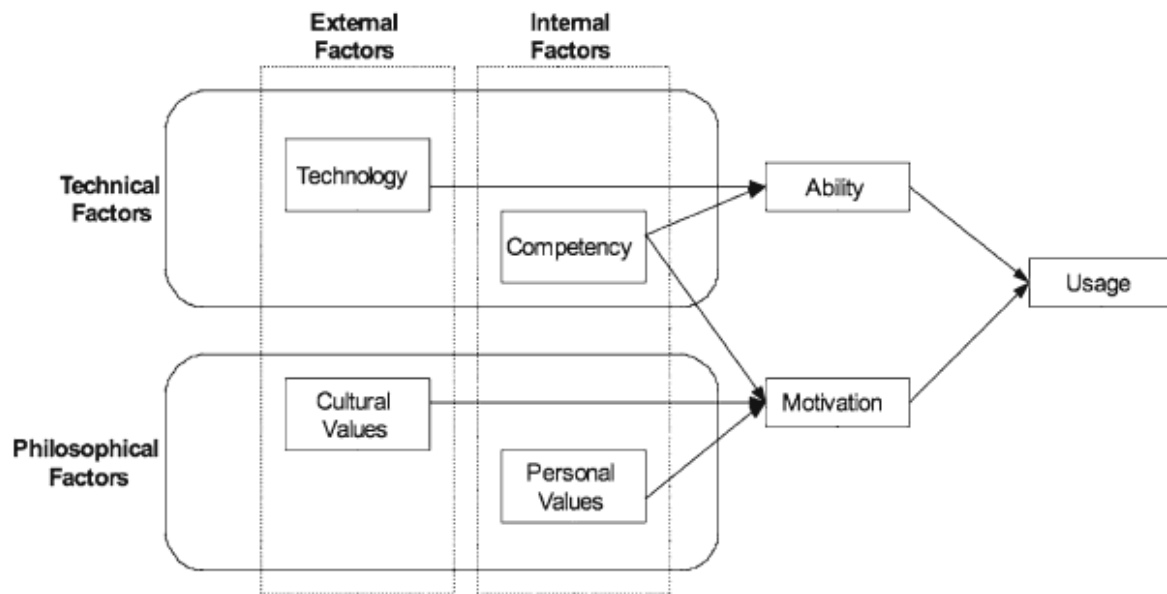


Figure 5: Quadratic Usage Framework (QUF)

Source: Mardis, Hoffman and Marshall (2008)

In the context of this study, **technology** would mean poultry management information, and **competence** would involve skills to access the information. The information will be accessed and used if the **culture-related values** (cultural values of poultry farmers) are put in place. **Personal values** involve making sure that the farmers trust that accessing poultry management information will benefit them by improving their poultry production. Once the farmers have the **ability** to access poultry management information, and they are **motivated**, then they will be able to use the information for improvement of poultry production. This means that once the farmers are **competent** with regard to information access, and they have a **positive attitude** and **culture**, then they will have the **ability** and **motivation** to use the information that is accessed.

The two models (the Delone and Mclean Model of Information Systems Success and Quadratic Usage Framework) are related at the point of information usage. The former creates an information system which is user-friendly, thereby promoting information use. The latter looks at other factors (such as skills to access information) which may affect the user in the process of access and use of information. Therefore, a combination of both models leads to improved use of poultry management information for better poultry management, as illustrated in Figure 6 below.

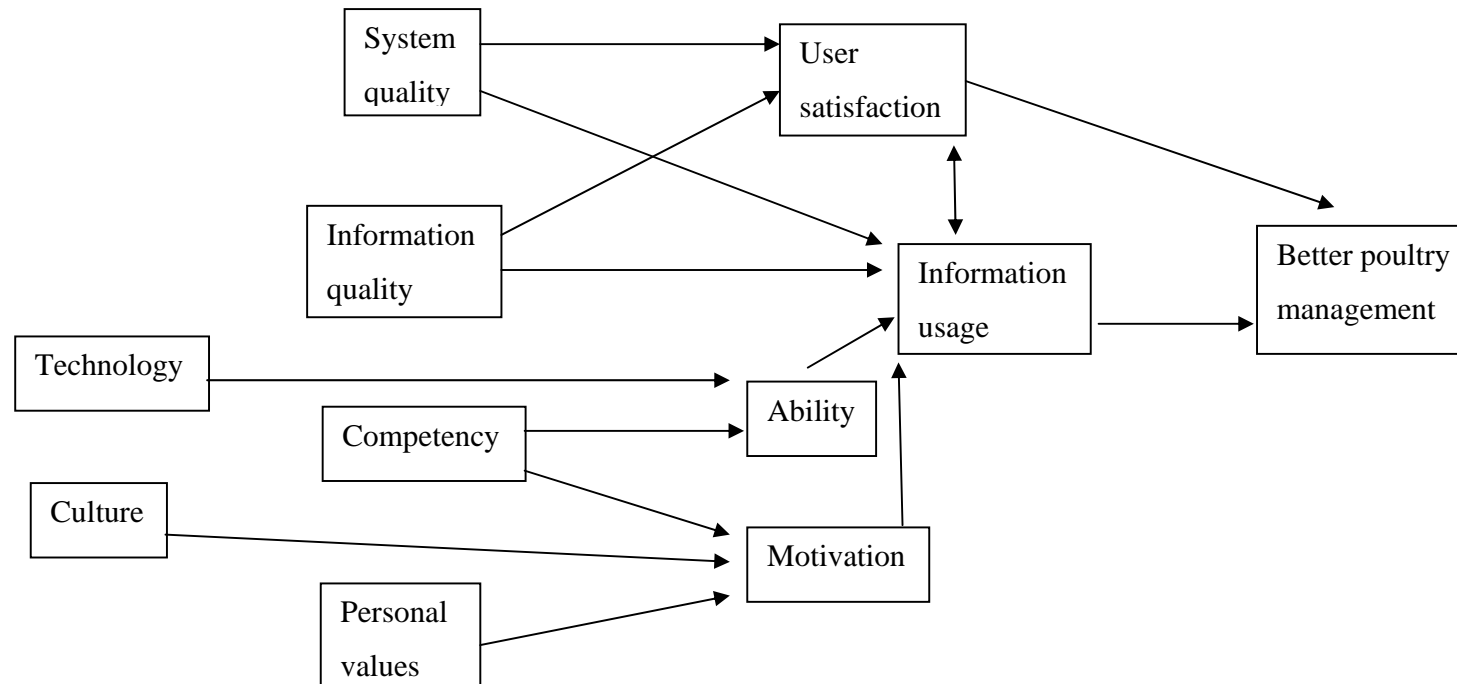


Figure 6: A diagrammatic representation of DeLone and McLean’s model and the Quadratic Usage Framework in relation to access and use of poultry management information

Adapted from DeLone and McLean (2003) and Mardis, Hoffman and Marshall (2008).

3.5 Review of related studies

This section provides a discussion on previous studies which are related to this study. Issues discussed in this section include the following: information needs and information seeking behaviour, preference of information sources, effectiveness of various information sources in delivering information to rural areas, and factors affecting access and use of information.

3.5.1 Information needs and information seeking behaviour

This section provides explanations of information needs, information seeking and information seeking behaviour, and highlights previous studies in this regard.

3.5.1.1 Information needs

An information need is the recognition that one's knowledge is inadequate to satisfy a goal (Case, 2002). It evolves from an awareness of something that is missing, which necessitates the seeking of information that might contribute to understanding and meaning (Kuhlthau, 1993). An information need arises when an individual senses a problematic situation or information gap, in which his or her internal knowledge and beliefs, and model of the environment fail to suggest a path towards the satisfaction of his/her goals (Case, 2007:333). As part of the quest for the satisfaction of the felt information need, an individual may engage in information seeking (Wilson, 1981). Information needs are thus a requirement that may drive farmers to become involved in an information seeking process, in order to fill their knowledge gaps.

The information needs of an individual or a group of individuals depend largely on the work activities of such an individual or group of individuals (Ukachi, 2007). For instance, farmers will need information on agriculture, while engineers will need information on design, development, testing, production or construction. Thus, rural poultry farmers, on whom this study is focusing, will need information on poultry management. An individual may have a need for information, either for problem solving or for improved awareness. The need for information for problem solving is purposive, immediate and time-dependent, while the need for information for awareness is passive. When the information need is for problem solving, the user approaches interpersonal informal channels such as colleagues, friends, family and neighbours. When the

information need is for awareness, both informal and formal information channels are utilised (Aina, 2004). Whatever information channel is used will result in satisfying or failing to satisfy the information need (Wilson, 1981). If the information channel that is used is not able to provide the necessary information, the information seeker may be directed to a formal agency, such as a government ministry or department, or a non-governmental organisation (Aina, 2004). The quality of sources of information available to the user is important because, according to Kebede (2002:158), information needs have content and non-content aspects. Content needs are users' needs for specific ideas, thoughts, claims, concepts or conceptual structure, in order to resolve their knowledge gap or problem situation. On the other hand, non-content needs refer to aspects other than the content of information, such as the carrier (information source). The non-content needs are also users' needs that have to be met, alongside the content needs, simply because ideas or thoughts that are needed depend on the carrier, be it books, individuals or computer systems. Therefore, meeting information needs depends not only on the existence of potentially relevant information content, but also on relevant information sources.

The level of similar information need may differ between persons or groups of persons, depending on a variety of factors, such as demographic factors of education, age, social and economic background, or those that are resource based, such as availability, awareness of availability, and acquaintance with and ease of use of information sources (Kaniki, 2001). According to Wilson (2000), information needs are influenced by a variety of factors, such as the range of information sources available, the uses to which the information will be put, and the background, motivation, professional orientation and individual characteristics of the user. Other factors are the socio-political, economic, legal and regulatory systems surrounding the user, as well as the consequences of information use.

Studies have been conducted to assess information needs of rural farmers in developing countries. Momodu (2002) conducted a study on information needs and information seeking behaviour of rural dwellers in Nigeria. He found that information needs of rural dwellers are usually directly related to occupation and basic survival. This was also supported by Dutta (2009) in his analysis of twelve articles on the information behaviour of urban and rural dwellers in developing countries. Kalusopa (2005) categorised farmers' information needs into three

types: farm management, dairy management, and poultry management. Similar observations were made by Sabo (2007). However, Lesaoana-Tshabalala (2003) and Meitei and Devi (2009) found that farmers' information needs are specific, and they vary from farmer to farmer, and from location to location. Thus, an assessment of the information needs of rural farmers is crucial in order to effectively satisfy the information needs and develop a demand-led information dissemination system (Rees *et al.*, 2000; Garforth, 2001).

Other studies that were reviewed were also significant for this study. Pigato's (2001) study examined the information needs, information sources and role of ICTs in delivering information to the rural poor. In contrast to this study, Pigato (2001) surveyed both urban and rural areas, while this study dealt only with rural areas. Chilimo's (2008) study was also relevant to this study, as it also assessed farmers' information needs. In contrast to this study, however, Chilimo (2008) examined telecentres, while this study investigated various types of information sources that are used in disseminating information to rural areas.

3.5.1.2 Information seeking

Information seeking is described as a conscious effort to acquire information in response to a need or gap in one's knowledge (Case, 2002). It is a process in which an individual goes about looking for information, and it is a complementary process to that of identifying an information need (Ikoja-Odongo & Ocholla, 2004). Such an identified information need may lead to information seeking and the formulation of requests for information (Ingwersen & Järvelin, 2005:20). Information seeking is therefore the activities that an individual undertakes to identify information that satisfies a perceived need (Davis, 2000:57). Information seeking encompasses purposive and passive activities when taking steps to satisfy a felt need. This includes purposive reception of information, such as face-to-face communication with others, and passive reception of information, such as watching television advertisements (Case, 2002; Ikoja-Odongo, 2002). The process requires an information seeker, his or her knowledge and skills in relation to the problem or task domain, knowledge and skills specific to an information system, and knowledge and skills regarding information seeking (Ikoja-Odongo & Ocholla, 2004). Information seekers use their general cognitive skills and knowledge to represent their problems or tasks, establish a set of sub-goals to fulfil the overall goals, and develop techniques and strategies to seek the

required information (Xie, 2000:843). In other words, when faced with an information problem, individuals first cognitively search their memory for past experience and previous learning from their environment. When the information seeker cannot solve his or her problem using memory, the search for information is extended beyond the individual memory domain and goes into the immediate environment (Ikoja-Odongo & Ocholla, 2004:92). The immediate environment may include individuals, groups and organisations working in similar fields.

In seeking information, an individual can either approach formal channels of information provision, such as libraries and media agencies, or informal channels, such as colleagues, neighbours and friends. Studies on information sources used by most information seekers in rural settings have found that different sources are used for accessing information. Lwoga, Stilwell and Ngulube (2011) investigated the information needs and information seeking behaviour of small-scale farmers in Tanzania. They found that farmers relied on interpersonal and face-to-face communication more than explicit sources of information. Chisenga, Entsua and Sam (2007) assessed the impact of globalisation on the information needs of farmers in Ghana, and found that poultry farmers mainly sought information from farmer associations, fellow farmers, radio and television. Another study was conducted in Nepal and India to analyse information needs and access to ICTs by poor urban and rural households (Pigato, 2001). The findings indicated that the poor relied mostly on informal networks of trusted family members, friends, and local leaders for their information needs. Kalusopa (2005) found that in Zambia, most farmers relied on personal experience, informal networks (family, friends, and colleagues) and non-governmental organisations (NGOs). Similar findings were observed by Kaniki (1994), who concluded that friends, relatives, and neighbours were found to be the major sources of information in Zambia. Njoku (2004) investigated the information needs and information seeking behaviour of fishermen in Nigeria, and found that their major sources of information included colleagues, friends, neighbours and relatives. In addition, similar findings were observed by Chakrabarti (2001), Chilimo (2008), Ikoja-Odongo and Ocholla (2003), and Momodu (2002). These findings are also supported by Dutta (2009), who concluded that people mainly rely upon informal social networks to meet their information needs. Based on the research findings described above, it can be said that information seekers in the rural areas of developing countries mostly seek information from informal sources, as opposed to formal sources. This observation

supports Aina's information seeking model, which asserts that when the information need is for problem solving (which is the case for most of the information seekers in rural areas), the information seeker approaches interpersonal informal channels (Aina, 2004).

3.5.1.3 Information seeking behaviour

Information seeking behaviour is the purposive seeking for information as a consequence of a need to satisfy some goal (Wilson, 2000). This occurs when an individual recognises a gap in his/her knowledge that needs to be filled in order to achieve a certain goal or solve a problem. Thus, efforts to satisfy the perceived need result in information seeking behaviour (Ikoja-Odongo & Mostert, 2006). In an effort to satisfy the perceived need, the information seeker may interact with people, manual information systems such as libraries and information centres, or computer-oriented information systems such as the Internet (Wilson, 2000; Singh & Satija, 2006). Information seeking behaviour is a process that requires an information seeker to apply personal knowledge and skills, such as a person's cognitive abilities, his/her knowledge and skills in relation to the problem/task domain, knowledge and skills in general, knowledge and skills specific to a system, and knowledge and skills regarding information seeking (Ikoja-Odongo & Ocholla, 2004). It is concerned with who needs what kind of information, for what reasons, and how that information is found by the user, evaluated and eventually used.

Dutta (2009) found that the information seeking behaviour of rural dwellers in the developing world is centred on survival and basic day-to-day concerns. Knowledge about the information seeking behaviour of individuals is crucial for effectively meeting their information needs. This knowledge may also lead to the discovery of unique information behaviour and user profiles that can be used to enhance existing information models or even develop new ones. Therefore, in order to ensure access to reliable information, there is a need to understand the kind of information thought to be important and necessary for decision making, and the information seeking behaviour of the target population (Bryant, 2000; Edejer, 2000).

3.5.2 Preference of information sources

Sources of information are tools that can possibly meet the information needs of different categories of users. They are the information carriers, while the media is the medium through which information is passed to the user (Ukachi, 2007). People seek information that they perceive to be relevant to their context, and tend to use sources that are accessible, both physically and technically (Koller *et al.*, 2001). This implies that there will be a greater chance of information being accessed and used if it is delivered through a source that the user prefers. Thus, it is important for information sources to provide relevant, useful, specific and accurate information that can help users solve their problems. According to Wilson (1997), personal characteristics, characteristics of information sources, work environment, and the method of information seeking have a greater influence in determining information sources and how information can be accessed. On the other hand, Kuhlthau (1991:362) stresses that the criteria for making choices about information sources are influenced by environmental constraints, such as prior experience, knowledge and interests, information that is available, requirements of the problem, and time allotted for its resolution. Furthermore, the process of selecting an information source requires the information user to know the options available to him or her, and the most preferred sources will be those that are credible and accessible (Wilson, 1997:561–566).

A number of studies (Adomi, Ogbomo & Inoni, 2003; Bagnall-Oakeley *et al.*, 2004; Castella *et al.*, 2006; Conroy *et al.*, 2004; Cho, 2004; Egge *et al.*, 2011; Garforth, 2001; Kalusopa, 2005; Leach, 2001; Matovelo, Msuya & de Smet, 2006; Rees *et al.*, 2000; Stefano *et al.*, 2005) have been conducted on preferences of information sources of rural people in developing countries. Generally, the findings of these studies have shown that rural people prefer informal information sources to formal ones. A study by Adomi, Ogbomo and Inoni (2003) investigated the extent to which crop farmers had access to agricultural information in the rural areas of Delta State, Nigeria. Data were gathered from ten villages using questionnaires. They found that farmers relied heavily on personal experience, neighbours and friends as sources of information for their farm work. Egge *et al.* (2011) conducted a study to identify the information sources used by sorghum farmers and to determine the relative importance of different information sources to farmers in the Awbere district of Somali Regional State. They used interviews to collect data. The findings revealed that the three most important sources of information, in order of

preference, were fellow farmers, family members and the office of agriculture. Conroy *et al.* (2004) assessed poultry keepers' agricultural knowledge and information systems in India. Group interviews, structured individual interviews, information mapping and linkage diagrams, agricultural timelines and feedback meetings were used. The findings showed significant variations in information sources and media preferences, both between various locations and between gender categories within them. Farmers relied on radio, family members, other farmers and the private sector (NGOs, traders) for accessing agricultural information. Cho (2004) assessed the implications of technology dissemination and development for smallholder farmers in Myanmar. The findings revealed that the major sources of information for small-scale farmers were friends, relatives, neighbours and markets. Similar sources of information were preferred by farmers in Zambia (Kaniki, 1994) and Nigeria (Okwu & Daudu, 2011), rural dwellers in India (Chakrabarti, 2001), rural people in Tanzania (Chilimo, 2008), and fishermen in Uganda (Ikoja-Odongo & Ocholla, 2003) and Nigeria (Njoku, 2004). The above studies confirm Kempson's observation that when rural dwellers are in need of any information, they begin by asking their friends, neighbours, family members or professional colleagues (Kempson, 1986:182). Furthermore, in an analysis of twelve articles on information behaviour of urban and rural dwellers in developing countries, Dutta (2009) concluded that rural people mainly rely upon informal social networks to meet their information needs.

On the other hand, there are studies which have found that mass media such as radio, television and newspapers are also preferred by farmers in rural areas of developing countries. A study by Fadiji, Atala and Voh (2005) focused on the identification of the main sources of extension information used by farmers who grew improved maize in two villages of Kaduna State, Nigeria. The findings showed that the relevant sources of extension information for maize farmers were in this order of importance: radio, extension agent, fellow farmers, agricultural shows, village head, slides/film shows, traders, written material and television. A study carried out in Hyderabad found that respondents regarded print media and fellow farmers as their major sources of agricultural information, followed by television and radio (Farooque, 2004). A study on dissemination of agricultural information by Rehman *et al.* (2011) concluded that the print media were the major sources of agricultural information, followed by fellow farmers and television. Furthermore, Adeogun, Olawoye and Akinbile (2010) found that the major source of

information for cocoa farmers in Nigeria was radio. Therefore, there are different scenarios of information sources preference by farmers. These differences are mainly influenced by personal characteristics, characteristics of information sources, and environmental constraints. It is thus important to assess the preference of information sources by the poultry farmers in rural areas of Tanzania, so that the knowledge can be used by information providers for better communication with farmers.

3.5.3 Effectiveness of various information sources

Rural communication is an interactive process in which information, knowledge and skills relevant for development are exchanged between farmers, extension/advisory services, information providers and researchers, either personally or through media such as print and information and communications technologies (Del Castello & Braun, 2006). Mass media (electronic and print media) are playing a very important role in disseminating agricultural information. Mass media can spread agricultural messages to the farmers at a faster rate than personal contact (Farooque, 2004). However, the mass media involve one-way communication from the information source to the receivers. Traditional media have also been used very successfully for agricultural information delivery to farmers in developing countries, and rural radio, in particular, has played a major role in delivering agricultural messages to farmers. Print, video, television, films, slides, pictures, drama, dance, folklore, group discussions, meetings, exhibitions and demonstrations have also been used to speed up the flow of information (Munyua, 2000).

Information and communications technologies (ICTs) are very important tools for information dissemination to rural areas (Anie & Otolu, 2007; Rathgeber, 2000). ICTs can enhance farmers' access to reliable, timely and relevant information and innovations on various aspects of agriculture. Various studies have reported that ICTs enhance the delivery of useful agricultural information to rural farmers. A study by Oyegbami and Fabusoro (2003) examined the use of radio and television as sources of agricultural information among poultry farmers in Nigeria. They found a significant relationship between farmers' level of production and the level of radio and television use. With the increased use of radio and television, there was an increased overall development of agriculture and food security. Chomba *et al.* (2002) carried out a user needs

assessment on improving the transfer and use of agricultural market information in Zambia. The findings showed that farmers believed that radio was a very efficient way of disseminating agricultural information. A study by Souter *et al.* (2005) assessed the impact of telephone on the lives of the rural poor in three developing countries: the state of Gujarat in India, Mozambique and Tanzania. The findings from all three countries revealed that face-to-face communication was the main source of information. Telephones were less used for knowledge acquisition, and Internet services had low usage in all three countries. This was also observed by Chilimo (2008), who found that people in rural communities relied on the informal networks of friends, relatives and knowledgeable farmers, followed by radio and Internet services. Kalusopa (2005) assessed the challenges that small-scale farmers face in the use of ICTs in two selected provinces in Zambia. Findings indicated that radio and television were seen as relevant media for accessing information. Computers and mobile phones were still undeveloped due to a poor ICT infrastructure, high tariffs and slow pace of private investment in ICT development. A study by Lwoga, Stillwell and Ngulube (2011) examined access and use of agricultural knowledge and information in the rural areas of Tanzania. They found that the majority of farmers used radio to access agricultural information and knowledge. Mobile phones and television were also found to be important in accessing agricultural information and knowledge.

An important observation from the reviewed studies is that the radio plays a major role in delivering agricultural messages to farmers. Findings from most of the studies revealed that radio is an effective tool for information access in rural areas. Other ICTs such as mobile phones and the Internet are used sparingly for information access, mainly due to the high cost involved in acquiring and operating them. Surveys (BBC World Service Trust, 2006; Balancing Act, 2008) agree that radio is still the dominant mass medium in Africa, with the widest geographical reach and the largest audiences, compared with other ICTs. Radio accessibility has been attributed to its effectiveness as a communication medium for populations with low literacy levels, low income, and lack of access to other forms of media (Myers, 2000; FAO, 2001). However, Ozowa (1995b) identified poor reception quality, inadequate area coverage and inappropriate broadcast time as some of the drawbacks of this medium.

Mobile phones have proven their usefulness in all sectors. Due to a high level of access, wide reach, good adoption and real-time interaction, mobile phones offer efficient solutions to rural communication challenges (Martin & Abbott, 2011). Mobile telephones effectively reduce the distance between individuals and institutions, making the sharing of information and knowledge easier and more effective. Mobile telephones provide a global communication channel for rural communities, extend the impact of established rural media, such as rural radio, help in making local content available to rural people, and make rural services more efficient and cost effective (Dhaliwal & Joshi, 2010). For instance, Jensen (2007) looked at a case study of fishermen's mobile phone use in India. The study found that the improvement of information transfer led to increased profits for fishermen. Furthermore, a study on the adoption of mobile phones by dairy farmers in rural Uganda highlighted the ability of mobile phones to provide an information advantage and encourage greater efficiency. Karamagi and Nalumansi (2009) found that mobile phones reduced transportation costs by enabling farmers to gain remote access to agricultural information. The benefits of mobile phones are amplified by the spread of mobile technology in some rural areas, which has occurred much faster than other information and communications technologies (Dhaliwal & Joshi, 2010).

3.5.4 Factors affecting access and use of information

Access to information can be influenced by availability, physical distance, costs, convenience, skills and perceived relevance of the information (Koller *et al.*, 2001). Many previous studies agree that even with the advent of information technologies, which has succeeded in improving information dissemination, constraints to information access are still experienced, especially in rural areas of developing countries (Oladele, 2006). On the other hand, information use is a behaviour that leads an individual to use information in order to meet his or her information needs (Meho & Hass, 2001). The process starts when the problem creates the need for information, and the troubled individual then seeks information from some information systems. The system and its sources are interrogated, and information, if found, is sought, extracted and integrated with existing information in the mind of this person, thereby leading to the use of the information. Certain factors may positively or negatively influence the process of information seeking, and they may therefore create barriers to either access to or use of information. These factors include the following: personal, emotional, educational, demographic,

social/interpersonal, environmental, economic, and source characteristics (Wilson, 1996). Other factors may include high cost, illiteracy, lack of ICT infrastructure (Aina, 2004), culture (Hepworth, 2007; Meyer, 2009), and social, psychological and behavioural needs (Hepworth, 2007). The barriers have been categorised into internal and external barriers. Internal barriers are considered to be those involving problems on the level of the individual, while external barriers relate to the collective level. External barriers include family socialisation patterns, community identity, social stratification, ethnic membership, and access to media. Internal barriers to information seeking include motivation and interest in accessing information, involvement and participation in community activities, family socialisation, and the role of interpersonal discussion (Gaziano, 1997). However, external barriers may also be internalised by an individual and become internal barriers. For example, family socialisation patterns are seen as being external to the individual, but their influences on the individual are sufficiently strong and pervasive to shape personality, and may therefore be as much internal as external (Sligo & Jameson, 2000).

A number of studies have been conducted to assess the factors responsible for access and use of information in developing countries. Momodu (2002) assessed the information needs and information seeking behaviour of rural populations in Nigeria, in order to identify barriers to information access so that better information systems could be designed to meet their information needs. The study used a survey methodology, with questionnaires, interviews and observations as the data-gathering tools. The study revealed that illiteracy was the primary barrier to fulfilling information needs. Besides illiteracy, there was a lack of information access and language barriers. A study by Dutta (2009) revealed that illiteracy, unknowledgeable extension workers, and the digital divide were the major obstacles to meeting the information needs of rural dwellers in eight developing countries. Ikoja-Odongo and Mostert (2006) observed that internal (personal) and external or environmental factors were major barriers to the information seeking processes of informal entrepreneurs. The internal and external barriers included low literacy levels, cultural norms that value the oral tradition of information transfer, failure of existing exotic information systems to meet the information requirements of entrepreneurs due to the unsuitability of information materials, inadequate communication services in the country, high cost of accessing foreign information, poverty, and prior experience.

Other barriers included the state of one's interests, information availability, requirements of the problem at hand, costly information materials, insufficient information infrastructure, lack of reading culture, lack of time to search for information, information illiteracy or ignorance about the important role of information, low rates of absorption and adoption of information, negative attitudes and apathy towards information triggered by inferiority complexes, age, sex, social status and lifestyle, and the multiplicity of local languages. The language barrier was serious, particularly in regions where there is no single local language, but rather several ethnic groups with different dialects. Similar findings were observed in studies of fishermen in Uganda (Ikoja-Odongo & Ocholla, 2003), fish farmers in the Niger Delta Region of Nigeria (Ugboma, 2010) and information needs of rural women in Nigeria (Saleh & Lasis, 2011).

3.6 Summary

Chapter Three provided the theoretical foundations of the study and the review of literature. The literature review was organised thematically, by using themes and sub-topics related to the objectives of the study. The literature review discussed the following issues: information needs and information seeking behaviour, preference of information sources, effectiveness of various information sources in delivering information to rural areas, and factors affecting access and use of information.

Previous studies in relation to information needs and information seeking behaviour, information sources, and access and use of agricultural information in rural areas of developing countries were discussed, and it was acknowledged that few studies have focused on access and use of poultry management information in rural areas. Thus, this study has bridged the knowledge gap in this area by focusing on access and use of poultry management information in rural settings. Furthermore, the literature review highlighted possible research methods and data interpretations for this study.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the research methodology that was used in this study. Issues discussed in this chapter include the following: research design, description of the study population, sampling procedures, data collection methods and instruments, procedures for data analysis, validity and reliability issues, ethical considerations, and evaluation of the research methodology.

4.2 Research methodologies

It is important to first explain the difference between research methods and research methodology. Research methods refer to all methods or techniques that researchers use in performing research operations (Kothari, 2004:7). Research methods relate principally to the tools of data collection or analysis - techniques such as questionnaires and interviews (Blaxter, Hughes & Tight, 2006:58). Research methodology, on the other hand, usually refers to the approach that underpins the research. Therefore, an interview that is conducted within a quantitative approach will have a different purpose and produce different data from an interview conducted within a qualitative approach (Blaxter, Hughes & Tight, 2006:58). Research methodology does not only consider research methods, but also includes the logic behind the methods to be used in the study, and the purpose of using a particular method, so that the research findings are capable of being evaluated either by the researcher or by others (Kothari, 2004:8). There are three approaches to research, namely the quantitative approach, qualitative approach and mixed methods approach.

4.2.1 Quantitative research

Quantitative research methods measure a phenomenon using numbers, in conjunction with statistical procedures, in order to process data and summarise results (Creswell, 1994:2; Payne & Payne, 2004:180). Quantitative data includes closed information such as that found in attitude, behaviour or performance instruments. Collecting this kind of data involves using a closed checklist, against which the researcher evaluates the behaviour that is observed (Creswell & Plano-Clark, 2007:6). This method requires the use of standardised measures, so that the varying perspectives and experiences of people can fit into a limited number of predetermined response

categories to which numbers are assigned (Denzin & Lincoln, 2005:13; Leedy & Ormrod, 2005:94; Silverman, 2006:39). The quantitative approach involves establishing, confirming or validating relationships and developing generalisations that contribute to theory (Leedy & Ormrod, 2005:95). Theory is largely causal and is often deductive. The research procedures are standard and replication is frequent. Data analysis proceeds by using statistics, tables or charts and discussing how they relate to the hypotheses (Neuman, 2006:57). A quantitative study may end with the confirmation or disconfirmation of the hypotheses that were tested (Leedy & Ormrod, 2005:94).

4.2.2 Qualitative research

Qualitative research methods are concerned with collecting and analysing information in as many forms as possible (Blaxter, Hughes & Tight, 2006:64). Qualitative research produces a detailed and non-quantitative account of small groups, seeking to interpret the meaning that people make of their lives in a natural setting (Creswell, 1994:2; Payne & Payne, 2004:175). As a result, it is useful for the description of groups, small communities and organisations (Welman, Kruger & Mitchell, 2005:188). The techniques of focus group discussions, interviews and depth interviews are generally used for data collection (Kothari, 2004:5). This approach is often exploratory in nature, and its observations may be used to build theory from the ground (Leedy & Ormrod, 2005:95). Theory can either be causal or non-causal and is often inductive. The research procedures are particular and replication is very rare. Data analysis proceeds by extracting themes or generalisations from evidence and organising data to present a coherent and consistent picture (Neuman, 2006:57).

4.2.3 Mixed methods research

Mixed methods research refers to research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or other paradigm characteristics into a single study (Johnson & Christensen, 2008:34; Johnson & Onwuegbuzie, 2004). In mixed methods, the researcher collects and analyses, persuasively and rigorously, both qualitative and quantitative data, and mixes the two forms of data concurrently or sequentially (Creswell & Plano-Clark, 2011:5). Mixed methods research is a research design with

philosophical assumptions, as well as methods of inquiry (Creswell & Plano-Clark, 2007:5). It involves philosophical assumptions that guide the direction of the collection and analysis of data, and the mixing of qualitative and quantitative approaches in the research processes. It also involves the methods of inquiry which focus on collecting, analysing and mixing both quantitative and qualitative data in a single study or a series of studies (Creswell & Plano-Clark, 2007:5; Johnson & Christensen, 2008:51; Leech & Onwuegbuzie, 2009:267). Ngulube (2010:254) summarises the definitions from various scholars by stating that:

“mixed methods research involves collecting, analysing, integrating and interpreting qualitative and quantitative data concurrently or sequentially in a single study or in a series of studies investigating the same problem, irrespective of whichever research methodology is dominant, in order to exploit the benefits of combining them and to enhance the validity of the findings”.

The mixed methods research design can be categorised according to the level of mixing, time orientation and emphasis of approaches (Leech & Onwuegbuzie, 2007). The level of data mixing refers to whether quantitative and qualitative data are partially or fully mixed; time orientation refers to whether the quantitative and qualitative phases of the study occur concurrently or sequentially; and the emphasis of the approach refers to whether both qualitative and quantitative phases of the study have equal or different status (Leech & Onwuegbuzie, 2007). Mixed methods research can be conducted either concurrently (parallel mixed designs) or sequentially (sequential mixed designs) (Johnson & Christensen, 2008:51; Leech & Onwuegbuzie, 2007; Teddlie & Tashakkori, 2009:26). In concurrent mixed designs, the qualitative and quantitative parts of a study are conducted in a parallel manner, either starting and ending simultaneously, or with a lapse of time. In other words, this is data collection where one strand starts or ends later than the other, or when a questionnaire which contains both closed and open-ended questions is administered (Creswell, 2003:18; Teddlie & Tashakkori, 2009:26). In sequential mixed designs, the quantitative and qualitative parts of the study are conducted in a chronological order - in other words, conducting one strand first and the other strand second, in order to address a research question or set of related questions (Creswell, 2003:18; Tashakkori & Teddlie, 2003:11).

This study used mainly a quantitative approach, which was supplemented with a qualitative approach. The study adopted the dominant-less-dominant model, where the quantitative approach was more dominant than the qualitative approach (Creswell, 2003:136). Combining quantitative and qualitative approaches provides a better understanding of the research problem than when each approach is used separately (Creswell & Plano-Clark, 2007:5). These approaches were combined in order to “ensure corroboration in which one method is used to verify the findings of the other, facilitation in which one strategy facilitates or assists the other, and complementarity in which two strategies are employed to investigate different aspects of a problem” (Dixon-Woods *et al.*, 2004:2).

4.3 Research design

A research design is the general blueprint for the collection, measurement and analysis of data, with the central aim of solving the research problem (Creswell & Plano-Clark, 2007:58). It provides a plan or outline of where the study will be carried out, what type of data is required, where the required data could be collected, what the sample design will be, what techniques of data collection will be used, and how the data will be analysed (Kothari, 2004). Through a research design, a researcher conceptualises an operational plan to undertake the various procedures and tasks required to complete the study, and ensures that these procedures are adequate to obtain accurate answers that are valid and objective in relation to the research questions (Kumar, 2005:84).

A research design involves multiple decisions about the way in which the data will be collected and analysed, in order to ensure that the final report answers the initial research question (Durrheim, 2006:35; Polit & Beck, 2004:49). Thus, a researcher must make a series of decisions in terms of four dimensions: the purpose of the research, theoretical paradigm informing the research, context or situation within which the research is carried out, and the research techniques employed to collect and analyse data (Durrheim, 2006:37; Kothari, 2004:32). For this reason, different research designs or types of studies attempt to answer different types of research problems or questions, and they therefore end up employing different combinations of methods and procedures (Babbie & Mouton, 2001:75). Based on the type of data collected, research designs can be categorised according to three types: quantitative, qualitative and mixed

methods research designs. A quantitative design refers to the collection and analysis of structured data, whereas a qualitative design deals with the collection and analysis of unstructured data. On the other hand, a mixed methods research design involves collecting, analysing and combining quantitative and qualitative data in a single study (Creswell & Plano-Clark, 2007). In this study, a survey research design was used, and it was supplemented by methodological triangulation.

4.3.1 Survey research

According to Creswell (2009), the term survey refers to a study that has used a representative sample of a defined population. A survey is a “means for gathering information about the characteristics, actions, or opinions of a large group of people” (Pinsonneault & Kraemer, 1993:77). The purpose is to “learn about their characteristics, opinions, attitudes, or previous experiences” (Leedy & Ormrod, 2013:189). According to Kraemer (1991), survey research has three characteristics: it is quantitative, data are collected from individual people as a unit of analysis, and it uses a representative portion of the population. Therefore, surveys are considered to be excellent for measuring people’s attitudes in large populations (Babbie, 2004:251; Gray, 2004:99). The purpose of a survey is to learn about a large population by studying a subgroup of it (Leedy & Ormrod, 2013:189). Survey research involves asking people questions and organising their answers in order to obtain information about their characteristics, opinions, attitudes or experiences (Creswell, 2003:151; Leedy & Ormrod, 2013:189). In survey research, questions must be asked using a standardised procedure that is applied equally and consistently across all respondents. The questions should be structured in such a way that they study the relationships among identified variables (Pickard, 2007:95). Responses to the questions are summarised through percentages, frequency counts and statistical indexes, and inferences about a population are then drawn (Leedy & Ormrod, 2013:189).

It is important to note that survey research, like any other type of research, has its strengths and weaknesses. A key strength of survey research is that it allows the generalisation of findings to a larger population from which a representative sample was drawn (Gray, 2004:99; McMillan & Schumacher, 2001:305; Powell & Connaway, 2004:84). Various authors (Babbie, 1990; Leedy & Ormrod, 2005; McIntyre, 1999; McMillan & Schumacher, 2001; Pickard, 2007; Salant & Dillman, 1994) have highlighted the strengths of survey research. A survey can be applied to

many people in various contexts or settings. It makes data collection and analysis less overwhelming, as the researcher goes into the field with prepared questions and fixed frameworks (Aldridge & Levine, 2001:29). Surveys are also reliable because they use a standardised questioning procedure which is applied equally and consistently among all respondents (Pickard, 2007:95). Thus, the same information is collected from all cases in the sample. Furthermore, surveys are versatile because they can be used to investigate any problem or question (McMillan & Schumacher, 2001:305).

On the other hand, survey research has certain weaknesses. A key weakness of survey research is that it is impossible to probe insights relating to the causes or processes relevant to the phenomenon being studied (Babbie, 2004). The other weakness of surveys is that they are generally not suitable for studies requiring an understanding of the historical context of the phenomenon (Pinsonneault & Kraemer, 1993). They also appear to be superficial in the coverage of complex topics because of predefined questions (Babbie, 2004). Aldridge and Levine (2001) point out that it is not possible to include a large number of open-ended questions in survey research, which means that respondents are not given the chance to express themselves in their own words.

Survey research can be divided into two types: cross-sectional and longitudinal studies (Brewer, 2009). A cross-sectional study is one where the researcher administers the survey to a sample only once. Thus, it produces a picture of the target population at a particular point in time - when the survey was administered (Brewer, 2009:521; Cohen, Manion & Morrison, 2007:213). In a longitudinal study, a researcher administers the survey to the same sample more than once. In so doing, it is possible to see how the target population changes over time (Brewer, 2009; Fraenkel & Wallen, 2009). Longitudinal surveys have four subgroups, including trend surveys, cohort surveys, panel surveys, and follow-up surveys (Cohen, Manion & Morrison, 2007:213; Gay, Mills & Airasian, 2009). Trend studies look at how concepts change over time; cohort studies at how historical periods change over time; panel studies at how people change over time (Cohen, Manion & Morrison, 2007:213); and follow-up studies reconnect at a later time with the same respondents who participated in the previous survey (Brewer, 2009). Each method has its

benefits and weaknesses, and it is therefore up to the researcher to decide on the method that fits the type of research problem and questions at hand. This study used a cross-sectional approach.

The survey method was employed in this study to investigate access and use of poultry information by rural farmers in Tanzania. The main issue in this study was to examine the information needs and information seeking behaviour of poultry farmers. The survey research method was considered appropriate for this study because it has been used previously by other scholars investigating information needs and information seeking behaviour. For instance, Kim and Sin (2007) used the survey method to investigate the perception and selection of information sources by undergraduate students. A survey was also used by Chiware and Dick (2008) to study information needs and information seeking patterns of small, medium and micro-enterprises in Namibia. Nwokedi and Adah (2009) surveyed the information needs of post-primary teachers in Nigeria. Using a quantitative survey supplemented with qualitative interviews, Mundt, Stockert and Yellesetty (2006) studied the information behaviour of teachers. Yi (2007) used an email survey to study international student perceptions of information needs and use. This study employed the survey method, complemented by focus group discussions, in order to offset the weaknesses of the survey and benefit from both methods. Methods were triangulated in order to strengthen the validity of the research results.

4.3.2 Triangulation

Triangulation refers to the designed use of several different research methods, with the offsetting or counteracting of biases, in investigations of the same phenomenon, in order to strengthen the validity of inquiry results (Greene, 2007:100; Polit & Beck, 2004:36). The idea behind triangulation is that by drawing data from sources that have very different potential threats to validity, it is possible to reduce the chances of reaching false conclusions (Hammersley, 2008:23). Triangulation enables the collection of multiple data using different strategies, approaches and methods, in such a way that the resulting mixture or combination is likely to result in complementary strengths and non-overlapping weaknesses (Johnson & Onwuegbuzie, 2004; Neuman, 2006). By combining information from complementary kinds of data or sources, a more complete study is achieved. This approach combines the strengths of both qualitative and quantitative research, and offsets their different weaknesses (Bryman, 2006; Creswell & Plano-

Clark, 2011; Creswell, 2003; Greene, Caracelli & Graham, 1989). According to Hammersley (2008:23), “if the data from contrasting sources confirm the original conclusion, then that conclusion can reasonably be held with more confidence than before”. Thus, triangulation can allow researchers to be more confident of their results. It can also stimulate the creation of inventive methods, new ways of capturing a problem to balance with conventional data collection methods, and it may also help to uncover the deviant or off-quadrant dimensions of a phenomenon (Jick, 2006:225).

Triangulation strengthens a study by combining methods - this involves using several kinds of methods or data, including both quantitative and qualitative approaches (Patton, 2002:247). Combining research methods in collecting data offers the promise of getting a “complete picture”, in a way that a single method cannot achieve (Ngulube, 2005:140). Similarly, it brings together the strengths of both data sets in order to compare, validate, confirm and corroborate quantitative results and qualitative findings (Creswell, 2003:96). It is also a means to seek convergence and corroboration across qualitative and quantitative approaches (Tashakkori & Teddlie, 2006).

According to Denzin (2009), there are four types of triangulation: data triangulation, investigator triangulation, methodology triangulation and theory triangulation. Data triangulation involves the use of multiple data sources in a study for the purposes of validating conclusions. Data triangulation has three subtypes, which include time, space and person. This means that data can vary based on the time at which data were collected, people involved in the data collection process, and the setting from which the data were collected. Investigator triangulation is when there are a number of researchers involved in the same study. It involves the use of multiple observers, interviewers or data analysts in the same study (Denzin, 2009:303). Theory triangulation is when more than one theory is used to interpret the phenomenon. Methodological triangulation is the use of more than one method to gather data, such as interviews, observations, questionnaires and document gathering. Methodological triangulation includes within-method triangulation and between-method triangulation (Denzin, 2009:301). Within-method triangulation involves the use of one method (such as questionnaires) and employs multiple strategies within that method to examine data, in order to increase the credibility of the research

findings. Between-method triangulation combines dissimilar research strategies to measure the same empirical unit, such as questionnaires and interviews (Denzin, 2009:307).

This study employed methodological triangulation and data triangulation. Both within-method and between-method triangulation were used. Data collection methods included questionnaires, focus group discussions and semi-structured interviews. The questionnaire and interview guide had open-ended and closed-ended questions, in order to collect qualitative and quantitative data. Focus group discussions assisted in collecting qualitative data for the validation of quantitative data. Data triangulation was applied by selecting various participants to be involved in the study. These participants included poultry farmers and information providers (extension officers, researchers, and local leaders). Thus, triangulation enabled the study to validate and corroborate different data, in order to enhance the validity and reliability of the findings.

4.4 Study population

A study population is the entire collection of all cases or units of analysis which the researcher wishes to investigate and about which he aims to draw conclusions (Kothari, 2004:55; Welman, Kruger & Mitchell, 2005:52). The units of analysis are those units or items that researchers examine in order to create summary descriptions of all such units and to explain differences among them (Bless & Higson-Smith, 2000:84). The term units is used because it is not necessarily people who are being sampled, as the sample may include a collection of nations, cities, regions, firms and so on (Bryman, 2004:87). It is important for the researcher to carefully and completely define the population before collecting samples (Ngulube, 2005:133). In order to define a population, a researcher must specify the unit that is being sampled, its geographical location, and the boundaries of the study population (Neuman, 2006:224).

The study population in this study comprised smallholder farmers involved in poultry production, village leaders, extension officers, and researchers working in the field of poultry management in selected rural areas of Tanzania. The poultry farmers were included in the study because they practice poultry farming. Thus, they were the main target group in this study. The leaders in the local communities were involved because they are the authority, and authority plays an important role in the lives of the rural population (Meyer, 2005). The researchers were

involved because they participate in the dissemination of poultry management information in rural areas. By involving the researchers, the study gained knowledge regarding the way in which farmers access poultry management information, and the way in which various sources are used in disseminating poultry management information to the rural areas of Tanzania. During data collection, the respondents were grouped into two categories: poultry farmers and information providers (extension officers, local leaders, and researchers).

4.4.3 Sampling frame

A sampling frame is a comprehensive list of the members of the population of interest (Williams, 2003; Conrad & Serlin, 2006). It is an important element of the overall sample design and provides a means of identifying and locating the population elements (Kalton, 1983). It is important for an investigator to define the population, including describing the elements in terms of content, units, extent and time (Kish, 1965 cited in Ngulube, 2005). In this regard, a sampling frame should be able to provide a correct description of the target population. For the sampling frame to do this, the description should be complete, accurate and current. A sampling frame is complete if it has adequately covered all members of the population, and accurate if each member of the population is included only once (no duplication). It also has to be current in order to be complete and accurate, because an old sampling frame would be inaccurate and incomplete due to changes which occur over time (Kalton, 1983).

The sampling frame for this study was a list of names of all farmers who were practising poultry farming in the selected villages. A village is a community located in a rural area with a population of less than 10,000 people. It is led by the village executive officer (URT, 2009; 2011b). The researcher obtained the name lists of poultry farmers from the offices of the village executive officers (farmers' up-to-date list for the year 2013). Therefore, the sampling frame was composed of all farmers who were engaged in poultry farming in the year 2013. The total number of poultry farmers in each village ranged from 245 to 287 (see Table 1), and this was the size of the sampling frame per village. The total number of poultry farmers in the nine selected villages was 2,401 farmers.

4.5 Sampling procedures

A sampling procedure is the process of selecting a sub-set of people or social phenomena to be studied from the larger universe to which they belong, in one of several ways, so as to be either non-representative or representative (Kothari, 2004:55). The process involves selecting entities from the population of interest in such a way as to permit generalisation about the phenomena of interest (Krishnaswami & Ranganathan, 2008). The main goal of sampling is to obtain a representative sample, so that the researcher can study a smaller group and produce accurate generalisations about the larger group (Neuman, 2006:219). The outcome or product of sampling is a sample. The sample is a subset of the population that is studied to enable the researcher to gain information about the entire population (Neuman, 2006:219). There are two main sampling approaches: probability and non-probability sampling. Probability sampling relies on random processes such that each element has an equal probability of being selected. Non-probability sampling is when the sampling elements are selected using something other than a mathematically random process (Neuman, 2006:219).

In probability sampling, a reasonable number of subjects, objects or cases that represent the target population are selected (Mugenda & Mugenda, 2003:45), and the chances of members of the wider population being selected for the sample are known. It seeks representativeness of the wider population and is mainly used in quantitative research (Cohen, Manion & Morrison, 2007:110). Non-probability sampling seeks mainly to represent only a particular group or a particular named section of a wider group, and the chances of members of the wider population being selected for the sample are not known (Cohen, Manion & Morrison, 2007:110). This sampling technique is mainly used in qualitative research. Probability sampling techniques include simple random sampling, stratified random sampling, systematic sampling and cluster sampling (Cohen, Manion & Morrison, 2007:110; Neuman 2006:219). Non-probability sampling techniques include quota sampling, purposive or judgmental sampling, snowball sampling, accidental or incidental sampling, self-selection sampling and convenience sampling (Cohen, Manion & Morrison, 2007:110; Neuman, 2006:219). In a situation where there is adequate time, a manageable population (less than one hundred) and adequate financial resources, it is desirable to study the whole population (Ngulube, 2005:130; Williamson & Bow, 2000:72). However,

sampling was considered to be important in this study due to limited funds and time. Purposive sampling and simple random sampling were used, and are explained in detail in this section.

In this study, probability and non-probability sampling techniques were used to select samples, in order to collect both quantitative and qualitative data. Purposive sampling and simple random sampling were used. According to Patton (2002 cited in 2007:7), “Purposive sampling leads to greater depth of information from a smaller number of carefully selected cases, whereas probability sampling leads to greater breadth of information from a larger number of units selected to be representative of the population”.

The purposive sampling technique was used to select districts, wards and villages, while the simple random sampling technique was used to select farmers. Using the purposive sampling technique, three districts were selected to include districts that were involved in poultry management programmes, and from each of the selected districts, one ward with a high level poultry production was selected. From each of the selected wards, three villages with well-established poultry production were selected. The districts selected for the study included Iringa rural, Morogoro rural and Mvomero. A total of nine villages were selected for the study, as shown in Table 1 below.

Table 1: Selected districts, wards and villages with number of poultry farmers

District	Ward	Village	Number of poultry farmers
Iringa Rural	Mlowa	Malinzanga	287
		Mafuluto	245
		Nyamahana	273
Mvomero	Mzumbe	Changarawe	274
		Tangeni	272
		Vikenge	265
Morogoro rural	Mikese	Mikese	263
		Mkambarani	263
		Fulwe	259

*Mvomero is a rural district. Iringa rural and Morogoro rural districts are named “rural” because there are other urban districts with identical names.

In simple random sampling, each individual is chosen randomly and entirely by chance, such that he or she has the same probability of being chosen at any stage during the sampling process, and each subset of the population has the same probability of being chosen for the sample (Yates, Moore & Starnes, 2008). This sampling technique involves selecting at random, from a list of the population (a sampling frame), the required number of subjects for the sample. Thus, when drawing a simple random sample, a researcher needs to have a sampling frame and random numbers for identifying individuals (Cohen, Manion & Morrison, 2000:100). Christensen, Johnson and Turner (2011:153) recommend the use of random number generators from the World Wide Web (www.random.org) in order to obtain numbers to be used in identifying individuals to be included in the sample. The sampling frame for this study was a list of names of all farmers who were practising poultry farming in each of the selected villages. Each name was assigned a unique number, and with the help of random number generators, a set of numbers associated with farmers' names was randomly selected. Using randomly generated numbers, the names associated with the numbers in the sampling frame were identified. Forty farmers were selected from each sampling frame to be included in the sample for the survey. Furthermore, purposive sampling was used to select respondents for focus group discussions.

The typical case sampling technique was used to select information providers (extension officers, researchers, local leaders) from the selected districts. The typical case sampling technique is one of the six types of purposive sampling. It involves selecting those cases that are the most typical, normal, or representative of the group of cases under consideration (Teddlie & Tashakkori, 2009:176). This technique was used because it allows the researcher to look for actual characteristics of individuals who represent the phenomenon of interest, in order to select them for participation in the study (Teddlie & Tashakkori, 2009:176).

4.5.1 Sample size

When it comes to sample size, social science researchers assume that if the population is large, the sample must be increased by a corresponding amount, but that is not necessarily accurate (Ngulube, 2005; O'Sullivan, Rassel & Berner, 2008:155). The sample size should be neither excessively large nor too small, but it must be optimum. An optimum sample is one which fulfils the requirements of efficiency, representativeness, reliability and flexibility (Kothari, 2004:56).

The optimum sample size depends on the degree of accuracy required and characteristics of the population under study. The degree of accuracy is determined by the confidence level required and the amount of error acceptable by the researcher. Population characteristics may be homogenous or heterogeneous. A sample size in a homogenous population is usually smaller than a heterogeneous population of the same size (Ngulube, 2005:134–135). In this study, the population of poultry farmers was homogenous. It was homogenous in the sense that poultry farmers lived in the same rural settings, with limited access to basic services, similar income patterns and educational levels, and their basic household characteristics did not differ (Covarrubias, Nsiima & Zezza, 2012).

Sample size can be obtained by making assumptions about the population and using statistical equations about the random sampling process. This method requires the researcher to make assumptions about the degree of confidence that is acceptable and the degree of variation in the population (Neuman, 2006:241). Sample size is determined by the level of confidence and degree of accuracy that the researcher wants to achieve, as well as the estimated level of variation within the population with respect to the main variable being studied (Kumar, 2005; O’Sullivan, Rassel & Berner, 2008). The method used in determining sample size is important for the validity and reliability of research results (Ngulube, 2005). A framework for developing methods of sample size determination is provided by sampling survey theory (Kothari, 1990; Cochran, 1977 cited in Bartlett, Kotlik & Higgins, 2001). According to Ngulube (2005), researchers do not need to have statistical knowledge of sampling theory to estimate sample size. Ngulube proposes the use of statistical power analysis software and tables for determining sample sizes (Ngulube, 2005:134).

Sample size determination depends on the research design. In an experimental research design, power analysis is used to determine the sample size, and sampling error formulas are used in survey research (Creswell & Plano-Clark, 2007:113). In this study, the researcher adopted the sampling error formulas to determine an appropriate sample size. This is mainly because the study design is a survey. In sampling error formulas, a common rule of thumb is a confidence level of 95% and a sampling error of 3%, which give the researcher a 95% confidence that the population will resemble the sample, and allows for a $\pm 3\%$ sampling error (Ngulube, 2005:135).

Taking the advice of Ngulube (2005:134), the researcher utilised tables for determining sample sizes. A table for determining sample size from a given population, as provided by Krejcie and Morgan (1970), was used to estimate the sample size required to be representative of 2,401 poultry farmers. The sample size that was representative of 2,401 farmers was found to be 331. This figure was rounded to 360 for convenience during sampling. Nine villages were selected for the study, and the researcher therefore felt that 360 was a convenient figure, in the sense that 40 farmers could be selected from each village.

The 360 poultry farmers constituted 15% of the population of poultry farmers in the nine selected villages. There are different opinions on the use of percentages as a criterion for sample adequacy. Studies by Neuman (2000:217) and Grinnell and Williams (1990) suggest that sample size can be based on a percentage of the population size. However, Ngulube (2005) argues that the size of the sample depends on the characteristics of the population from which the sample is drawn. Thus, the relationship between the sample and the population is what makes the sample representative of the population, rather than its percentage. This study agrees with Ngulube's argument, hence the criterion for sample representativeness was not a percentage of the population.

There is no agreement about the sample size with regard to qualitative and quantitative data collected for the same study. A common practice is "to select the same individuals for both the quantitative and qualitative data collection, so the data can be more easily converged or compared" (Creswell & Plano-Clark, 2007:119). A sample for focus group discussions (FGD) was purposively drawn from individuals who participated in the survey questionnaire. With regard to the sample size for purposive sampling, the literature (Green, Tull & Albaum, 2003; Leedy & Ormrod, 2005; Onwuegbuzie & Collins, 2007; Tashakkori & Teddlie, 2009) suggests six to twelve participants per group for FGD and twelve participants for interviews. The researcher decided that ten participants in each FGD were sufficient for providing useful information. A total of 160 poultry farmers participated in sixteen FGD. Initially, eighteen FGD were planned, but only sixteen were conducted, making it a total number of 160 participants, instead of 180 participants. Reluctance of farmers to participate in FGDs made it difficult to recruit participants for the two remaining FGDs. The sample size for information providers was

twenty five participants - however, only twenty two participants were interviewed because of the availability. These included nine village executive officers, three extension officers, and three researchers. This number was obtained through convenience sampling, as these were the people deemed to be suitable for providing the information required in the study.

4.6 Data collection methods and instruments

Once the researcher has selected the sample, he or she must decide on the methods and instruments to be used for data collection. Generally, the choice of methods and instruments for data collection is influenced by the research methodology that is used. The methods and instruments which are commonly used for data collection in social research include questionnaires, interviews, focus group discussions, observation and document analysis (Aina, 2002). This study used questionnaires, interviews, and focus group discussions. The application of more than one instrument in data collection was vital to provide checks and balances with regard to the weaknesses of each of the data collection instruments.

Access to the study area is a process of gaining and maintaining entry to a setting or social group, or of establishing working relations with members, in order that social research can be undertaken (Neuman, 2007:282). It involves writing a letter to inform the participants about the extent of time, the potential impact, and the outcome of the research (Creswell, 2003:65). Permission to collect data might be gained through individuals in authority (gatekeepers), in order for them to provide access to study participants at a research site (Cohen, Manion & Morrison, 2007:109). However, access may be denied due to a number of reasons, including access to sensitive and unauthorised areas, as well as to some people who have something to protect or have busy schedules (Cohen, Manion & Morrison, 2007:109).

The introduction letters obtained from the University of South Africa (UNISA) (see Appendix 11) and the Sokoine University of Agriculture (SUA) in Tanzania (researcher's employer) (see Appendices 8, 9, & 10) were used to get permission for collecting data in the selected districts of Tanzania. An informed consent form (see Appendix 12) was used to ask for participants' voluntary agreement to participate in the study, as recommended by Neuman (2006:135). The informed consent form was attached to each copy of the data collection instrument.

The data collection instruments provide the data input into a study, and the quality and validity of the output are therefore solely dependent upon them (Kumar, 2005:137). The research findings are based on the type of information that researchers collect, which is entirely dependent upon the questions that respondents are asked (Kumar, 2005:137). Thus, the construction of data collection instruments is the most important aspect of a study. The sections below provide information on questionnaires, interviews and focus group discussions, as well as the category of the population to which each method was applied.

4.6.1 Questionnaires

A questionnaire is a document containing a set of questions designed to collect appropriate information in a study for analysis (Babbie, 2004:183). It is the primary data collection tool used by social science researchers to cover both small and large populations within a short period of time at minimum costs (Bless & Higson-Smith, 2000:111). In the library and information science field, questionnaires are used in order to understand users, as well as to evaluate information services, users' information requirements, user satisfaction, and information usage patterns (Williamson & Bow, 2000:217). Questionnaires contain two basic types of questions: open-ended (or unstructured) questions, which do not have pre-coded options, and closed-ended (or structured) questions, which have pre-coded possible answers (Singh, 2007:69). Questionnaires are highly structured, and are characterised by categories of several structured questions, together with a few open-ended questions. They are mostly used to generate quantitative data from a large population (Pickard, 2007:64). The administration of questionnaires can be done in two main ways: self-administered questionnaires, where the respondents complete the questionnaire themselves by filling in the answers, and verbal surveys, either face-to-face or by telephone, where the researcher reads the questions to the respondent and records the responses.

The major considerations in formulating questionnaires are their content, structure, format, and the sequence of questions (Frankfort-Nachmias & Nachmias, 1996:250). Mangione (1998:413) argues that a questionnaire should "efficiently ask about all the elements that are important to the study". Thus, the content of the questionnaire should address the set objectives by answering the research questions. The structure, format and sequence of questions must motivate the respondents to provide the information being sought (Frankfort-Nachmias & Nachmias,

1996:250). Similarly, good survey questions give the researcher valid and reliable measures, and help respondents feel that they understand the questions and that their answers are meaningful (Neuman, 2006:277). Thus, the question items should be pre-tested to check for bias and sequential order, to clarify validity, and to determine usefulness and reliability (Marshall & Rossman, 2006). The purpose of pre-testing is “to make sure questions are well understood by the respondents; the layout is clear, including use of a font that is easy to read; easy and interesting questions are at the beginning; and questions build upon each other” (Powell & Connaway, 2004). Detailed information on the pre-testing of research instruments is provided in section 4.8.3.

The advantages of using questionnaires for data collection include the fact that the questionnaire is relatively inexpensive and allows a large number of respondents to be surveyed in a short period of time (Cohen, Manion & Morrison, 2000; Powell & Connaway, 2004). They provide an assurance of privacy and anonymity for respondents (Kumar, 2005:130; Powell & Connaway, 2004:125). In addition, respondents get the opportunity to answer questions at their own convenience and to look up information in cases where they are not sure of the answers (Frankfort-Nachmias & Nachmias, 1996:226). On the other hand, the disadvantages of a questionnaire are that there may be a low response rate for distributed questionnaires, and the failure of the researcher to provide clarification on some questions may lead to missing data. Furthermore, in a self-administered questionnaire, it is not possible to probe for more information, and only literate people can participate (Kumar, 2005:130; Leedy & Ormrod, 2005:185; Powell & Connaway, 2004:126).

4.6.1.1 Structure and layout of the questionnaire

In this study, both closed-ended and open-ended questions were used to address the research questions. Closed-ended questions required respondents to choose their responses from the options provided. Some of these questions were designed using a Likert scale frame (Kumar, 2005:144; Powell & Connaway, 2004). In a Likert scale frame, each response is given a numerical value to reflect the degree of agreement with the set statement. In open-ended questions, respondents use their own words to respond to the set questions. Open-ended

questions give respondents the freedom to elaborate on their responses and avoid bias (Powell & Connaway, 2004:128).

In this study, one questionnaire was formulated to be administered to poultry farmers in selected rural communities. The questionnaire consisted of 60 questions that were set objectively in order to answer the research questions that the study sought to investigate (see Appendix 2). These questions were grouped into sections, which represented specific research objectives. This sequencing of questions enabled the researcher to ensure that each research objective would be fully addressed. All questions were given specific numbers and clear instructions were provided at the beginning of the questionnaire.

4.6.1.2 Administration of the questionnaire

The administration of the questionnaire was done by the principal researcher and trained research assistants. The mode of administration was through verbal communication during a face-to-face meeting with the respondents. The researcher and research assistants read the questions to the respondents in order to obtain their responses, and the researcher and research assistants then recorded the answers on the questionnaire. This mode of administration was found to be more appropriate for obtaining sufficient responses. In addition, the researcher thought that some of the farmers in the rural areas might be reluctant to read the questionnaire. This is also confirmed by Powell and Connaway (2004), who assert that respondents do not thoroughly read questions that are too long, and they eventually give inaccurate responses or information, as they usually do not read all of the questions. It was therefore clear that it would be difficult to get adequate number of responses from rural farmers if the researcher distributed the questionnaire and left the farmers to answer the questions in their own time. Furthermore, this mode of administration gave the researcher an opportunity to clarify questions for respondents and probe for more information when necessary. It should be noted that most of these rural farmers rarely read because of their rural settings. In addition, the study benefited from the use of this mode of administration, which offset the disadvantages of the questionnaire.

4.6.2 Interviews

An interview is data collection in face-to-face settings, using an oral question-and-answer format which either employs the same questions in a systematic and structured way for all respondents, or allows respondents to talk about issues in a less directed but discursive manner (Payne & Payne, 2004:129). Interviews are appropriate when the purpose of research is to elicit individual views, beliefs and feelings about a subject, or when questions are too complex to be asked in a straightforward manner and more depth is required from the answers (Pickard, 2007:181). Interviews enable participants, be they interviewers or interviewees, to discuss their interpretations of the world in which they live, and to express their own point of view regarding particular situations (Cohen, Manion & Morrison, 2007:349). They are also flexible and provide the interviewer with an opportunity to probe and ask follow-up questions. Hence, more in-depth information can be obtained from an interview than from a questionnaire (Kothari, 1990; Kumar, 2005). Therefore, among the various data collection methods, interviews are considered to be the most common and effective way of understanding our fellow human beings (Denzin & Lincoln, 2005:698). This is also supported by Kumar (2005:131), who asserts that interviews are more appropriate for studying complex and sensitive topics, as the interviewer has the opportunity to prepare a respondent before asking sensitive questions, and to explain complex questions to respondents in person. Interviews can be structured, unstructured or semi-structured (Castro, 2006; Kothari, 2004:97; Pickard, 2007:175).

Structured interviews involve the use of a set of predetermined questions and of highly standardised techniques of recording (Kothari, 2004:97; Pickard, 2007:175). It is the kind of interview in which the content and procedures are organised in advance, and the same questions are asked in the same way to a large number of respondents. In this case, the sequence and wording of the questions are determined by means of a schedule, and the interviewer is left with little freedom to make modifications (Cohen, Manion & Morrison, 2000; Ratcliffe, 2002). Unstructured interviews are based on a clear plan or list of topics that the interviewer follows (IIRR, 1996:44). In this kind of interview, the research objectives govern the questions to be asked, but their content, sequence and wording are entirely in the hands of the interviewer (Cohen, Manion & Morrison, 2000; Leedy & Ormrod, 2005). The unstructured interviews are more flexible (Leedy & Ormrod, 2005:146), and probing is thus commonly used to get more in-

depth information (Pickard, 2007:175). Semi-structured interviews are based on written lists of questions or topics that need to be covered in a particular order, although some questions may arise during the semi-structured interviews (IIRR, 1996:44). Semi-structured interviews provide a half-way house between the highly rigorous and inflexible fully structured interview and the open-ended and more subjective unstructured interview (Denzin & Lincoln, 2005:698; Ratcliffe, 2002:21). They are more flexible and thus more likely to yield information that the researcher had not planned on asking for (Bryman, 2004:321; Leedy & Ormrod, 2005:146).

This study used semi-structured interviews. Interviews were conducted with information providers (extension officers, researchers, and local leaders) in selected rural communities. Both open-ended and closed-ended questions were used to gather quantitative and qualitative data in the semi-structured interviews. One semi-structured interview guide (see Appendix 4) with 41 questions was formulated to guide the interviews with the information providers. The interviews focused on assessing the information needs and information seeking behaviours of poultry farmers, establishing the information delivery channels most preferred by poultry farmers, and identifying the factors contributing to access and use of poultry management information in rural communities. The interviews also assessed information delivery from the perspective of information providers, such as the types of information that they disseminate, strategies that they use, as well as challenges that they face during information dissemination.

4.6.3 Focus group discussions

A focus group discussion (FGD) is a form of qualitative approach in which several participants can be interviewed simultaneously in a group of about six to twelve people (Green, Tull & Albaum, 2003; Leedy & Ormrod, 2005). FGD is a contrived setting, bringing together a specifically chosen sector of the population to discuss a particular theme or topic, where the interaction within the group leads to data and outcomes (Cohen, Manion & Morrison, 2007:376). Focus groups usually involve a narrowly focused topic discussed by group members of equal status (Payne & Payne, 2004:103). They offer the opportunity to interview a number of people at the same time, and to use the interaction between a group as a source of further insight (Blaxter, Hughes & Tight, 2006:185). Focus group discussions are important because the group develops its own conversation, raising issues and ideas that might not emerge in a discussion with the

interviewer alone (Cohen, Manion & Morrison, 2000). According to Marshall and Rossman (2011:50),

“The focus group method also allows the facilitator the flexibility to explore unanticipated issues that arise during the discussion. The cost of focus groups is relatively low, and they can increase the sample size of the qualitative studies by permitting more people to be interviewed at one time”.

The purpose of a focus group discussion is to generate rich data on a topic, as well as exploratory information, and there is thus no need for participants to agree, disagree or reach any kind of consensus (Sillitoe, Dixon & Barr, 2005:177; Tacchi, Slater & Hearn, 2003). Therefore, focus group discussions are most effective for gaining insight into opinions, attitudes and experiences, as well as exploring how points of view are constructed and expressed. They are also invaluable for examining how knowledge, ideas and story-telling operate within a given cultural context (Barbour & Kitzinger, 1999:5).

The advantages of focus group discussions are that they are inexpensive to conduct and often produce rich data that are cumulative and elaborative. They are relatively easy and often quicker than individual interviews, and are therefore time-saving and involve minimal disruption (Cohen, Manion & Morrison, 2007:378; Leedy & Ormrod, 2005:146). Focus group discussions can be conducted with non-literate individuals who are not able to complete a self-responding questionnaire (Welman, Kruger & Mitchell, 2005:203). They are relatively flexible in terms of format, types of questions and desired outcomes (Marshall & Rossman, 1999). Participants may query each other's points of view and explain their answers to one another (Neuman, 2006:412), thus providing natural quality control in data collection. A focus group discussion is conducted in an unstructured and natural way, where interviewers study people in a more natural setting than a one-to-one interview, and respondents are free to express their views on any aspect.

The disadvantages of a focus group discussion include the following: it requires skilled facilitators or moderators to guide the discussion and maintain the focus, and a moderator may unknowingly limit open, free expression of group members (Neuman, 2006:412). Groups are also difficult to assemble, and participants may hide important facts from the facilitator, thereby

producing fewer ideas than in the individual interviews (Bryman, 2004:360). For instance, if people in positions of authority are present in the discussion, participants may hide sensitive information. The researcher may also have difficulty interpreting and analysing the observed data, and may have less control over proceedings than in the individual interview (Cohen, Manion & Morrison, 2007:377).

In this study, focus group discussions were conducted with poultry farmers. One FGD guide was formulated (see Appendix 6) with 20 questions. Unstructured questions were used in the discussions, in order to obtain more information from participants. Two FGDs were conducted in each village, except Mafuluto and Lubungo, where only one FGD was conducted per village. Reluctance of farmers to participate in FGDs made it difficult to recruit participants for the second FGD in the two villages. Thus, a total of sixteen FGD sessions were conducted in nine selected villages. A number of factors were considered in preparation for conducting focus group discussions, in order to obtain adequate information of a high quality. Various authors (Cohen, Manion & Morrison, 2000:289; 2007:377; Neuman, 2006; Sillitoe, Dixon & Barr, 2005:179; Welman, Kruger & Mitchell, 2005:202) have suggested criteria to be used to select participants, size and composition of the groups, and the number of focus groups to be conducted. Thus, the selection of group participants considered the gender, age, economic and cultural characteristics of the participants. There were ten farmers in each focus group discussion. With regard to the number of focus group discussions, Bloor *et al.* (2001) suggest that the number of focus groups should be kept to the minimum, as such groups are often labour intensive in terms of recruitment, transcription and analysis.

4.7 Processing and analysis of data

Data analysis refers to how the collected information is classified and interpreted (Oates, 2006). This involves a number of closely related operations, which are performed with the purpose of summarising the collected data and organising them in such a manner that they answer the research questions. These operations include editing, coding, classifying and tabulating. It also involves categorising, ordering, manipulating and summarising data, in order to find answers to the research questions underlying the study (Green, Tull & Albaum, 2003; Kerlinger, 1986; Marshall & Rossman, 1999).

Prior to data analysis, the editing and coding of the data were done to make the data amenable to analysis (Cohen, Manion & Morrison, 2000). Editing is a process of reviewing the data to ensure maximum accuracy and eliminate ambiguity (Green, Tull & Albaum, 2003). The purpose of editing was to identify and eliminate errors made by respondents, and to ensure that data were accurate, consistent, complete, uniformly entered, and had been well arranged, in order to facilitate coding and tabulation (Cohen, Manion & Morrison, 2000; Kothari, 2004). Data coding, on the other hand, is the assigning of a label to each question or variable, and a number or value to each response category, in order to enable the responses to be grouped into a limited number of classes or categories (Gray, 2004:107; Green, Tull & Albaum, 2003). Data coding transforms raw data into symbols that can be tabulated and counted (Ngulube, 2005).

This study gathered both quantitative and qualitative data. Thus, data analysis had to be done both quantitatively and qualitatively. The reason for this is that quantitative and qualitative approaches deal with data analysis differently (Teddlie & Tashakkori, 2009).

4.7.1 Quantitative data analysis

Quantitative data include information obtained using questionnaires and semi-structured interviews that emanate from closed-ended questions. To allow quantitative analysis to be done, relevant data were converted into numerical codes representing attributes or measurements of variables (Mugenda & Mugenda, 2003:116). Quantitative data were analysed using the SPSS (Statistical Product and Service Solutions) software program version 21. SPSS is the most widely used statistical data analysis software (Muijs, 2004:85; Powell & Connaway, 2004:247). The software has been widely applied by many scholars, particularly in technology acceptance and user studies (Ifinedo, 2006; Louho, Kallioja & Oittinen, 2006).

SPSS is a comprehensive, relatively easy-to-use computer program for statistical analysis, report writing, tabulation and general purpose data management. It provides numerous statistical procedures, from the creation of simple tables to multivariate analysis (Powell & Connaway, 2004:247). SPSS enables the input of raw data, as well as modification and re-organisation of data, in order to perform a wide range of simple, statistical and multivariate analyses (Blaxter, Hughes & Tight, 2006). It can also reduce the time required to analyse data and errors involved

in coding data, as well as analyse data with in-depth statistics and charts, and present results clearly with flexible reports and charts (Pickard, 2007:278). In this study, SPSS facilitated the generation of frequencies, percentages, forms and tables, which were used to present data statistically and graphically.

4.7.2 Qualitative data analysis

Qualitative data analysis involves the process of categorisation of themes contained in the data, followed by the linking of themes and ideas and exploring of new ideas (Pickard, 2007:280). Thus, qualitative data were sorted and categorised into small sets of underlying themes. The process of analysing and presenting data was organised according to the research questions. This arrangement was found to be useful, as it draws together all relevant data from various instruments in relation to the exact issue of concern. It also provides a collective answer to a specific research question (Cohen, Manion & Morrison, 2007:468).

In this study, qualitative data included information obtained using questionnaires and semi-structured interviews with open-ended questions and focus group discussions. Qualitative data were analysed by means of content analysis. Content analysis involves reducing the data into small units to represent distinctive categories (Gray, 2004). The process encompasses going through each of the questions and noting the responses relevant for each of the research questions. The responses were organised into themes based on the research questions, and then summarised to obtain a concise description of the results for each category. The findings were presented in the form of narrative descriptions, numerical summaries, tables and figures.

4.8 Validity and reliability

According to Watling as cited in Winter (2000), “validity and reliability are tools of an essentially positivist epistemology”. Reliability is the extent to which the same measurement technique or strategy produces the same result on different occasions, for example when used by different researchers (Hammersley, 2008:43). It is concerned with the stability and consistency of measurement (Cohen, Manion & Morrison, 2007:146). Validity is the extent to which the research findings accurately represent what is really happening in the situation (Leedy &

Ormrod, 2005:92). It tests how well an instrument measures the particular concept it is intended to measure (Neuman, 2006:188). Generally, validity and reliability address issues concerning the quality of the data and appropriateness of the methods used in conducting research. The quality of the data and the appropriateness of the methods employed are particularly important in social sciences, because of the different philosophical and methodological approaches to the study of human activity (Cano, 2003). Validity and reliability are of primary concern for data quality control measures in research, since the quality of a study depends to a large extent on the accuracy of the data collection procedures (Mugenda & Mugenda, 2003:95). Thus, a study is considered to be valid when the conclusions are true or correct (McBurney & White, 2010:173), and reliable when the findings are repeatable (Bryman, 2004:28).

4.8.1 Validity in quantitative and qualitative research

Qualitative research views validity in a different way to quantitative research. Quantitative research tends to focus more on minimising threats to validity, because the objective of the study must be representative of what the researcher is investigating (Welman, Kruger & Mitchell, 2005:9). On the other hand, the focus of qualitative research is on authentically capturing the lived experiences of people (Neuman, 2006:196; Onwuegbuzie & Johnson, 2006:49).

In quantitative research, validity is more concerned with measurement validity. It determines whether or not the research truly measures what it was intended to measure, or how truthful the research results are. In other words, does the research instrument allow the researcher to hit "the bull's eye" of the research object? (Joppe, 2000 cited in Golafshani, 2003). Validity in quantitative research can be minimised through careful sampling, appropriate instrumentation and appropriate statistical treatments of data (Cohen, Manion & Morrison, 2007:133).

In qualitative research, the term validity has generally been replaced by the term "trustworthiness" (Onwuegbuzie & Johnson, 2006:51) or "validation" (Creswell, 2007:207). Validity in qualitative research has something to do with the research being accurate, correct or true (Robson, 2002:171). Various authors (Lincoln & Guba, 1985; Cohen, Manion & Morrison, 2000; Onwuegbuzie & Leech, 2007; Silverman, 2006; Creswell, 2007) have proposed ways in which trustworthiness in qualitative research can be achieved. These include prolonged

engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential adequacy, and member checks. Others include thick description, clarifying researcher bias and external audit.

4.8.2 Reliability in quantitative and qualitative research

In any study, reliability is a consequence of validity (Patton, 2002). There can be no validity without reliability. Therefore, demonstration of the former is sufficient to establish the latter (Lincoln & Guba, 1985:316). In quantitative research, reliability refers to dependability, consistency and replicability over time, instruments and groups of respondents (Cohen, Manion & Morrison, 2007:146; Leedy & Ormrod, 2005:31; Payne & Payne, 2004). It is mainly concerned with the extent to which similar results will be obtained if the study was to be repeated (Payne & Payne, 2004:195). There are four ways of achieving reliability in quantitative research: clearly conceptualising constructs; use of a precise level of measurement; use of multiple indicators; and use of pilot tests (Neuman, 2006:190). Thus, research findings are considered to be reliable if they are repeatable, and if the repeated measures yield constant results (Babbie & Mouton, 2001; Cohen, Manion & Morrison, 2000; Leedy & Ormrod, 2001; Payne & Payne, 2004).

In qualitative research, reliability includes fidelity to real life, context-and-situation-specificity, authenticity, comprehensiveness, detail, honesty, depth of response and meaningfulness to the respondents (Cohen, Manion & Morrison, 2007:149). Reliability in qualitative research can be achieved through a range of data sources and use of multiple measurement methods (Neuman, 2006:196). It can also be achieved by the use of standardised methods to write field notes and prepare transcripts, and by comparing the analysis of the same data by several researchers in the case of interviews and textual studies (Silverman, 2006).

4.8.3 Pre-testing the instruments

Pre-testing the data collection instruments is one of the tools that may be used for content validation (Ngulube, 2005:136). No matter how carefully a data collection instrument is designed, there is always a possibility of error. The surest protection against such errors is to pre-

test the data collection instruments (Babbie & Mouton, 2001:244). Pre-testing gives the researcher an opportunity to identify items that tend to be misunderstood by the participants. It also gives respondents ample opportunity to highlight problem questions, poor instruction, and unnecessary or missing questions, and to give their general reactions to the instrument (Powell & Connaway, 2004:140).

In this study, the data collection instruments were developed by the researcher, in collaboration with her supervisor. The developed questionnaires, interview schedules and FGD guide were pretested. The pretesting was done in two phases, as advised by Dawson (2007). In the first phase, the researcher asked people who were not involved in the preparation of the tools to read the tools and see if there were any ambiguities. The tools were sent to practicing library and information science professionals, who were asked to provide their comments. They provided useful comments, which were then used to modify the tools. After incorporating all the comments, the research tools were translated into Swahili. In the second phase, the Swahili tools were pretested in a purposively selected village with similar characteristics to those of the study villages. The data collection instruments were pretested in Tungamalenga village, Iringa rural district. The instruments were modified to incorporate suggestions drawn from the pretesting. The complete data collection instruments in Swahili are presented in Appendices 3, 5 and 7.

4.8.4 Sampling adequacy and saturation

Saturation is defined as the process of adding cases until the full range of what there is to observe/cover has been included. Data saturation means that sampling continues to the point at which no new information is obtained and redundancy is achieved (Bryman, 2004:305; Teddlie & Tashakkori, 2009). When researchers have truly attained saturation, informational adequacy has been achieved. At this point, the actual number of cases is less important than the sense of having fully covered or saturated the topic of study (Bryman, 2004:305; Pickard, 2007:91). Saturating data ensures replication in categories - replication verifies and ensures the comprehension, adequacy and completeness of the data (Morse *et al.*, 2002). In this study, efforts were made to ensure that the sample was appropriate, consisting of participants who best represented the research topic.

4.8.5 Verification

Verification is the process of checking, confirming, making sure and being certain. In qualitative research, verification refers to the mechanisms used during the process of research to incrementally contribute to ensuring reliability and validity (Morse *et al.*, 2002). In this study, the researcher sought to identify and correct errors in every step of the research process. This allowed the researcher to judge the situation and decide whether to continue, stop or modify the research process, in order to achieve validity and reliability. For instance, checking data collected on a daily basis ensured that the data collected was relevant, and if not, the process was repeated to fill in the gaps and obtain relevant data.

4.9 Ethical considerations

Ethics refer to a code of conduct or expected societal norm of behaviour that applies when conducting research (Kripanont, 2006). They are a guiding set of principles to assist researchers in conducting ethical studies (Johnson & Christensen, 2008:102). Ethical issues are of importance to all kinds of social and behavioural research, and of particular importance when human subjects are involved (Powell, 1985; Powell & Connaway, 2004). Thus, research ethics should be a fundamental concern of all social science researchers in planning, designing, implementing and reporting research with human participants (Wassenaar, 2006:60). Research ethics involves the consideration of how researchers should treat the people who form the subjects of their investigation, and whether there are certain actions that should or should not be taken in relation to them (Bell, 2008:87–88; Henn, Weinstein & Foard, 2006:68).

The research ethics which need to be considered when conducting research include privacy, anonymity and confidentiality of research data, honesty with professional colleagues, informed consent, psychological abuse and legal jeopardy, protection from physical harm and accuracy (Cohen, Manion & Morrison, 2007; Leedy & Ormrod, 2005; Neuman, 2006; Powell & Connaway, 2004). Ethical issues arise when specifying the research problem, purpose statement and research questions, and collecting, analysing and presenting the results (Creswell, 2003). Thus, these ethical issues need to pervade each step of the research process, including data collection, data analysis and reporting, as well as dissemination of information (Kripanont,

2006). All the ethical issues were applicable to this study and the researcher strived to adhere to all of them in each step of the research process.

Furthermore, this study adhered to the University of South Africa (UNISA) research ethics policy. The following are some of the issues observed by the researcher, as stipulated in this policy (UNISA, 2007):

- i. It should be clearly demonstrated that the research is essential to the pursuit of knowledge and/or the public good.
- ii. Research should be carried out for the benefit of society, and with the motive of maximising public interest and social justice.
- iii. Researchers should be professionally and personally qualified for the research.
- iv. Researchers should respect and protect the dignity, privacy and confidentiality of participants.
- v. Autonomy requires that individuals' participation should be freely given, specific and based on informed consent.
- vi. Researchers should respect participants' traditions.
- vii. Criteria for the selection of participants should be fair, besides being scientific.
- viii. The conduct of research should be honest, fair and transparent.
- ix. There may be no exploitation of research participants, researchers, communities, institutions or vulnerable people.
- x. Researchers should ensure that the risks are assessed and that adequate precautions are taken to minimise and mitigate risks.

In connection with the above ethical issues, the researcher requested ethical clearance for the research from UNISA and complied with UNISA's code of conduct for research throughout the study.

4.10 Evaluation of the research methodology

Research methods have to be evaluated in order to explain what information was required, how it was collected and how it was analysed (Ngulube, 2005:139). Ngulube (2005:139) adds that all research methods are imperfect, and it is therefore mandatory for researchers to evaluate their

investigation procedures. The evaluation of research methods ensures that these methods are appropriate to the research questions and compatible with the kind of knowledge that the study is aiming to produce (Willig, 2001). According to Silverman (2006:59), reliability and validity are also important ways of evaluating research, and other criteria could also be useful. Some of these criteria include unexpected changes to the research design, limitations of the research design, acknowledgement of the shortcomings of the execution of the study, and ethical issues (Ngulube, 2005:139). Similarly, Howe and Ensenhardt (1990) proposed five standards that can be applied to all research, which include the following: the research questions should drive the data collection and analysis, the researcher's assumptions should be explicit, the study should be robust, data collection and analysis techniques should be competently applied in a technical sense, respected theoretical explanations should be used, and the study should have value both in informing and improving practice, as well as in protecting the confidentiality, privacy and truth telling of participants.

This study used a survey research design, which was complemented by methodological triangulation. Although surveys have some limitations, such as the failure to establish a causal relationship between variables, problems of self-reporting that increase bias, effects of sampling techniques, and non-response rates; this method was found to be relevant to this study, because of its benefits, including being economical and achieving a rapid turn-around in data collection (Ngulube, 2005). This study combined quantitative and qualitative data to provide a broader perspective through methodological triangulation. A survey was employed to collect mainly quantitative data and some qualitative data through a semi-structured questionnaire. More qualitative data was collected through interviews and focus group discussions. Thus, quantitative data collected through the questionnaire was supplemented by qualitative data collected through interviews and focus group discussions. This allowed for methodological triangulation.

The triangulation of data collection instruments enabled the researcher to collect reliable data. Multiple research instruments were used in order to cross-check and verify the reliability of research tools and the validity of the collected data (McNeil & Chapman, 2005). The research instruments that were used include questionnaire, semi-structured interviews and focus group discussion. The use of focus group discussions and interviews facilitated face-to-face

communication between the researcher and participants, which enabled the researcher to explain questions, depending on the level of understanding of the participants. Likewise, questionnaires were administered during face-to-face interaction between the researcher and respondents. Furthermore, focus group discussions were used to validate information collected by means of the questionnaire. Similarly, data from interviews with information providers were used to clarify the different findings from the questionnaire administered to farmers.

During data collection, the researcher encountered some challenges related to the reluctance of respondents to participate. Some poultry farmers were reluctant to participate in focus group discussions (FGD), as they thought that it was a waste of their time. The same farmers who participated in the questionnaire survey were chosen for FGD, and some of them therefore complained that they had already participated, so there was no need for them to participate in FGD, as they had nothing new to add. In order to overcome this challenge, the researcher had to request the village executive officers to encourage the farmers to participate in FGD. Another issue which surfaced during the questionnaire survey was that some farmers needed monetary compensation for their time. Since this went against research ethics, the researcher explained to the farmers that there was no monetary compensation, but that the research results would provide them with guidance for future improvements in poultry management. Another challenge was related to transport. The rural villages selected for the study were very remote, with no tarmac roads, and some were mountainous areas. In addition, the houses in the villages were very scattered. Thus, transport from one house to another and from one village to the other was difficult. All these challenges slowed down the data collection process. However, the triangulation of data collection methods enabled the researcher to achieve the study objectives.

4.11 Summary

Chapter Four presented the research design of the study. The chapter discussed the research design, study population, sampling procedures and methods of data collection. Other issues discussed included the processing and analysis of data, validity and reliability, ethical considerations and evaluation of the research methodology. One of the main issues in this chapter was that it was important for this study to use a survey research design. The triangulation of data collection methods enabled the study to validate the findings and produce complementary

data for completeness of the findings. Validity and reliability issues were important in ensuring the consistency, credibility and trustworthiness of the research findings. Ethical considerations were also important for the researcher to adhere to during each step of the research process. Other issues included data processing and analysis, and the evaluation of the research methodology used in the study. Chapter Five presents the research findings.

CHAPTER FIVE: PRESENTATION OF FINDINGS

5.1 Introduction

This chapter presents the research findings of the study. The findings are derived from the analysis of the data, which transformed the raw data into meaningful facts. The data for this study were derived from the questionnaire, semi-structured interviews and focus group discussions. Thus, the findings originated from both qualitative and quantitative methods. Quantitative data was analysed using SPSS and presented in graphic and tabular forms (tables and figures). Qualitative data was analysed by means of content analysis and presented in a descriptive manner. The findings are presented in the form of research themes in relation to the study objectives and research questions. Generally, the presentation of findings is in the form of narrative descriptions, as well as tables and graphs.

A total of nine villages from three districts (three villages from each district) were surveyed. Three hundred and sixty farmers participated in a survey questionnaire. Twenty two information providers (nine village executive officers, six researchers, three extension officers, three district agricultural officers, and one ward executive officer) participated in semi-structured interviews. One hundred and sixty farmers participated in focus group discussions conducted in nine villages, where ten farmers attended each focus group discussion session.

The sequence of the presentation of findings was guided by research themes based on the research objectives that were presented in section 1.5.1, namely:

1. To assess the information needs of poultry farmers.
2. To assess the information seeking behaviours of poultry farmers.
3. To establish the most preferred information sources.
4. To assess the effectiveness of various information sources.
5. To determine the factors related to access and use of poultry management information.
6. To recommend a model that could be used for the dissemination of poultry management information in rural areas.

5.2 Response rate

The aim of a good study is to keep non-responses to a minimum and to achieve the highest response rate that is possible in relation to the kind of research being conducted (Denscombe, 2010). A response rate of 50% is considered to be adequate for analysis, while 60% and 70% are good and very good respectively (Babbie & Mouton, 2001:261). However, response rates between 50% and 60% have to be treated with caution (Moore, 2000:261). In this study, a total of 360 (100%) of the targeted 360 farmers were surveyed, and 22 (88%) of the targeted 25 information providers were interviewed. One hundred and sixty farmers (88.9%) of the targeted 180 farmers participated in sixteen focus group discussions. Direct administration of questionnaires helped the study to achieve high response rates. Table 2 below shows the surveyed villages and number of respondents in each of the surveyed villages.

Table 2: Number of respondents in the surveyed villages

Districts	Villages	Number of respondents - survey questionnaire	Number of respondents - focus group discussions	Number of respondents – interviews
Iringa	Malinzanga	40	20	4
Rural	Mafuluto	40	10	1
	Nyamahana	40	20	3
Morogoro rural	Fulwe	40	20	3
	Mikese	40	20	3
	Mkambarani	40	10	1
Mvomero	Changarawe	40	20	1
	Tangeni	40	20	4
	Vikenge	40	20	2
Total		360	160	22

5.3 Characteristics of respondents

The identification of respondents' characteristics was not one of the research objectives of this study. However, it was felt that it was important to present this information because the characteristics of respondents may have a significant influence on information seeking behaviours. Likewise, this information gives the reader an understanding of the background of respondents. Understanding the characteristics of respondents provides a clear picture of the study population. The study population included respondents who were actively engaged in poultry farming activities, and information providers who were involved in disseminating poultry management information. The characteristics of respondents are described in terms of age, gender, education and occupation.

5.3.1 Characteristics of respondents: survey questionnaire

Three hundred and sixty poultry farmers participated in the survey questionnaire, where 171 (47.5%) were women and 189 (52.5%) were men. The mean age of respondents was 39 years. The majority of the respondents were middle aged, with 303 (84.1%) being between 18 and 57 years old. Some respondents were old, with 55 (15.3%) being 58 years and above. Only a few respondents were young, with 2 (0.6%) being below the age of 18 years. Table 3 below presents the detailed findings on the age of respondents involved in the survey questionnaire.

Table 3: Age of respondents involved in the survey questionnaire (N=360)

Age category (Years)	Frequency (N)	Percentage (%)
Below 18	2	0.6
18 - 27	53	14.7
28 - 37	120	33.3
38 - 47	76	21.1
48 - 57	54	15
58 and above	55	15.3
Total	360	100

The majority of the respondents had primary education, a few had secondary education, and only four respondents had post-secondary education. Forty three respondents (11.9%) were illiterate. Table 4 below presents the findings on the educational levels of respondents involved in the survey questionnaire.

Table 4: Educational levels by gender of the respondents involved in the survey questionnaire (N=360)

Educational levels	Female		Male		Total	
	No	%	No	%	No	%
Post-secondary education	3	0.8	1	0.3	4	1.1
Secondary education	9	2.5	13	3.6	22	6.1
Primary education	131	36.4	156	43.3	287	79.7
Informal education	3	0.8	1	0.3	4	1.1

The majority of the respondents (341, 94.7%) were involved with mixed farming, practising both crop farming and livestock keeping. Some farmers (13, 3.6%) were involved in livestock keeping and small business. Only a few farmers (6, 1.7%) were involved in livestock keeping and skilled work.

Table 5 below shows the age, gender and literacy levels of respondents involved in the survey questionnaire.

Table 5: Age, gender and literacy levels of the respondents involved in the survey questionnaire (N=360)

Demographic data	Districts			Total
	Iringa rural	Morogoro rural	Mvomero	
Respondents interviewed	120 (33.3%)	120 (33.3%)	120 (33.3%)	360 (100%)
Mean age	37	40	41	39
Female to male ratio	57 (15.8%): 63 (17.5%)	62 (17.2%): 58 (16.1%)	52 (14.4%): 68 (18.9%)	171 (47.5%): 189 (52.5%)
Literacy-illiteracy ratio	109 (30.3%): 11 (3.1%)	102 (28.3%): 18(5%)	106 (29.4%): 14 (3.9%)	317 (88%): 43 (12%)

5.3.2 Characteristics of respondents: focus group discussions

One hundred and sixty poultry farmers participated in the focus group discussions, where 67 (41.9%) were women, and 93 (58.1%) were men. The mean age of the respondents was 42 years. The majority of the respondents (58, 36.3%) were between 28 and 37 years, whereas 39 (24.4%) respondents were between 38 and 47 years, 24 (15%) respondents were between 48 and 57 years, 22 (13.8%) respondents were above 58 years, and 17 (10.6%) were between 18 and 27 years. One hundred and thirty eight (86.3%) respondents had primary education, nine (5.6%) had secondary education, and two (1.3%) had no formal education, but could read and understand. Eleven (6.9%) respondents were illiterate. Table 6 below indicates the age, gender and literacy levels of respondents in the focus group discussions.

Table 6: Age, gender and literacy levels of the respondents in the focus group discussions (N=160)

Demographic data	Districts			Total
	Iringa rural	Morogoro rural	Mvomero	
Respondents interviewed	50 (31.3%)	50 (31.3%)	60 (37.5%)	160 (100%)
Mean age	42	40	45	42
Female to male ratio	19 (11.9%): 31 (19.4%)	22 (13.8%): 28 (17.5%)	26 (16.3%): 34 (21.3%)	67 (41.9%): 93 (58.1%)
Literacy-illiteracy ratio	46 (30.3%): 4 (3.1%)	48 (28.3%): 2(5%)	55 (29.4%): 5 (3.9%)	149 (93.1%): 11 (6.9%)

5.3.3 Characteristics of respondents: Interviews

Twenty two information providers participated in the semi-structured interviews, where 15 (68.2%) were men and seven (31.8%) were women. The mean age of the respondents was 42 years. The majority of the respondents (18, 81.8%) were between 35 and 55 years, and four (18.2%) respondents were above 55 years. Nine (40.9%) respondents were village executive officers, six (27.3%) were researchers, three (13.6%) were district agricultural officers, three (13.6%) were extension officers and one (4.5%) was a ward executive officer. Figure 7 below shows the educational levels of information providers, where the majority (6, 27.3%) had secondary education and four (18.2%) had a tertiary certificate.

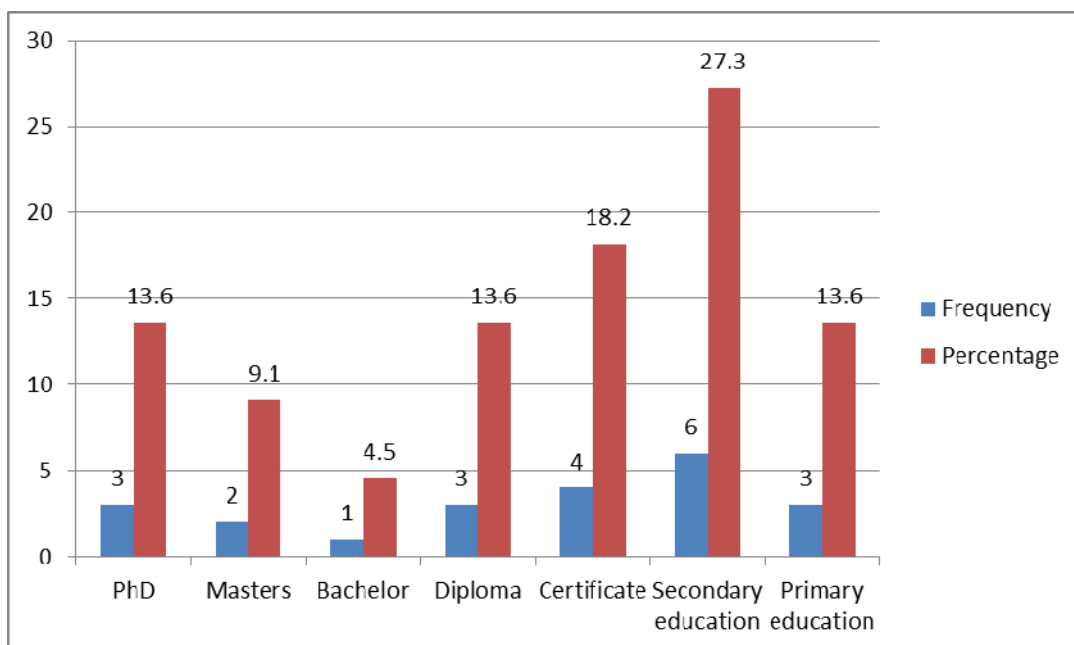


Figure 7: Educational levels of information providers (N=22)

5.4 Information needs of poultry farmers

The first objective of this study was to assess the information needs of poultry farmers in the surveyed communities. In order to address this objective, data were collected through the questionnaire, interview schedule and focus group discussions. The respondents (farmers) were asked to provide information on whether or not they had information needs related to poultry management. The majority of the respondents (355, 98.6%) indicated that they had information needs related to poultry management. The respondents who indicated that they had information needs were asked to provide information on the types of information needs that they had. The study findings indicated that the majority of farmers (352, 97.8%) needed information on poultry disease management. Other main information needs were: protection (133, 37.5%), shelter (83, 23.4%), production (51, 14.4%), breeds and breeding (47, 13.2%), feeding and nutrition (35, 9.9%), and hatching (32, 9.0%). Other information needs were marketing (7, 2.0%) and competition with crops (6, 1.7%). The study findings (see Table 7 below) indicate that there were slight differences in information needs across the three surveyed districts.

Table 7: Information needs of poultry farmers by district (N=355)

Information needs	Districts						Total	
	Iringa rural		Morogoro rural		Mvomero		No.	%
	No.	%	No.	%	No.	%		
Breeds and breeding	8	2.3	17	4.8	22	6.2	47	13.2
Competition with crops	1	0.3	1	0.3	4	1.1	6	1.7
Disease management	119	33.5	118	33.2	115	32.4	352	99.2
Feeding and nutrition	8	2.3	6	1.7	21	5.9	35	9.9
Hatching	9	2.5	3	0.8	20	5.6	32	9
Market for poultry products	1	0.3	1	0.3	5	1.4	7	2
Production	16	4.5	13	3.7	22	6.2	51	14.4
Protection	37	10.4	48	13.5	48	13.5	133	37.5
Shelter for poultry	23	6.5	30	8.5	30	8.5	83	23.4
Total responses	119	33.5	120	33.8	116	32.7	355	100

(Multiple responses were possible)

The findings, as indicated in Table 7, reveal that poultry disease management, protection and shelter were the main information needs for farmers in all the three districts. Farmers in the Mvomero district needed information on breeds and breeding (22, 6.2%), production (22, 6.2%), feeding and nutrition (21, 5.9%), and hatching (20, 5.6%). In the Morogoro rural district, farmers needed information on breeds and breeding (17, 4.8%) and production (13, 3.7%), while farmers in the Iringa rural district needed information on production (16, 4.5%). The least needed types of information across the three districts were market for poultry products (7, 2%) and competition with crops (6, 1.7%).

The findings revealed further that the information needs varied according to gender of the respondents. Table 8 below shows the information needs by gender of respondents.

Table 8: Information needs of poultry farmers by gender (N=355)

Information needs	Women		Men		Total	
	No.	%	No.	%	No.	%
Disease management	167	47.0	185	52.1	352	99.2
Shelter	28	7.9	55	15.5	83	23.4
Protection	61	17.2	72	20.3	133	37.5
Production	22	6.2	29	8.2	51	14.4
Breeds and breeding	15	4.2	32	9.0	47	13.2
Feeding and nutrition	23	6.5	12	3.4	35	9.9
Hatching	16	4.5	16	4.5	32	9.0
Market	5	1.4	2	0.6	7	2.0
Competition with crops	2	0.6	4	1.1	6	1.7
Total	168	47.3	187	52.7	355	100

(Multiple responses were possible)

These findings were confirmed by the data from focus group discussions, which indicated that the main information needs of farmers were poultry disease management, protection and shelter. Other information needs, arranged in descending order of importance, were: breeds and breeding; production; hatching; feeding and nutrition; and competition with crops. Some of the typical responses were:

“.....we need more information on how to control poultry diseases because every year a lot of poultry die in our community”.

“..... we want to know how to protect the poultry from predators, most of the times we lose poultry because they are eaten by other animals”.

During the semi-structured interviews, the information providers were asked to indicate if they were aware that farmers had information needs related to poultry management. All respondents (22, 100%) indicated that they were aware of farmers’ need for information on poultry management. Respondents were further asked to state if it was important to first inquire about farmers’ information needs when planning for information dissemination. All respondents (22,

100%) agreed that it was important to inquire about farmers' needs before disseminating information. The respondents were probed about the reasons for inquiring about farmers' needs before disseminating information. Two reasons were given: (1) in order to understand what farmers need, so that the type of information disseminated fits within their requirements (17, 72.3%), and (2) in order to plan for future information dissemination activities (9, 40.9%).

5.4.1 Consideration of farmers' information needs

The farmers were asked to provide information on whether or not information providers inquired about their information needs before disseminating poultry management information in their communities. The majority of the respondents (262, 72.8%) indicated that information providers had never inquired about their information needs. Other respondents (98, 27.2%) indicated that information providers had inquired about their information needs.

Data from focus group discussions confirmed that most of the information providers had never inquired about farmers' information needs when planning for information dissemination. Some of the typical responses were:

“.....They never ask us what we need, they only come when there is poultry disease outbreak and tell us how to control the disease”.

“.....They prepare the information without asking us what we need, and most of the time they bring the information when the poultry are already sick”.

“.....They never consult us, they just come to deliver the information”.

Information providers were asked to indicate whether or not they determined farmers' information needs during their planning for information dissemination. The majority of the respondents (18, 81.8%) had never inquired about farmers' information needs. A few respondents (4, 18.2%) indicated that they had involved farmers in their planning for information dissemination. Among the four information providers who had determined farmers' information needs, three were extension officers and one was a researcher. These information providers were further asked to state the strategies that they used. The strategies used were visits to the farmers' households, village meetings, school meetings, farmers' groups, and vaccination campaigns.

5.4.2 Prioritisation of farmers' information needs

The respondents were asked to indicate whether or not information providers prioritised their information needs. The majority of the respondents (267, 74.2%) indicated that information providers did not prioritise their information needs, while 93 (25.8%) respondents indicated that information providers prioritised their information needs. The respondents who indicated that information providers prioritised their needs were further asked to identify the categories of information providers who prioritised their information needs. The extension officers were cited as the only information providers who prioritised farmers' information needs.

It was evident from the focus group discussions that some of the information providers prioritised farmers' information needs. Some of the typical responses were:

“.....The extension officer always prioritised our information needs, especially during poultry disease outbreak”.

“.....Extension officer asks us what problems we are facing, and prioritise in solving them”.

On the other hand, some of the farmers had different opinions, indicating that the information providers did not prioritise their information needs. Some of the typical responses were:

“.....They never prioritised our needs, they just do what they are directed by the government”.

“.....They deliver information which is already formulated without prioritising our needs”.

Information providers were asked to state whether or not they prioritised farmers' information needs. Most of the respondents (19, 86.4%) indicated that they did not prioritise farmers' information needs, while a few (3, 13.6%) responded that they prioritised farmers' information needs. The respondents who indicated that they prioritised farmers' needs were further asked to identify the approaches that they used to prioritise farmers' information needs. The main approaches used by extension officers in order to prioritise farmers' needs were visiting farmers, holding village meetings and organising seminars to discuss various problems facing farmers. The respondents who indicated that they did not prioritise farmers' information needs were asked to give reasons for this failure. The reasons were: inadequate resources (19, 100%), unfavourable working conditions (15, 78.9%), lack of facilities to assist in prioritising farmers' needs (12, 63.2%), and inadequate support from the government (3, 15.8%).

5.5 Information seeking behaviours of poultry farmers

The study findings in relation to the second research objective dealing with information seeking behaviours are presented in this section as follows: information seeking patterns, access to poultry management information, use of poultry management information, and satisfaction of poultry farmers. The data were collected through the questionnaire, semi-structured interviews and focus group discussions.

5.5.1 Information seeking patterns

Information seeking is a result of the identification of an information need. The respondents who stated that they had information needs related to poultry management were asked if they had tried to find information to solve the problems or challenges that they were facing. Most of the respondents (342, 96.3%) had tried to find solutions, while a few (13, 3.7%) had not sought solutions. The respondents who had tried to find solutions were asked to indicate whether or not they had succeeded in finding information. Out of the 342 respondents who tried to find solutions, 197 (57.6%) managed to get the information.

The respondents who reported that they had sought a solution were asked to identify the information sources that they consulted in order to access poultry management information and the reasons for choosing these sources. The findings (Table 9) indicate that the main sources of information were family, friends and neighbours (288, 84.2%). Other important information sources were extension officers (162, 47.4%), researchers (53, 15.5%), and radio (26, 7.6%). The least used sources were mobile phones, television, the Internet, and drama, each with a score of one (0.3%).

Table 9: Sources for poultry management information by district (N=342)

Information source	Districts						Total	
	Iringa rural		Morogoro rural		Mvomero		No.	%
	No.	%	No.	%	No.	%		
Books	2	0.6	3	0.9	4	1.2	9	2.6
Cell phone	-	-	-	-	1	0.3	1	0.3
Drama	1	0.3	-	-	-	-	1	0.3
Extension officer	62	18.1	48	14	52	15.2	162	47.4
Films	2	0.6	-	-	-	-	2	0.6
Internet	1	0.3	-	-	-	-	1	0.3
Leaflets	6	1.8	1	0.3	3	0.9	10	2.9
Family/friends/ neighbours	67	19.6	115	33.6	106	31	288	84.2
Newspapers	3	0.9	2	0.6	5	1.5	10	2.9
NGOs/CBOs	1	0.3	1	0.3	-	-	2	0.6
Posters	1	0.3	3	0.9	-	-	4	1.2
Radio	7	2	5	1.5	14	4.1	26	7.6
Researchers	28	8.2	-	-	25	7.3	53	15.5
Songs	3	0.9	-	-	-	-	3	0.9
Television	-	-	-	-	1	0.3	1	0.3
Veterinary drug seller	-	-	3	0.9	-	-	3	0.9
Total Responses	107	31.3	119	34.8	116	33.9	342	100

(Multiple responses were possible)

Generally, the findings show that farmers relied on interpersonal sources of information, rather than formal sources. Family, friends, neighbours and extension officers were the main sources of information in all the three districts. However, there was variation in terms of choices of information sources across the three surveyed districts. The findings (Table 9) show that researchers were an important source of information in Iringa rural (28, 8.2%) and Mvomero (25, 7.3%), but were not used at all in Morogoro rural. Radio was used to a small extent in Mvomero

(14, 4.1%), Iringa rural (7, 2%) and Morogoro rural (5, 1.5%). A few farmers utilised leaflets in Iringa rural (6, 1.8%), newspapers in Mvomero (5, 1.5%) and books in Mvomero (4, 1.2%).

When asked about the reasons for choosing to access information using particular sources, out of the 342 respondents who tried to find solutions, 292 (85.4%) had reasons, while 50 (14.6%) had no reasons. The findings indicate that the availability (222, 76.0%) and convenience (175, 59.9%) of the sources were the major reasons. Other reasons were influence from fellow farmers (69, 23.6%), reliability of the source (65, 22.3%), affordability (49, 16.8%), and skills in using the source (17, 5.8%).

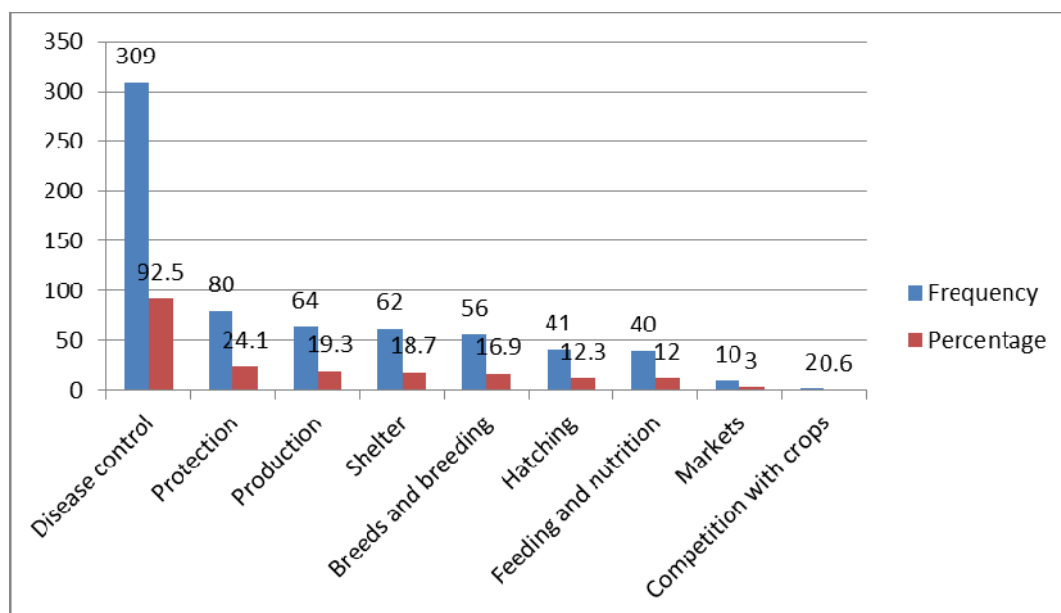
Data from the focus group discussions confirmed that family, friends, neighbours and extension officers were the main sources of information in the surveyed communities. There were, however, variations in terms of choices of information sources for seeking information in the three districts. For instance, in Iringa rural and Mvomero districts, participants relied on researchers for finding information, while participants in Morogoro rural showed no interest in researchers. Cell phones and television were not mentioned as sources of poultry information during all the focus group discussions. Some of the typical responses were:

“.....if I need information on poultry management, I always consult my fellow farmers”.

“.....when I face problems such as poultry diseases, I ask the extension officer for solutions”.

5.5.2 Access to poultry management information

The respondents were asked to indicate whether or not they have accessed poultry management information in the past. The majority of respondents (332, 92.2%) indicated that they had accessed poultry management information. The respondents who indicated that they had accessed poultry management information were asked to provide details on the types of information that they accessed. The majority of the respondents accessed information on disease control (307, 92.5%), protection (80, 24.1%), production (64, 19.3%), and shelter (62, 18.7%). Other information accessed by poultry farmers included: breeds and breeding, hatching, and feeding and nutrition. The least accessed types of information were markets (10, 3%) and competition with crops (2, 0.6%). Figure 8 below shows the types of information accessed by poultry farmers.



(Multiple responses were possible)

Figure 8: Types of information accessed by poultry farmers (N=332)

Data from focus group discussions showed that disease control was the most accessed type of information, followed by protection of poultry. The types of information accessed, in descending order of importance were: breeds and breeding, feeding and nutrition, production, hatching, shelter, markets, and competition with crops. Generally, most of the farmers indicated that they were more interested in information on disease control because this was the biggest challenge that they were facing in the management of poultry. Some of the typical responses were:

“...I mostly access information on poultry disease because diseases are the main challenges for poultry management”.

“...I access information on disease control to have enough knowledge for protecting my poultry against diseases”.

“...I want to be well equipped with information on disease management because our community is prone to Newcastle poultry disease”

Information providers were asked to mention the types of information that they disseminated to the local communities. These included poultry disease management, feeding and nutrition,

markets for poultry products, breeds and breeding, housing and shelter, poultry protection, and poultry production. Table 10 below presents detailed findings on the poultry management information disseminated by information providers.

Table 10: Poultry management information disseminated by information providers (N=22)

Type of information	Frequency (N)	Percentage (%)
Poultry disease management	22	100
Feeding and nutrition	5	22.7
Breeds and breeding	5	22.7
Housing and shelter	4	18.2
Poultry protection	3	13.6
Poultry production	2	9.09
Markets for poultry products	5	22.7

(Multiple responses were possible)

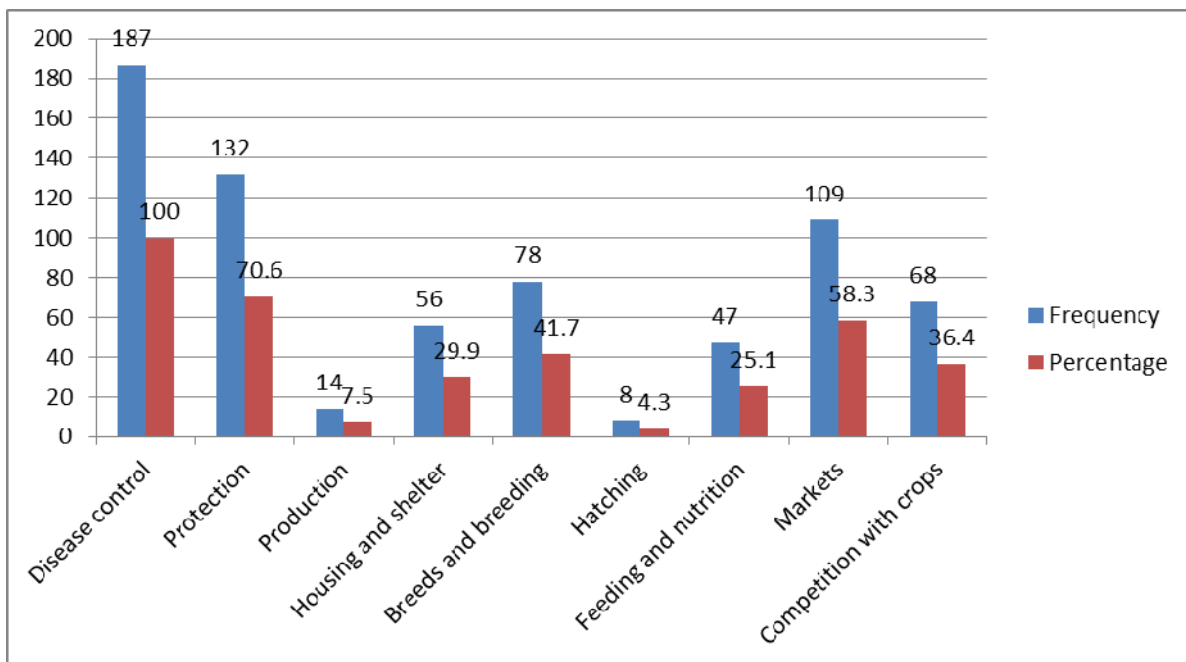
Respondents were also asked to identify the strategies that they used in order to ensure that farmers accessed the information that they disseminated. The most frequently used strategy was to arrange for meetings with farmers (12, 54.5%), so that they could deliver the information directly to the farmers. Another strategy was to arrange for seminars (9, 40.9%) where farmers could get information regarding poultry management. School meetings (8, 36.4%) and village meetings (7, 31.8%) were also used to discuss issues related to poultry management.

5.5.3 Use of poultry management information

The respondents were asked whether or not they used the information they had accessed. Out of the 332 respondents who reported that they had accessed information, 187 (56.3%) respondents indicated that they used the information. They were also asked if the information had assisted them to solve the problems or challenges that they were facing. Most of the respondents (146, 78.1%) indicated that the information assisted them to solve the problems and ensure better management of their poultry. Some respondents (41, 21.9%) indicated that the information was not helpful in solving their problems. The respondents who indicated that the use of information

did not solve their problems were asked about the possible reasons for this failure. The main reasons were: unavailability of the extension officer to consult (29,70.7%), inadequate knowledge on how to use the information (22, 53.7%), expense in terms of cost of implementing the advice (16, 30%), unavailability of poultry treatment drugs (9, 23%), travelling distance to the drug store (9, 23%), and loss of hope (8, 19.5%).

The respondents who indicated that they used poultry management information (187, 56.3%) were further asked to mention the types of information that they had used. All the respondents reported that they used information on disease control (187, 100%). Other commonly used types of information were information on poultry protection (132, 70.6%) and markets (109, 58.3%). The least used information was information on production (14, 7.5%) and hatching (8, 4.3%). Figure 9 below presents detailed findings on the use of poultry management information by farmers.



(Multiple responses were possible)

Figure 9: The use of poultry management information by farmers (N=187)

Data from focus group discussions established that there was low use of information on feeding practices and shelter. Most farmers used information on poultry disease control, and were not willing to provide proper feeds and housing for the poultry. In addition, some farmers, especially in Mafuluto village, were not interested in using conventional methods for prevention of poultry diseases because they had experienced a massive loss of their poultry when the vaccine was used previously. Thus, they were reluctant to use any information that they received from the extension officer. Some of the typical responses were:

“...We have used vaccines previously, and as a result all the poultry died because of Newcastle disease. Now, we only want to use the traditional methods to prevent loss of poultry”.

“...Implementing some of the advices from extension officers is expensive, and some of us cannot afford. For instance building a house for the poultry is expensive”.

“...It is expensive to get food for the poultry, why should I feed them while they can easily find their own food?”

The information providers were asked to identify the strategies that they used to ensure that farmers used the information that they had accessed. The majority of the respondents (17, 77.3%) indicated that they had no strategies for ensuring that farmers used the information. A few respondents (5, 22.7%) indicated that they had strategies. The strategies that they used were: following up with the farmers (5, 100%), practicing together with farmers (4, 80%), demonstrating during the seminars (4, 80%) and requesting feedback from farmers (3, 60%). One researcher in Mvomero district organised school children, and they built a poultry house at their school. He provided the building materials, and bought the poultry and feeds for starting the project. This was a strategy to help farmers and students to learn from the school poultry project. Students learnt how to manage poultry and transferred that knowledge to their homes. Through this strategy, many farmers started to use the information after seeing the benefits of doing this through the school poultry project.

5.5.4 Farmers' satisfaction with information dissemination services

The respondents were asked to indicate whether they were satisfied with the information dissemination services in their community. The majority of the respondents (216, 60%) were not satisfied, while other respondents (144, 40%) were satisfied with the information dissemination

services. The respondents were also asked to mention the reasons for their satisfaction or dissatisfaction. All the respondents who indicated that they were not satisfied gave their reasons for dissatisfaction. Out of 144 respondents who indicated that they were satisfied with information dissemination, 101 respondents gave reasons, while 43 respondents had no reasons for their satisfaction. This was an open-ended question, which may therefore have contributed to the low responses.

The reasons for dissatisfaction were: inadequate information services from extension officers (87, 40.3%), lack of reliable sources of information (54, 25%), lack of awareness of the availability of information (34, 15.7%), unavailability of the extension officers (20, 5.6%), availability of only a few sources of information (11, 5.1%), and unreliable information services (10, 4.6%). The reasons for satisfaction were: availability of the extension officers for consultation (47, 46.5%), availability of information from the neighbours (25, 24.8%), and access of information and knowledge through seminars and training (17, 16.8%). Other reasons were the availability of reliable information (9, 8.9%) and convenience of the source of information (3, 3.0%).

Similarly, data from the focus group discussions showed that most farmers were dissatisfied with information dissemination services. Responses from all the focus group discussions showed that farmers were not satisfied, except for the two focus group discussions in Sangasanga village, where farmers indicated that they were satisfied. Some of the typical responses were:

“.....I am satisfied because I get support from the extension officer whenever I need it”.

“.....Researchers prepare seminars and trainings for farmers to learn, so I am satisfied”.

“.....Most of fellow farmers have lot of knowledge through seminars, so I get information from my colleagues whenever I face problems”.

Participants in the focus group discussions were also asked about the reasons for their satisfaction and dissatisfaction. The reasons for satisfaction, in descending order of importance, were: the extension officer could be easily reached, availability of seminars, knowledgeable fellow farmers, and convenience of getting information. Some of the typical responses were:

“...I am satisfied because I can easily reach the extension officer when I have a problem”.

“...I can contact my friends and fellow farmers all the times, it is convenient for me”.

The reasons for dissatisfaction, in descending order of importance were: unavailability of information, unreliable sources of information, unavailability of extension officers, and the top-down approach of information services. Some of the typical responses were:

“...I am not happy with the way information is hidden in the offices, and we farmers are suffering with poultry diseases and predators”.

“...There is only one extension officer for the four villages, so it is difficult to get hold of him when I need information”.

“....We do not get information on time; it is until there is disease outbreak when you find the village officers coming. They should give us information well in advance in order to prevent diseases”.

During the semi-structured interview, the information providers were asked whether or not the information dissemination services satisfied farmers' needs. More than half of the respondents (15, 68.2%) indicated that the services did not satisfy farmers' needs, while seven (31.8%) respondents indicated that the services satisfied farmers' needs. The respondents who indicated that the services did not satisfy farmers' needs were asked to provide reasons. The reasons were: poor infrastructure (13, 86.7%), poor facilities (12, 80%), limited transport services (12, 80%), lack of funds (10, 66.7%), insufficient number of extension officers (8, 53.3%), and difficult geographical infrastructure (7, 46.7%).

5.6 Information sources preferred by poultry farmers

The assessment of information sources preferred by poultry farmers in accessing poultry management information was important in order to establish the most preferred sources of information in the surveyed communities. When poultry farmers were asked to specify the information sources that they preferred when accessing poultry management information, the majority of the respondents preferred extension officers (256, 71.7%), followed by family, friends and neighbours (241, 67.7%). Other preferred sources were radio (171, 47.5%), researchers (136, 37.9%), books (126, 35.6%), and leaflets (121, 33.7%). Posters (112, 31.2%) were the only information source in the preferred category. The least preferred sources of

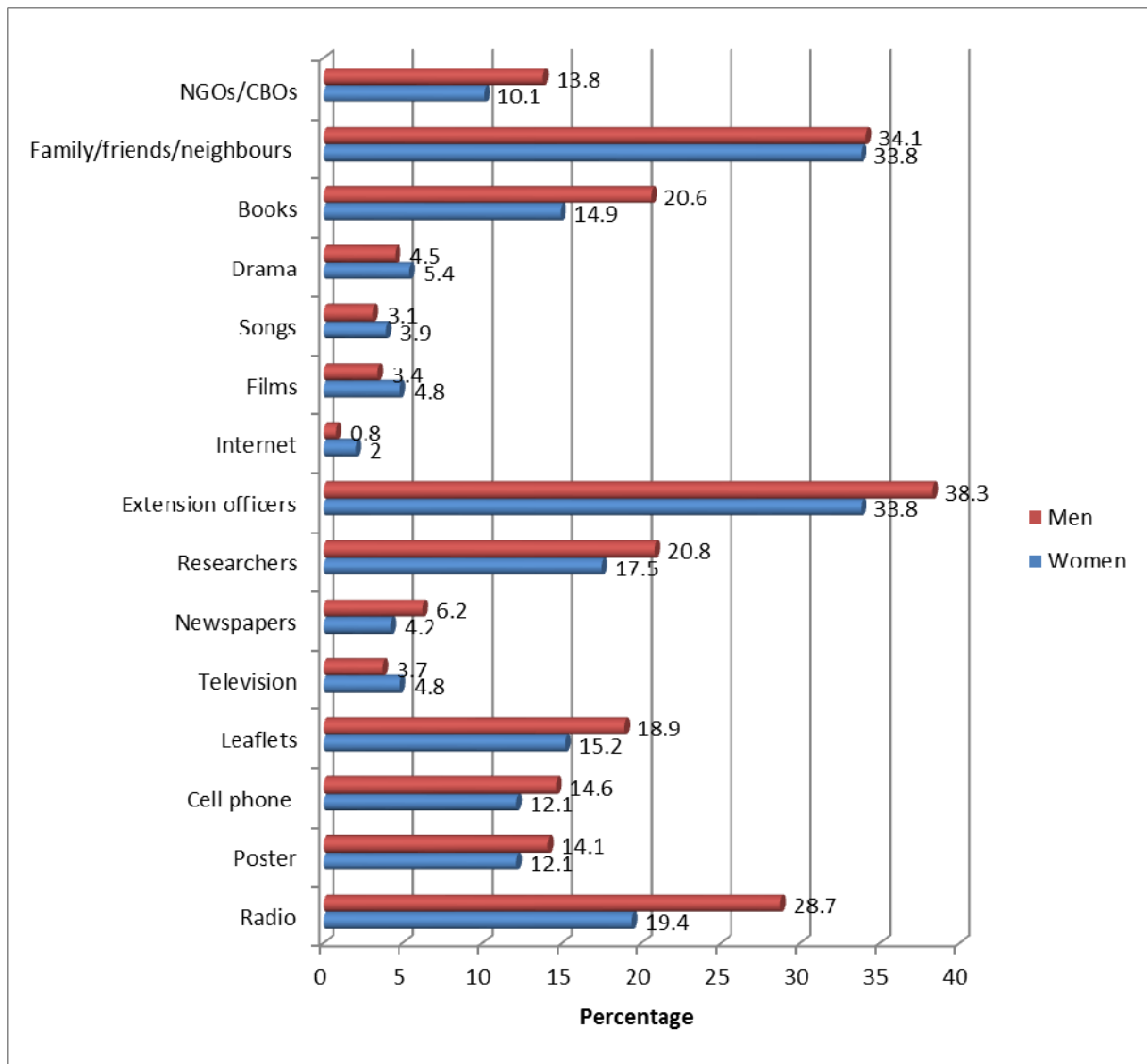
information were: songs (140, 39.2%), newspapers (126, 35%), NGOs/CBOs (119, 33.9%), and cell phones (96, 26.7%). The majority of the respondents did not prefer the Internet (309, 86.1%) and television (200, 56.5%). Table 11 below shows detailed findings on the information sources preferred by poultry farmers in the surveyed communities.

Table 11: Preference of information sources by poultry farmers (N=360)

Information source	Rank								
	Not preferred			Least preferred		Preferred		Most preferred	
	N	No	%	No	%	No	%	No	%
Radio	359	23	6.4	71	19.7	94	26.1	171	47.5
Poster	359	61	17.0	92	25.6	112	31.2	93	25.9
Cell phone	359	83	23.1	96	26.7	85	23.6	95	26.4
Leaflets	358	62	17.3	72	20.1	103	28.7	121	33.7
Television	353	200	56.5	80	22.6	43	12.1	30	8.5
Newspapers	359	124	34.4	126	35.0	72	20.0	37	10.3
Researchers	358	28	7.8	106	29.5	88	24.5	136	37.9
Internet	358	309	86.1	29	8.1	10	2.8	10	2.8
Films	356	189	52.8	108	30.2	31	8.7	29	8.1
Songs	356	129	36.1	140	39.2	62	17.4	25	7.0
Drama	357	132	36.9	130	36.3	60	16.8	35	9.8
Books	353	47	13.3	86	24.3	94	26.6	126	35.6
Family/friends/ neighbours	355	8	2.2	44	12.4	62	17.4	241	67.7
Extension officers	356	16	4.5	22	6.2	62	17.4	256	71.7
NGOs/CBOs	350	32	9.1	119	33.9	114	32.5	85	24.2

(Multiple responses were possible)

The findings indicated further that there was variation in preference of information sources according to the gender of respondents. Figure 10 below shows the preference of information sources by gender of respondents.



(Multiple responses were possible)

Figure 10: Information sources preference by gender (N=360)

The respondents were asked to provide reasons for preferring one source of information over the other. The major reasons for their preferences were convenience (252, 72.2%) and availability (237, 67.9%) of the information source. Other reasons were the reliability of the source (153,

43.8%), skills in using the source (110, 31.5%), affordability (77, 22.1%), and influence from a friend (58, 16.6%).

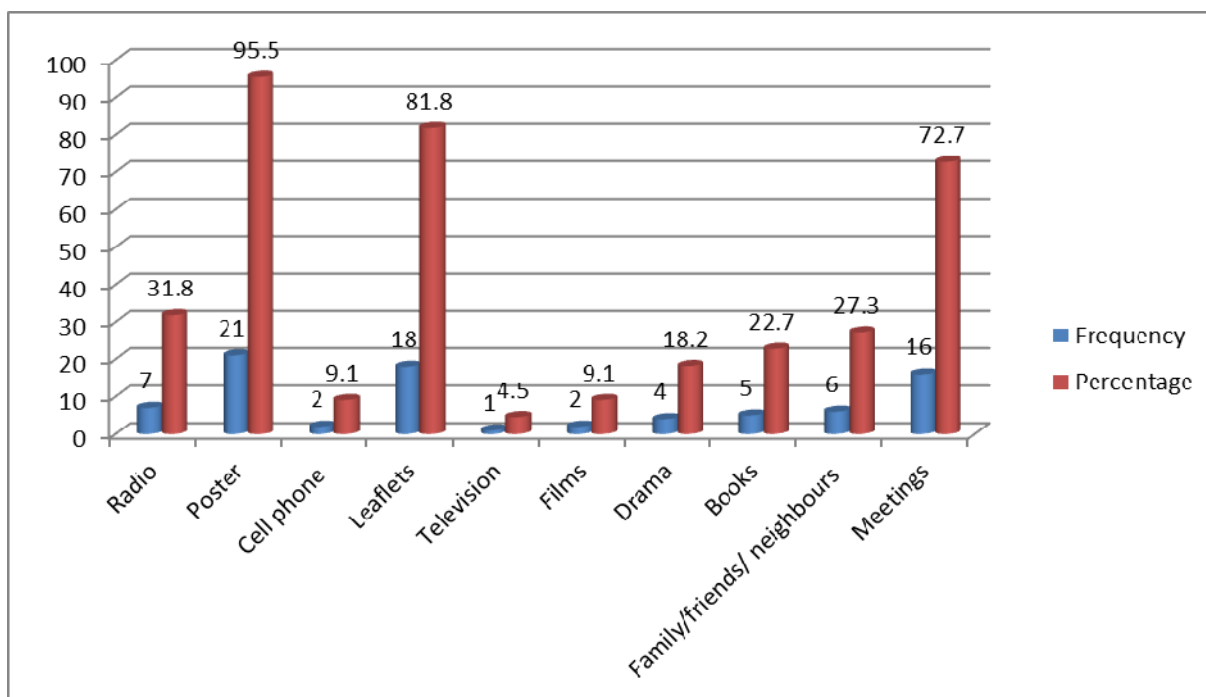
It was evident from the focus group discussions that extension officers were the most preferred information source, followed by family, friends and neighbours. The main reasons were the availability and convenience of the information source. Generally, the availability of the information source was a key factor in the preference of information source. During a focus group discussion session at Malinzanga village, farmers reported that:

“...We prefer to use any information sources that are available and convenient to us”.

“...The most convenient sources are the best because we can consult them anytime to get information”.

5.6.1 Preference of information sources (data from information providers)

When asked to identify the information sources that they preferred to use for disseminating poultry management information, the information providers had different choices. The most preferred sources were posters (21, 95.5%), leaflets (18, 81.8%), and meetings (16, 72.7%). The Internet, newspapers, songs and NGOs/CBOs were not preferred by any of the information providers. The results detailing their choices are presented in Figure 11 below.



(Multiple responses were possible)

Figure 11: Information sources preferred by information providers (N=22)

The information providers were also asked to provide the reasons for their choice of information sources. None of their reasons were related to farmers' information source preferences. The reasons, in descending order of importance were: availability of the source, affordability, convenience of using the source, skills in using the source, and reliability of the source. Furthermore, the respondents were asked whether or not they inquired about farmers' preferences for information sources. The findings showed that all the information providers (22, 100%) had never inquired about farmers' information source preferences. In addition, the respondents were asked to provide the reasons for not inquiring about farmers' information source preferences. The majority of the respondents mentioned inadequate resources (16, 72.7%) and difficult working conditions (13, 50.1%) as their main reasons. Other reasons were: lack of knowledge about different information sources (9, 40.9%), and lack of funds to support various dissemination channels (7, 31.8%).

5.7 Effectiveness of information sources

In addressing the fourth research objective on assessment of the effectiveness of various information sources, three variables were used: effectiveness, appropriateness and the factors that determine the appropriateness of an information source. The respondents were asked to indicate the information sources that they considered to be effective on a scale of one (very effective) to four (not effective). The majority of the respondents indicated that they considered extension officers (268, 75.1%) to be the most effective information source for delivery of information related to poultry management. Other sources considered to be very effective were: family, friends and neighbours (238, 67%), radio (174, 48.7%) and leaflets (163, 45.7%). The information sources considered to be effective were: books (131, 36.9%), posters (119, 33.5%), NGOs/CBOs (117, 33.1%), cell phones (115, 32.4%) and researchers (114, 32%). Songs (150, 41.8%) and newspapers (148, 41.6%) were considered to be the least effective sources, while the Internet (261, 74.6%), television (164, 45.8%) and films (159, 44.4%) were considered to be ineffective. Table 12 below presents detailed information on the effectiveness of various information sources.

Table 12: Effectiveness of sources for poultry management information (N=360)

Information source	Rank								
	Not effective			Least effective		Effective		Very effective	
	N	No	%	No	%	No	%	No	%
Radio	357	7	2.0	78	21.8	98	27.5	174	48.7
Poster	355	28	7.9	92	25.9	119	33.5	116	32.7
Cell phone	355	38	10.7	108	30.4	94	26.5	115	32.4
Leaflets	357	28	7.8	71	19.9	95	26.6	163	45.7
Television	358	164	45.8	92	25.7	55	15.4	47	13.1
Newspapers	356	63	17.7	148	41.6	84	23.6	61	17.1
Researchers	356	26	7.3	110	30.9	106	29.8	114	32.0
Internet	350	261	74.6	51	14.6	17	4.9	21	6.0
Films	358	159	44.4	133	37.2	47	13.1	19	5.3
Songs	359	91	25.3	150	41.8	82	22.8	36	10.0
Drama	357	120	33.6	131	36.7	73	20.4	33	9.2
Books	355	26	7.3	81	22.8	131	36.9	117	33.0
Family/friends/ neighbours	355	7	2.0	43	12.1	67	18.9	238	67.0
Extension officers	357	5	1.4	25	7.0	59	16.5	268	75.1
NGOs/CBOs	353	17	4.8	135	38.2	117	33.1	84	23.8

(Multiple responses were possible)

The respondents were also asked to indicate the most appropriate source of information. This question was aimed at identifying the sources which were considered by the whole community to be appropriate for their local situations, culture and traditions. The majority of respondents (269, 75.4%) considered the extension officer to be the most appropriate source for delivering poultry management information to their community. Other sources considered to be very appropriate were: family, friends and neighbours (245, 68.8%), radio (172, 48%), leaflets (145, 40.7%), researchers (134, 37.5%), books (130, 36.7%) and cell phones (117, 32.6%). The Internet (280,

78.7%), television (167, 46.9%), and films (163, 45.7%) were considered to be inappropriate sources for delivering poultry management information to the surveyed communities. Table 13 below presents detailed findings on the appropriateness of information sources for poultry management information.

Table 13: Appropriateness of sources for poultry management information (N=360)

Information source	Rank								
	Not appropriate			Least appropriate		Appropriate		Very appropriate	
	N	No	%	No	%	No	%	No	%
Radio	357	12	3.4	83	23.2	90	25.1	172	48.0
Poster	354	37	10.4	91	25.6	114	32.1	112	31.5
Cell phone	358	54	15.0	105	29.2	82	22.8	117	32.6
Leaflets	355	37	10.4	67	18.8	106	29.8	145	40.7
Television	355	167	46.9	109	30.6	50	14.0	29	8.1
Newspapers	354	64	18.0	157	44.2	80	22.5	53	14.9
Researchers	356	31	8.7	98	27.5	93	26.1	134	37.5
Internet	355	280	78.7	53	14.9	14	3.9	8	2.2
Films	356	163	45.7	125	35.0	44	12.3	24	6.7
Songs	356	94	26.3	151	42.3	78	21.8	33	9.2
Drama	353	115	32.5	122	34.5	78	22.0	38	10.7
Books	353	29	8.2	81	22.9	113	31.9	130	36.7
Family/friends/ neighbours	355	8	2.2	45	12.6	57	16.0	245	68.8
Extension officers	356	11	3.1	31	8.7	45	12.6	269	75.4
NGOs/CBOs	355	24	6.7	131	36.8	111	31.2	89	25.0

(Multiple responses were possible)

The respondents were asked to provide reasons for considering a certain information source to be more appropriate than the others. The main reasons for an information source being appropriate were convenience (259, 75.1%), availability (223, 64.6%), and reliability (157, 45.5%). Other reasons were skills in using the source (116, 33.6%), cost of getting the information (81, 23.5%), and influence from other people (66, 19.1%).

Data from focus group discussions confirmed that the extension officer was considered to be the most effective and appropriate source of poultry management information. However, respondents across all the surveyed communities indicated their concern that they were not getting appropriate services from the extension officers. Other sources considered to be very effective varied across the districts. Iringa rural and Morogoro rural indicated that they considered family, friends and neighbours to be the second most effective source of information. In Mvomero, participants indicated that they considered researchers to be the second most effective source of information. Some of the typical responses were:

“... I believe extension officer is the most effective source because this is a person we can consult any time when we face challenges”.

“..... It is easy to reach my neighbours, fellow farmers and friends, so I consider them as the most appropriate sources for poultry management information”.

“... Researchers give us good guidance, advices, and sometimes practice with us. They are the most appropriate sources of information”.

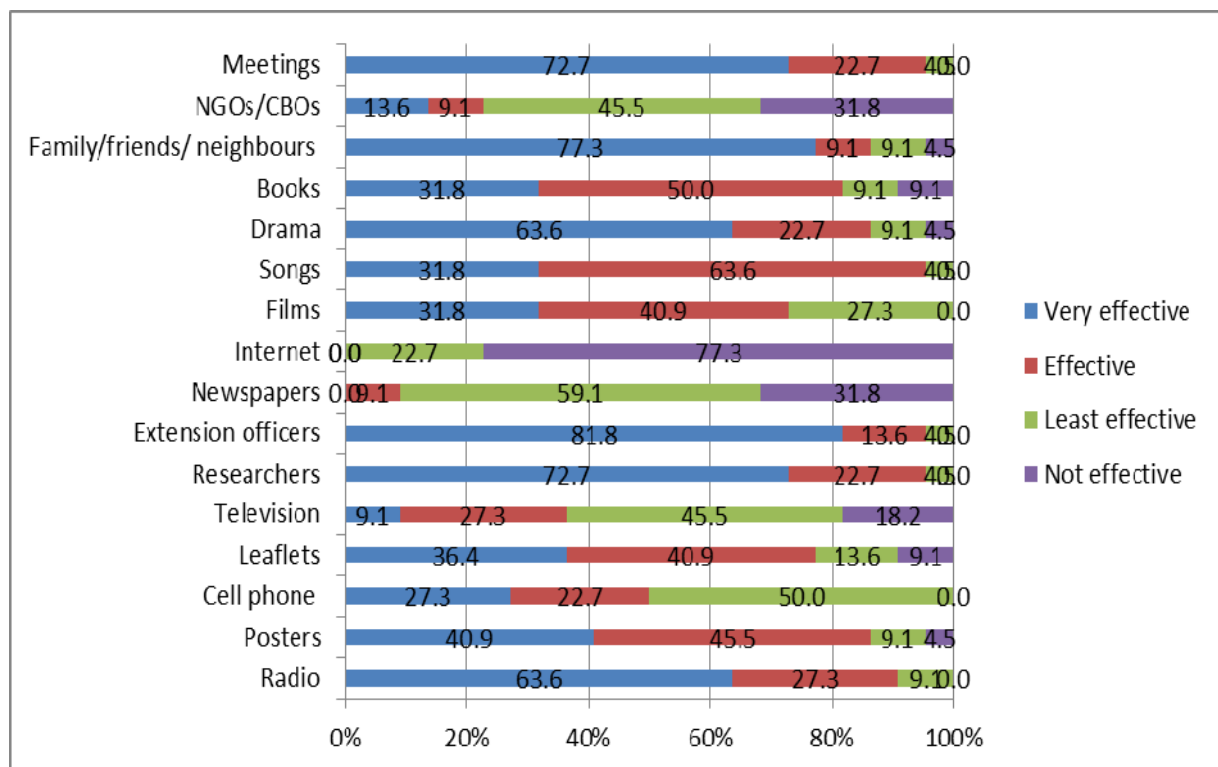
Furthermore, the findings from the focus group discussions showed that the main reasons for the effectiveness and appropriateness of information sources were the availability and convenience of the source. Other reasons were: the affordability of the information, reliability of the source, and skills in using the source. Some of the typical responses were:

“... The information source that is available all the times can be considered as effective because it is easy for us to get information whenever we face problems”.

“..... Convenience of accessing the source of information is important to make it effective, for instance, if I have a book, I can access it any time when need arises. Therefore, it is an effective source of information for me”.

5.7.1 Effectiveness of information sources (data from information providers)

Respondents were asked to indicate the sources of information that they considered to be most effective in delivering poultry management information to farmers. The extension officers (18, 81.8%) were considered to be the most effective source, followed by family, friends and neighbours (17, 77.2%), researchers (16, 72.7%), meetings (16, 72.7%), radio (14, 63.6%), and drama (14, 63.6%). The least effective sources were the Internet, newspapers and television. Figure 12 below presents the findings on the effectiveness of information sources in delivering poultry management information to farmers in the surveyed communities.

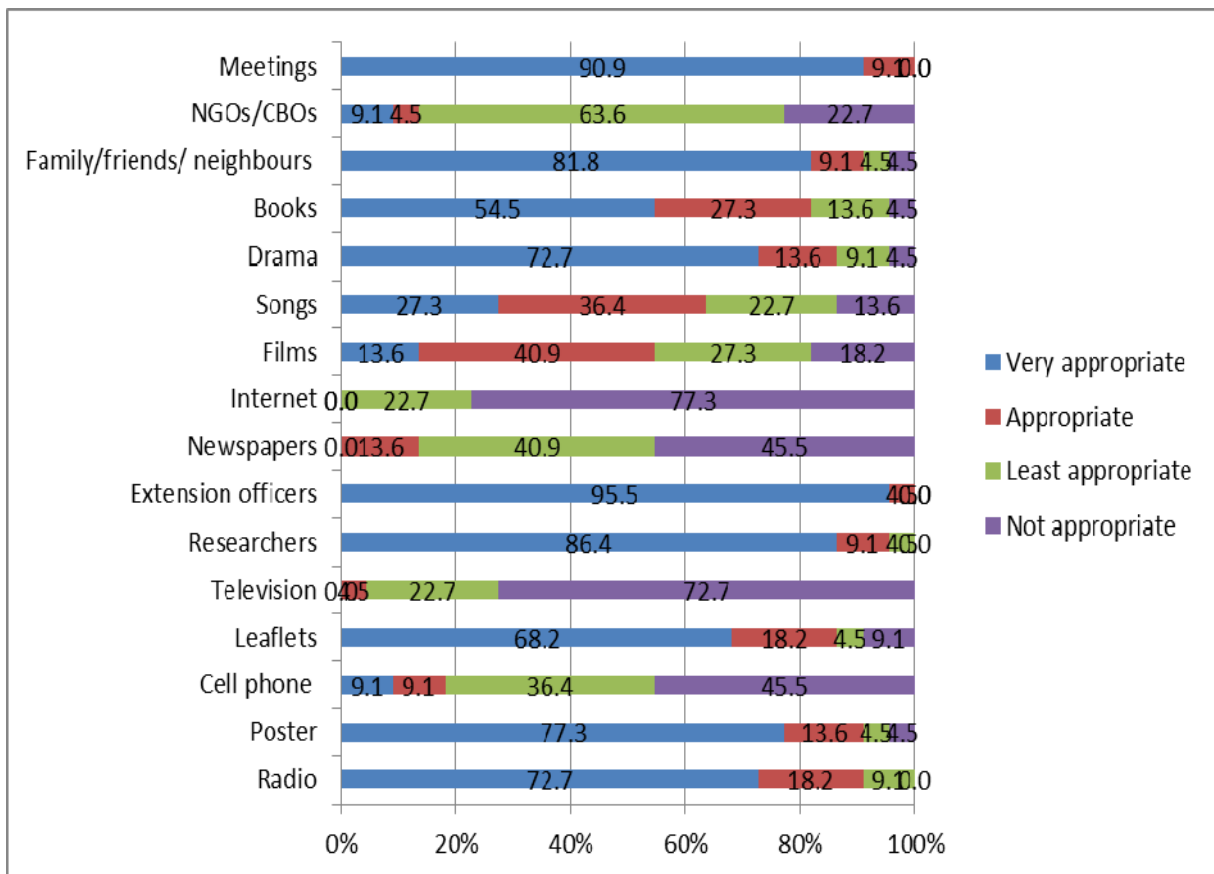


(Multiple responses were possible)

Figure 12: Effectiveness of information sources (data from information providers N=22)

Furthermore, the respondents were asked to indicate the sources that were considered to be appropriate for disseminating poultry management information in the surveyed communities. The extension officers (21, 95.5%), meetings (20, 90.9%), researchers (19, 86.4%), and family/friends/neighbours (18, 81.8%) were considered to be the most appropriate sources. Other

sources considered to be most appropriate, in descending order of importance were: posters (17, 77.3%), radio (16, 72.7%), drama (16, 72.7%), leaflets (15, 68.2%), and books (12, 54.5%). The Internet, television, newspapers and cell phones were considered to be inappropriate sources. Figure 13 below presents detailed findings on the appropriateness of information sources.



(Multiple responses were possible)

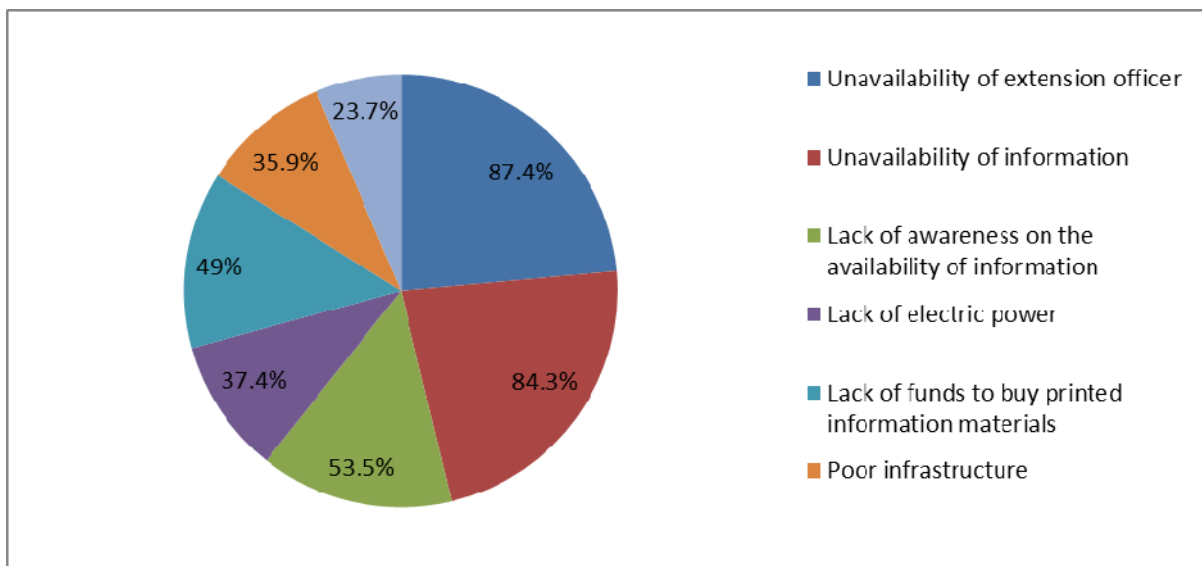
Figure 13: Appropriateness of information sources (data from information providers N=22)

5.8 Factors influencing access and use of poultry management information

This section presents research findings related to objective five of the study. The objective was to assess the factors influencing access and use of poultry management information in the surveyed communities. The factors are presented in separate sections.

5.8.1 Factors that hinder access to poultry management information

Farmers were asked to identify the factors that hindered them from accessing poultry management information. Out of the 360 respondents, 198 (55%) respondents gave their views in this regard, while 162 (45%) respondents had no ideas regarding these factors. Most of the respondents indicated that unavailability of the extension officer (173, 87.4%) and unavailability of information (167, 84.3%) were the main hindering factors. Other factors were: lack of awareness on the availability of poultry management information (106, 53.5%), lack of funds to buy printed information materials (97, 49%), lack of electrical power (74, 37.4%), poor infrastructure limiting access to information sources (71, 35.9%), and limited literacy levels (47, 23.7%). Figure 14 below presents a summary of the findings on factors that hinder access to poultry management information.



(Multiple responses were possible)

Figure 14: Factors that hinder access to poultry management information (N=198)

Data from focus group discussions confirmed that the unavailability of extension officers was the main factor which hindered farmers from accessing poultry management information, followed by lack of awareness on the availability of poultry management information. Other factors were: long distance to find the extension officer, reluctance of farmers to share information, limited literacy of some of the farmers, limited transport services for accessing information and services,

unreliable information sources, and lack of funds to purchase printed information materials. Some of the typical responses from the participants were:

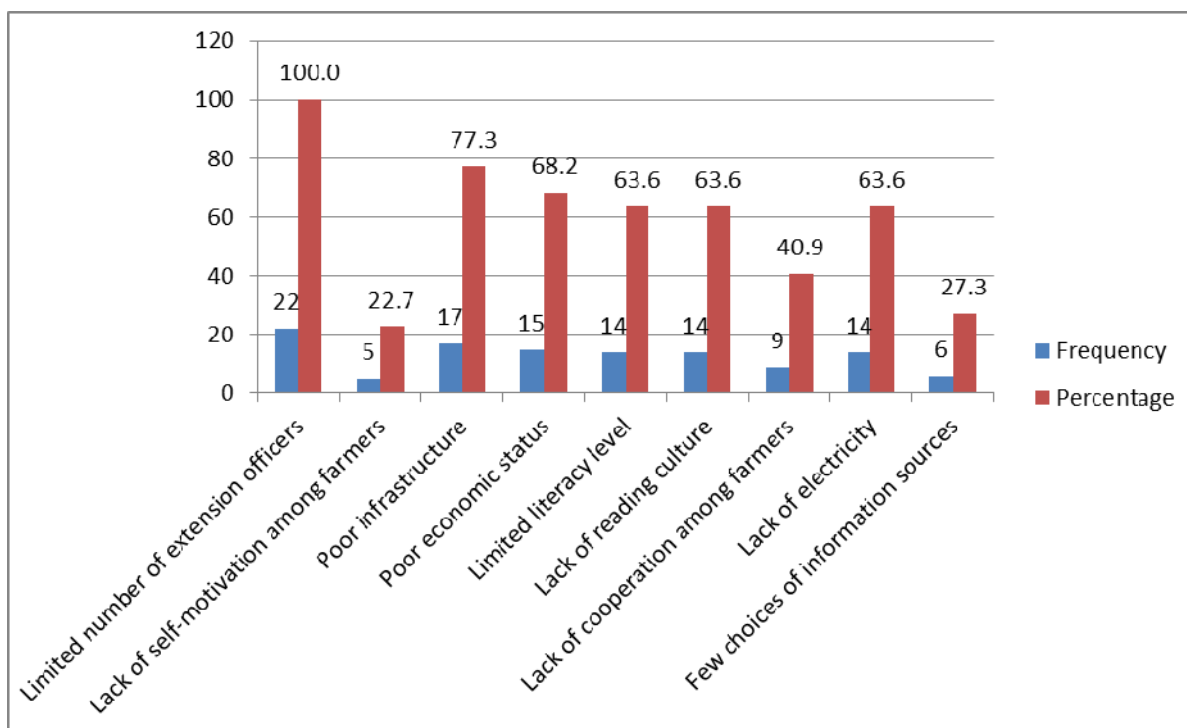
“.....The extension officer serves four villages. There is a very long distance from my house to his office. So, it is very discouraging to find the extension officer hence difficult to access information when need arises”.

“... Some of the information materials such as books are sold at a price which I cannot afford. I would like to have my own book, but I have no funds to buy one”.

“... I cannot read, so if they bring posters, leaflets and books; they are of no use to me unless someone reads for me”.

5.8.1.1 Factors that hinder access to poultry management information (data from information providers)

The information providers were asked to give their opinions regarding the factors which hinder farmers from accessing poultry management information. The most cited factors were the limited number of extension officers in the rural areas (22, 100%), and poor infrastructure limiting the movement of farmers and extension officers (17, 77.3%). Other factors were: poor economic status, limited literacy level, lack of reading culture, lack of cooperation among farmers, lack of electricity, few choices of information sources because of lack of electricity, and lack of self-motivation among farmers. Figure 15 below presents the findings on the factors that hinder access to poultry management information.

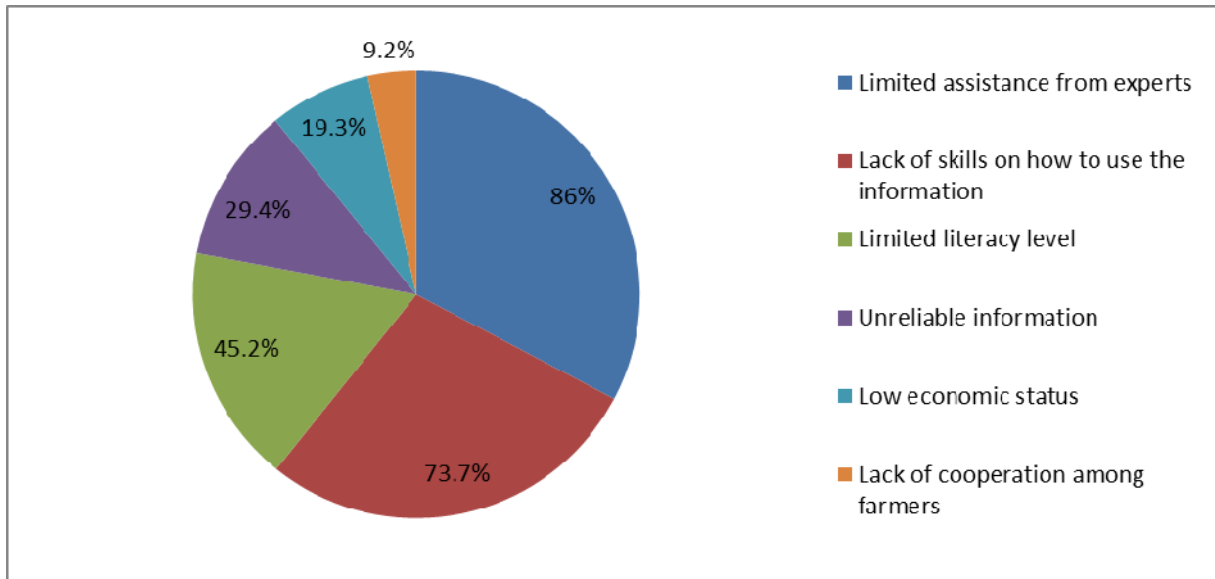


(Multiple responses were possible)

Figure 15: Factors that hinder access to poultry management information (data from information providers N=22)

5.8.2 Factors that hinder use of poultry management information

When asked to indicate the factors that hinder use of poultry management information, 228 (63.3%) farmers responded to the question. The majority of the respondents indicated that limited assistance from experts (196, 86%), and lack of skills on how to use the information (168, 73.7%) were the main factors. Other factors were: limited literacy level (103, 45.2%), unreliable information (67, 29.4%), low economic status (44, 19.3%), and lack of cooperation among farmers (21, 9.2%). Figure 16 below shows the findings on factors that hinder the use of poultry management information.



(Multiple responses were possible)

Figure 16: Factors that hinder use of poultry management information (N=228)

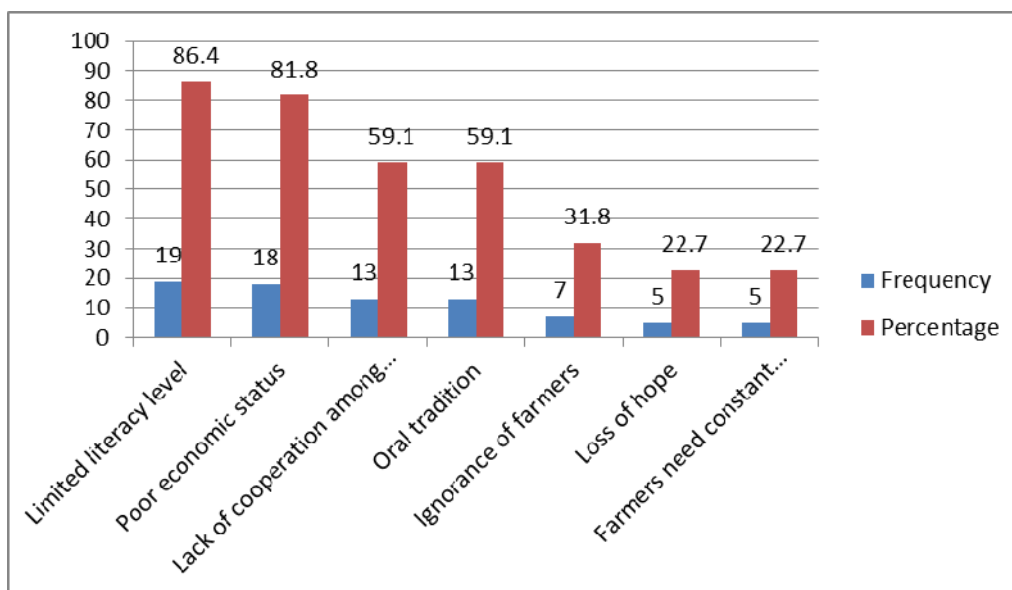
Data from focus group discussions confirmed that the unavailability of assistance from experts such as extension officers was a major factor which hindered farmers from using poultry management information. Other factors, in descending order of importance were: lack of cooperation among poultry farmers, unreliability of the information, poor economic status, high cost of implementing the information, and unavailability of poultry treatment drugs in the community. Some of the typical responses were:

“..... They only give us information, but we don’t know how to use it. For instance, I read a poster on vaccination of poultry against Newcastle disease. I buy the drug, vaccinate the poultry, and they die. They should demonstrate to us how to do it, when to do it, and how often we should do it”.

“.... There is a long distance from our community to the drug store. It is a day trip which requires funds for transport. Even if I get information, it is difficult to apply it, because there is no drug store in our community, and I cannot afford the transport cost to town”.

5.8.2.1 Factors that hinder use of poultry management information (data from information providers)

Information providers were asked to mention the factors that they considered to be barriers to farmers' use of poultry management information. The majority of the respondents mentioned limited literacy level (19, 86.4%) as the main factor that hindered farmers from using poultry management information. Other factors were: poor economic status, which meant that farmers cannot afford to buy inputs; lack of cooperation among farmers; oral tradition limiting farmers' use of information in print format; ignorance of farmers in not understanding that information can assist to solve problems; loss of hope by some of the farmers; and the fact that some farmers need constant follow-ups, which is not possible. Figure 17 below presents the findings on the factors that hinder the use of poultry management information.



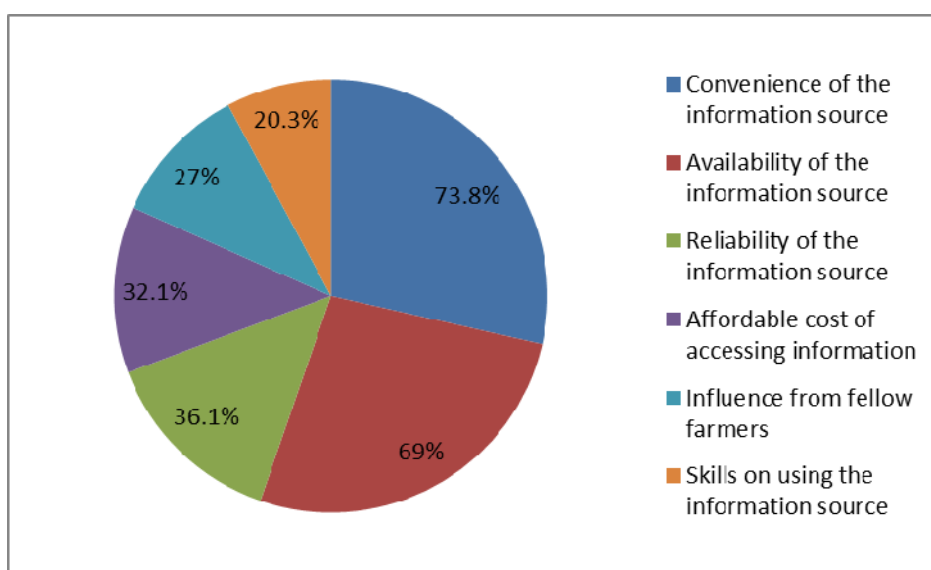
(Multiple responses were possible)

Figure 17: Factors that hinder use of poultry management information (data from information providers N=22)

5.8.3 Factors that promote access to poultry management information

Farmers were asked to indicate the factors that encouraged them to access poultry management information. Out of the 360 respondents, 355 (98.6%) responded to the question, while 5 (1.4%)

respondents did not answer the question. The majority of the respondents indicated that the convenience (262, 73.8%) and availability (245, 69%) of the information source were the main factors encouraging them to access poultry management information. Other factors were: reliability of the information source (128, 36.1%), affordability of accessing information (114, 32.1%), influence from fellow farmers (96, 27%), and skills in using the information source (72, 20.3%). Figure 18 below presents a summary of the findings on factors that promote access to poultry management information.



(Multiple responses were possible)

Figure 18: Factors that promote access to poultry management information (N=355)

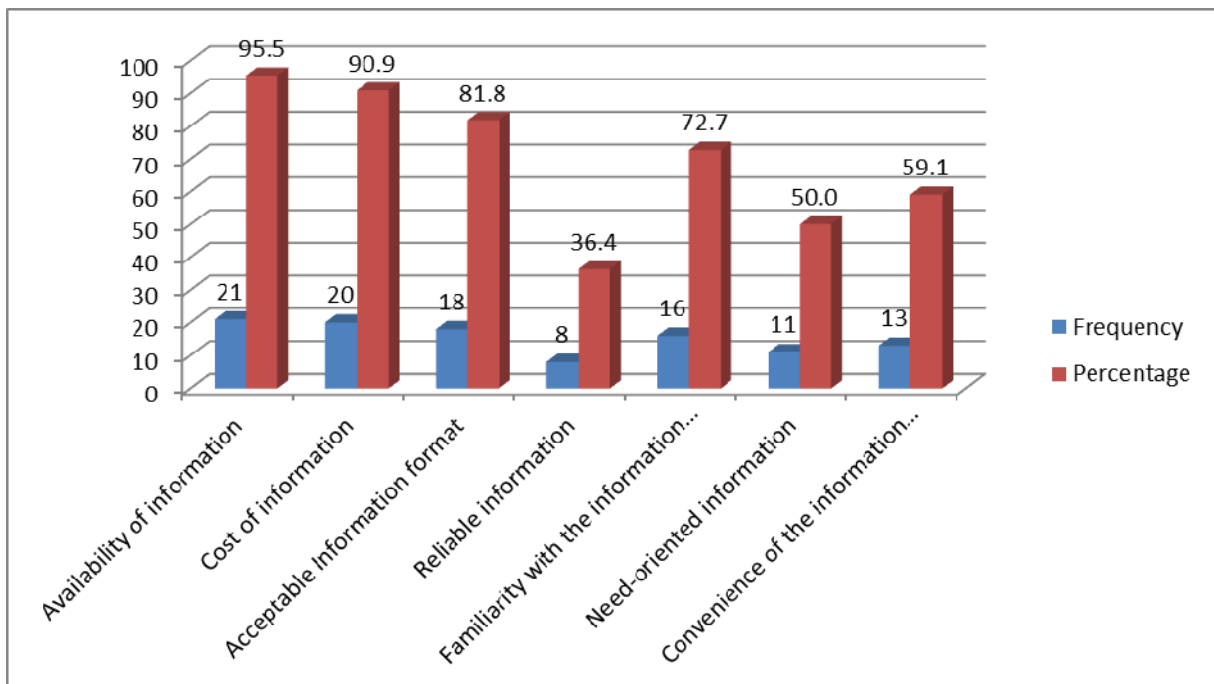
Focus group discussions confirmed that the main factor promoting farmers' access to poultry management information was the availability of information sources such as the extension officers. Other factors, in descending order of importance, were: convenience of accessing information, training and seminars, information cost that is affordable, availability of variety of information sources, and organised farmers' groups. Some of the typical responses were:

"...If the information source is easily available and convenient; I will be motivated to access information all the times".

"...Seminars are very important because we can discuss issues related to poultry management, and share the information among ourselves even after the seminar".

5.8.3.1 Factors that promote access to poultry management information (data from information providers)

The information providers were asked to identify the factors that could encourage farmers to access poultry management information. The majority of respondents mentioned the availability of information (21, 95.5%), and cost of information (20, 90.9%), as the main factors that motivate farmers to access information. Other factors, in a descending order of importance were: an information format that is acceptable and easy to understand; familiarity of farmers with the information source; need-oriented information; convenience of the information source; and reliable information. Figure 19 below presents the findings on the factors that promote access to poultry management information.

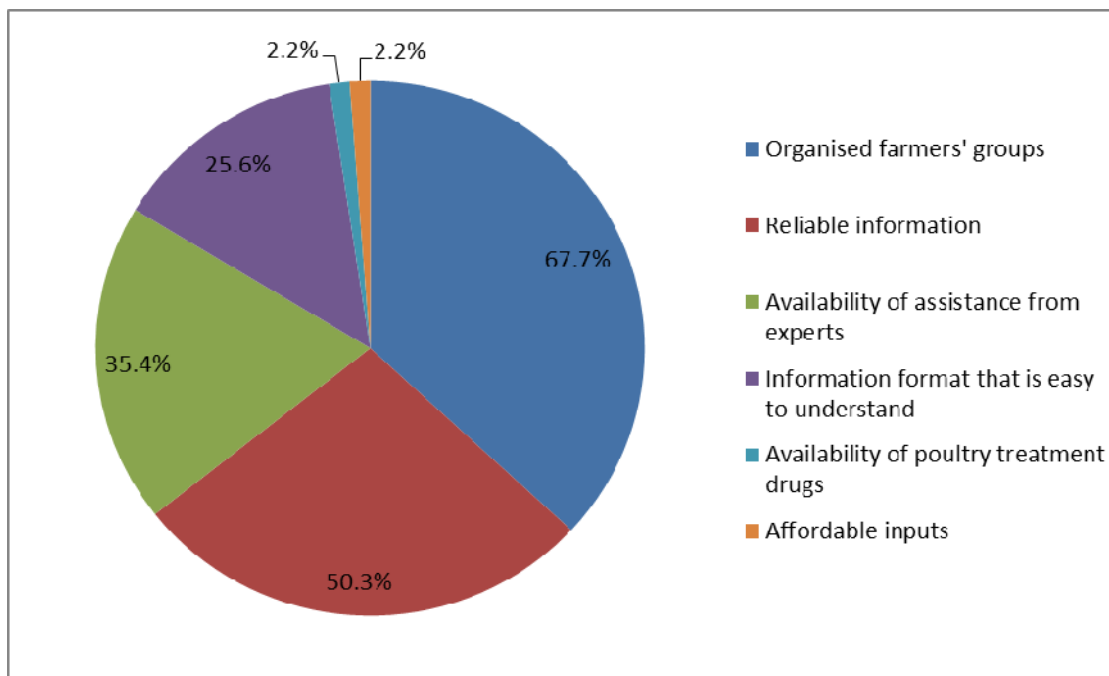


(Multiple responses were possible)

Figure 19: Factors that promote access to poultry management information (data from information providers N=22)

5.8.4 Factors that promote use of poultry management information

When asked about the factors that encouraged them to use poultry management information, 356 (98.9%) farmers responded to the question. Organised farmers' groups (241, 67.7%) and reliable information (179, 50.3%) were the main factors. Other factors were: availability of assistance from experts such as extension officers (126, 35.4%), an information format that is easy to understand (91, 25.6%), affordable inputs to implement the information (8, 2.2%) and availability of poultry treatment drugs (8, 2.2%). The findings are summarised in Figure 20 below.



(Multiple responses were possible)

Figure 20: Factors that promote use of poultry management information (N=356)

The findings obtained from the focus group discussions were somewhat different. The availability of assistance from experts was the main factor for promoting the use of poultry management information. Other factors that would enhance the use of poultry management information, in descending order of importance were: reliable information, assistance from village leaders, training, and organised farmers' groups. Some of the typical responses were:

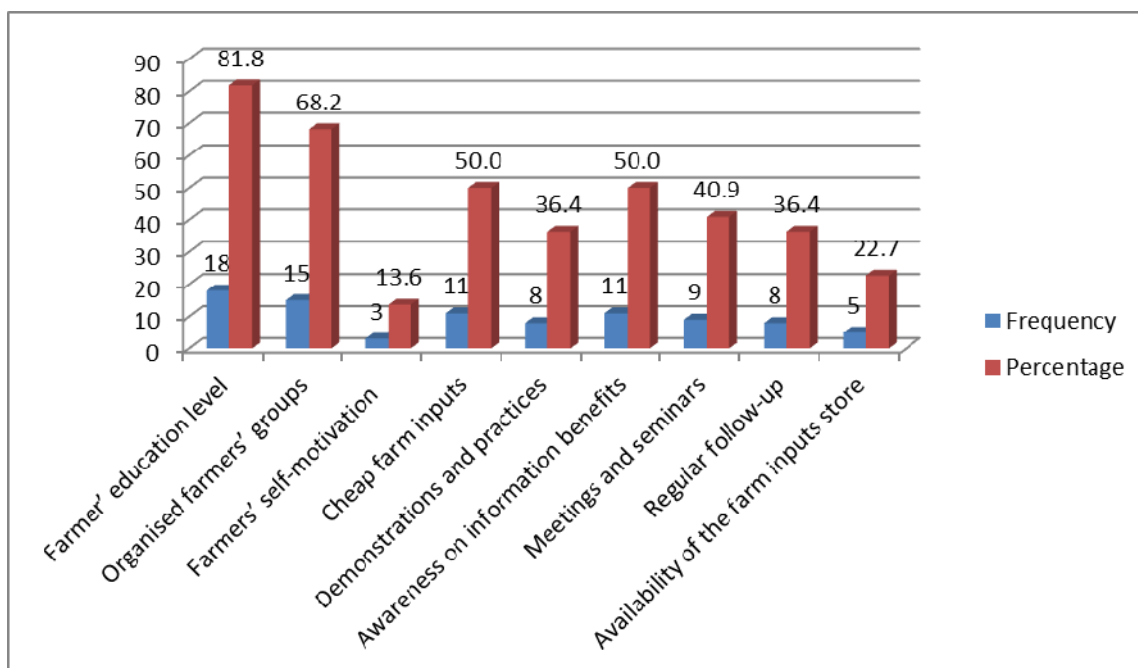
“...If we could organise farmers’ groups, it could be easier to share knowledge and learn from each other on how to apply certain techniques in managing poultry”.

“...Assistance from experts and village leaders will motivate me to use information, as I can easily consult them when I have questions”.

Respondents were also asked to indicate whether or not they had professional assistance for using poultry management information. A total of 331 respondents answered the question. The majority of the respondents (268, 81%) indicated that they did not get professional assistance in terms of how to use the information. Some of the respondents (63, 19%) indicated that they did get professional assistance with using the information.

5.8.4.1 Factors that promote use of poultry management information (data from information providers)

The information providers were asked to identify the factors that motivate farmers to use poultry management information. The majority of the respondents indicated that the educational level of the farmer (18, 81.8%) was the main factor promoting farmers’ use of poultry management information. This means that farmers who have a certain level of education can easily understand the information and apply it in a real situation. Other factors, in descending order of importance, were: organised farmers’ groups, affordable farm inputs; meetings and seminars; demonstrations and practices; regular follow-ups; creation of awareness on the benefits of using information; availability of the farm inputs store in the community; and farmers’ self-motivation. Figure 21 below presents the findings on the factors that promote use of poultry management information.



(Multiple responses were possible)

Figure 21: Factors that promote use of poultry management information (data from information providers N=22)

5.9 Summary of the findings

This section presents the major findings of the study, according to the research objectives identified in section 1.5.1.

5.9.1 The information needs of poultry farmers

- The majority of the respondents needed information on poultry disease control, protection, shelter, and production.
- Information needs were not the same across the three surveyed districts. There were variations in terms of the types of information needs in the three districts.
- Only a few respondents indicated that information providers considered farmers' needs in planning for information dissemination.
- Only a few information providers prioritised farmers' information needs as part of their information dissemination strategies.

5.9.2 The information seeking behaviours of poultry farmers

The major findings related to the information seeking behaviours of poultry farmers are categorised according to information seeking patterns, access and use of information, and farmers' satisfaction with information dissemination services.

5.9.2.1 Information seeking patterns

- Most of the respondents had tried to find information to solve the problems related to poultry management.
- The majority of the respondents sought information from family, friends and neighbours.
- Family, friends and neighbours were the main sources of information for poultry management within the surveyed communities. Other important sources of information were extension officers, researchers, and radio.
- Availability and convenience of the information source were the major reasons for farmers choosing a particular information source.
- There were variations in terms of choices of information sources across the three surveyed districts.

5.9.2.2 Access and use of poultry management information

- The majority of the respondents had accessed and used information on poultry management.
- Only a few respondents had not used poultry management information.
- Most of the respondents who had used the information found it useful in managing poultry.
- Only a few farmers indicated that the information was not useful in solving poultry management problems.
- The type of information that was mostly used by farmers was poultry disease control.

5.9.2.3 Farmers' satisfaction with information dissemination services

- The majority of the farmers were not satisfied with information dissemination services in their communities.

- Unavailability of the extension officers, lack of awareness on the availability of information, long distances to find the information, and unreliable information were among the reasons for farmers' dissatisfaction.

5.9.3 Information sources preferred by poultry farmers

- There were variations in terms of preference for information sources across the three surveyed districts.
- Extension officers, as well as family, friends and neighbours, were considered to be the most preferred information sources in all the surveyed districts.
- Interpersonal and oral communication sources were considered to be more important than written sources of information.
- The main reasons for preferring one information source over the other were convenience and availability of the information source.

5.9.4 Effectiveness of information sources

- The majority of the respondents considered extension officers to be the most effective information source for delivery of information related to poultry management.
- The extension officers were also considered to be the most appropriate source for delivering poultry management information to the surveyed communities.
- The convenience, availability and reliability of an information source were considered to be important reasons for an information source being effective.

5.9.5 Factors influencing access and use of poultry management information

The major findings on the factors that influence access and use of poultry management information were grouped into two: the negative factors, which inhibit access and use of poultry management information, and the positive factors, which promote access and use of poultry management information.

5.9.5.1 Factors that hinder access and use of poultry management information

- The unavailability of the extension officer and information were the main factors that hindered farmers from accessing poultry management information, followed by lack of awareness on the availability of poultry management information.
- Other important barriers were the long distance to find the extension officer, unreliability of the information, limited literacy level of some of the farmers, reluctance of farmers to share information, poor economic status, and limited transport services for accessing information and services.
- Lack of assistance from experts and lack of skills on how to use the information were the main factors that hindered farmers from using poultry management information.
- Lack of funds, limited facilities, few extension officers and long distances were the major factors which inhibited information providers from disseminating poultry management information to the rural communities.

5.9.5.2 Factors that promote access and use of poultry management information

- The convenience and availability of the information source were considered to be the most important factors for promoting access to poultry management information.
- Other factors were the availability of extension officers, reliability of the information source, affordable cost of accessing information, influence from fellow farmers, and skills in using the information source.
- The main factors for promoting the use of poultry management information were organised farmers' groups and reliable information.
- Other factors that promote the use of poultry management information, in descending order of importance were: availability of assistance from experts such as extension officers, an information format that is easy to understand, and availability of poultry treatment drugs.

5.10 Summary

Chapter Five presented the study findings according to the objectives of the study. The key issues which emerged from the findings are that poultry farmers in rural areas have unmet information needs. There was limited access to poultry management information, and farmers

faced several challenges in accessing and using poultry management information. It was evident that farmers had preferences for certain information sources, but mainly depended on interpersonal sources such as family, friends and neighbours for their information needs. The most preferred information source was extension officers, followed by family, friends and neighbours. Print sources of information such as books were rarely consulted because of unavailability, illiteracy or ignorance. Farmers considered some of the information sources to be more effective than others because of the convenience and availability of the sources. Access and use of poultry management information was influenced by the availability of the extension officers, awareness of farmers, literacy level, and economic status. The data presented in this chapter provided the basis for data interpretation. Chapter Six presents an interpretation of the research findings.

CHAPTER SIX: INTERPRETATION OF THE FINDINGS

6.1 Introduction

This chapter provides an interpretation of the research findings presented in Chapter Five. The interpretation of findings involves: relating the findings to the original research problem and to the specific research questions; relating the findings to pre-existing literature, concepts, theories and research studies; determining whether the findings have partial significance, as well as statistical significance; and identifying the limitations of the study (Leedy & Ormrod, 2005:276). The interpretation of findings is presented in the form of research themes in relation to the study objectives outlined in Section 1.5. It should be noted that the sixth study objective is presented in Chapter Seven. This chapter starts with a discussion of the background information of the respondents. This was not part of the study objectives, but it helps to inform the interpretation of the findings and guide the flow of the discussion in this thesis.

6.2 Characteristics of respondents

This section discusses the findings in relation to the characteristics of respondents, as provided in Section 5.2. The characteristics of respondents included in this study are age, gender, education and occupation. These characteristics were the important predetermined factors expected to determine the extent to which respondents accessed and used poultry management information in the selected rural communities. Previous studies (Atala, 1984; Adomi, Ogbomo & Inoni, 2003; Carter & Batte, 1993; Opara, 2010; Sheba, 1997; Waller *et al.*, 1998) have reported that the personal and socio-economic characteristics of farmers have an influence on their access and use of information. In this regard, these characteristics may have either a positive or a negative effect on farmers' access and use of information.

6.2.1 Age

Age is one of the factors that may influence access and use of poultry management information (Babu *et al.*, 2012). The mean age of respondents was 39 years. The majority of the respondents (303, 84.2%) were between the ages of 18 and 57 years. This is in line with the Tanzania population statistics, which show that the majority of Tanzanians (52.2%) are between the ages of 15 and 64 years (URT, 2013a). The study findings are similar to the profiles of rural farmers

in other studies on information behaviour in most parts of developing countries in terms of age. A study on information needs and information seeking behaviour of small-scale farmers in Tanzania reported that the majority of farmers (135, 74.6%) were between the ages of 29 and 68 years (Lwoga, Ngulube & Stilwell, 2010). A study by Mihale *et al.* (2009) indicated that farmers around Lake Victoria basin in Tanzania were aged between 20 and 75 years. A study conducted in Nigeria noted that women aged between 30 and 59 years actively participated in farming activities (Okwu & Umoru, 2009).

In India, a study on farmers' information needs in rural Manipur indicated that the majority of farmers (143, 86.67%) were between the ages of 20 and 55 years (Meitei & Devi, 2009). In South Africa, a study on agricultural information needs of rural women farmers in Nkonkobe Municipality reported that the majority of farmers (105, 89%) were between the ages of 36 and 65 years (Yusuf, Masika & Ighodaro, 2013). This study included respondents who were actively involved in poultry farming. Thus, the findings show that most of the respondents were middle-aged. This indicates that older and younger people were not actively participating in poultry farming. The main reasons for this may be the migration of youth to urban areas in search of better opportunities than labour-intensive farming activities in rural areas. This is also supported by Aina (2007), who asserts that most of the farmers in Africa were growing old because youth were migrating to urban areas. It could also be due to young people choosing to engage in other activities, such as trading within the local community.

This trend is detrimental for the future development of the agricultural sector, rural productivity and the national economy. According to the World Bank (2014) and CIA (2014), the sector contributes more than one quarter of the Tanzania national GDP and 85% of export earnings. The fact that agriculture is a source of national economic growth means that adequate attention needs to be paid to improving agricultural production. Thus, strategies should be put in place to encourage the young generation to engage in agricultural activities for future economic development.

6.2.2 Gender

Gender is an important factor that may influence information access and use, due to gender-related attitudes and practices (Adomi, Ogbomo & Inoni, 2003). The study findings show that the majority of respondents were males (189, 52.5%), and the remaining respondents were females (171, 47.5%). A similar trend was observed for participants in focus group discussions, where the female-to-male ratio was 67 (41.9%): 93 (58.1%), as well as in semi-structured interviews, where 15 (68.2%) participants were men and seven (31.8%) were women. Although the findings show that there were more men than women, the national statistics indicate that there are more women than men, with a female-to-male ratio of 51.3%: 48.3% (URT, 2013a). This situation might be attributed to the gendered nature of the social, cultural and economic systems in the surveyed communities, which encourage gender imbalances.

These characteristics are similar to the gender profiles of the respondents in other studies on information behaviours in most parts of developing countries. A study on the information needs and information seeking behaviour of small-scale farmers in Tanzania reported that the majority of farmers who participated in the study were men (Lwoga, Ngulube & Stilwell, 2010). Another 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 & Silayo, 2013). Moving away from the Tanzanian context, a study in India on farmers' information needs in rural Manipur reported that the majority of respondents were men (134, 81.21%) and only 31 (18.79%) were women (Meitei & Devi, 2009). Most of the societies in Tanzania are patrilineal, and women are therefore less empowered members of the community. Despite the number of women respondents being lower than men, this does not mean that there were only a few women farmers. The patrilineal nature of the society may have hindered women farmers from participating, especially in households where both (women and men) were present.

6.2.3 Education

Opara (2010:2) asserts that “information may be physically accessible but may not be intellectually so”. The educational level of farmers has a great influence on the way in which farmers access and use information (Waller *et al.*, 1998). According to Sheba (1997), exposure to

education gives an individual the ability to control information input, and store and retrieve information for future use. The study findings show that the majority of farmers were literate (317, 88.1%), with the female-to-male ratio of 146 (40.6%): 171 (47.5%). A few farmers were illiterate (43, 11.9%), with 25 (6.9%) being women and 18 (5%) men. A similar characteristic was observed with participants in the focus group discussions, where 149 (93.1%) were literate, and 11 (6.9%) were illiterate. All the information providers were literate.

The characteristics of the respondents in this study were similar to the profiles of respondents in other studies involving rural farmers in developing countries in terms of literacy levels. A study on the assessment of information needs of rice farmers in Tanzania noted that the majority of farmers were literate, in the sense that they could write, read and understand (Benard, Dulle & Ngalapa, 2014). A similar situation was observed by a study which examined ICTs for rural farmers' market access in Tanzania (Mwakaje, 2010). In India, a study on farmers' information needs and search behaviours reported that most farmers (92.9%) had some schooling (Babu *et al.*, 2012). The level of education of an individual determines his or her knowledge and capability, and may influence the individual's ability to access and use information (Chen, Liu & Yang, 2011). Most of the farmers who participated in this study attended informal or formal schooling, and could read and understand. This is an indication that most of the farmers have the capability to access information presented in print media and other sources. However, it should be understood that these farmers have very little education - most of them attended four to seven years of 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 use the information in print, electronic and other sources.

6.2.4 Occupation

As explained in Section 5.3.1, the majority of the respondents (341, 94.7%) were involved with mixed farming, practising crop farming and livestock keeping. A few farmers practised livestock keeping and small business, while six (1.7%) were involved with livestock keeping and skilled work. Most of these farming activities were carried out at a subsistence level, depending on the availability of family members for labour. Similar observations were made by Sabo (2007), who reported that women farmers in the Mubi region practised mixed farming by cultivating crops

and keeping livestock. A study by Yusuf, Masika, and Ighodaro (2013) found that women farmers in the Nkonkobe municipality were engaged in mixed farming, practising both backyard farming and indigenous chicken production.

Furthermore, a study by Aina (2007) noted that the majority of farmers in Africa practice subsistence farming, producing little food for the household and for sale in the neighbourhood. Farmers operating at a subsistence level practise mixed farming as a way of survival and risk management, in the sense that if one component fails, the others will provide food for the household and little for sale (FAO, 2000). Thus, it is apparent from the study findings that most farmers were engaged in more than one occupation, in order to ensure their survival and optimum use of resources to enhance production. For instance, crop by-products are fed to animals, and livestock manure is used as a fertilizer for crops.

6.3 Information needs of farmers

An information need is the recognition that one's knowledge is inadequate to satisfy a goal (Case, 2002). This section discusses the findings in relation to the first objective of the study, which sought to assess the information needs of poultry farmers. The findings were in line with the Model of the Information Search Process (ISP) (Kuhlthau, 1991; 1993). The ISP presents a view of information seeking from the user's perspective in six stages, namely: task initiation, selection, exploration, focus formulation, collection and presentation. The first stage of the ISP model is initiation, where the task is to recognise a need for information. In this case, the poultry farmer first recognises that information is needed to solve the problem or answer the question. A farmer becomes aware of a problematic situation or information gap that requires information either to solve a certain problem or fill the gap. The study assessed the information needs of poultry farmers, and the findings are presented in Section 5.4. The discussion of findings is presented in three subsections: farmers' information needs, consideration of farmers' information needs and prioritisation of farmers' information needs.

6.3.1 Types of information needed by poultry farmers

An information need arises when an individual senses a problematic situation or an information gap (Case, 2007). The study findings in Section 5.4.1 show that there were significant information needs among the poultry farmers. The majority of the respondents (355, 98.6%) indicated that they had information needs related to poultry management. This is an indication that almost all the poultry farmers had gaps in their knowledge, which needed to be filled. Similar findings were obtained by Meitei and Devi (2009), where most of the farmers in rural Manipur had information needs.

Furthermore, the study findings show that the main information needs of poultry farmers were poultry disease control (352, 97.8%), poultry protection (133, 37.5%), and shelter for poultry (83, 23.4%). Other information needs were poultry production (51, 14.4%), breeds and breeding (47, 13.2%), feeding and nutrition (35, 9.9%), hatching (32, 9.0%), marketing (7, 2.0%) and competition with crops (6, 1.7%). The findings on information needs of farmers were similar to other related studies in developing countries (Matovelo, Msuya & de Smet, 2006; Lwoga, Ngulube & Stilwell, 2012; Garforth, Khatiwada & Campbell, 2003; Elly & Silayo, 2013; Meitei & Devi, 2009). Lwoga, Ngulube and Stilwell (2012) found that the main information and knowledge needs of farmers were pest management and soil fertility. Matovelo, Msuya and de Smet (2006) reported that crop diseases, rodent infestation, credit, chicken diseases, livestock diseases and markets were the main information needs of farmers. Elly and Silayo (2013) concluded that farmers needed information on crop and livestock production, marketing, funding options and value addition. These findings indicate that the information needs of farmers in rural areas are not uniform. The farmers' needs are diverse, depending on farming activities, level of development, distance from urban areas, and agro-ecological conditions. The findings suggest the need to identify farmers' information needs before embarking on information dissemination to the rural areas.

In addition, the study findings from the focus group discussions confirmed that farmers were more concerned with poultry disease control, because this was the major challenge that they were facing in poultry farming. This indicates that most of the information needs were directly related to the issues that affected the wellbeing of the poultry. Thus, the information needs

identified were problem-oriented, and information was required to solve problems related to poultry management. A similar observation was made by Lwoga, Stilwell and Ngulube (2011), who found that farmers were more concerned with information that affected their agricultural activities. A study by Ozowa (1995a) reported that information needs of farmers were problem-oriented. Ozowa found that farmers needed information for solving problems such as hazards, weed control, moisture insufficiency, soil fertility, farm credit, labour shortage and soil erosion. Similarly, Saravan, Raja and Sheela (2009) reported that farmers needed information on pest management and disease management. Mtega and Benard (2013) also confirmed that rural people needed information for solving the problems that they face. This increases the credibility of the researchers and development agents, as it allows them to respond directly to the needs of the beneficiaries.

Furthermore, the study findings indicated that farmers' information needs were different across the surveyed districts. This means that information needs were specific to location, depending on various factors such as level of development, social setting, distance from urban areas, and presence or absence of active information providers. Similar observations were made by other studies on information needs in developing countries (Lwoga, Ngulube & Stilwell, 2010; Matovelo, Msuya & de Smet, 2006; Lesaoana-Tshabalala, 2003; Meitei & Devi, 2009; Garforth, 2001).

The study findings also indicated that there were slight variations in information needs according to gender. On the other hand, there were no differences in information needs with regard to age, educational level and occupation. A higher percentage of women needed information on feeding and nutrition, as well as markets, whereas a higher percentage of men needed information on shelter, protection, breeds and breeding. It appeared that each gender was seeking information on matters that directly concerned them. For instance, shelter construction and re-stocking are issues dealt with mostly by men, while feeding is normally in the women's domain. However, there were no differences according to gender in terms of information needs such as disease control, production, and hatching. Similar findings were reported by previous related studies. Lwoga, Stilwell and Ngulube (2011) observed slight variations in information needs according to gender. Adomi, Ogbomo and Inoni (2003) reported definite gender variations in information needs. The

findings for this and previous studies suggest that there are differences in information needs according to gender. However, since information needs in poultry production do not appear to be gender-specific, efforts should be made to provide information based on farmers' information needs, rather than their gender.

6.3.2 Consideration of farmers' information needs

An information dissemination service that considers farmers' information needs has a great chance of success (Islam & Gronlund, 2010). Farmers understand what they need, and will therefore be in the best position to determine the information products that fit their needs (Morris & Stilwell, 2003). Assessment of information needs assists the information providers to plan for and deliver information that targets specific information needs of users (Babu *et al.*, 2012). The information providers use the identified needs and experiences of farmers to plan for and deliver information which is context-specific.

The study assessed whether or not information providers determined farmers' needs. The study findings (Section 5.4.2) show that most of the information providers had never inquired about farmers' information needs (262, 72.8%). However, a few information providers considered farmers' information needs in the delivery of information (98, 27.2%). The findings from focus group discussions and semi-structured interviews were similar. Most of the information providers (18, 81.8%) indicated that they had never inquired about farmers' information needs. The findings show that the identification of farmers' information needs was very low in the surveyed communities.

The study findings clearly indicate that most of the information disseminated to the surveyed communities was not based on the farmers' information needs. Most of the information providers delivered general or academic information to the farmers. Likewise, the planning and designing of information products did not involve farmers, who are the target beneficiaries. Similar observations were made by Ozowa (1995a), who noted that information disseminated to farmers did not focus on the targeted beneficiaries. The author stressed that information providers were disseminating information focusing on the views of researchers, policy makers, and those who manage policy decisions. This was also highlighted by Mudege (2005), who emphasised that

extension services have to address farmers' needs, instead of addressing the needs of the experts. A study by Lwoga, Ngulube and Stilwell (2012) concluded that knowledge intermediaries should disseminate knowledge according to farmers' needs, in order to enable the effective adoption of technologies. Thus, it is important for information providers to consider farmers' needs, in order to ensure the optimum uptake of information disseminated to the local communities.

Furthermore, a study by Islam and Gronlund (2010) noted that the effectiveness of rural information services relies on the planning, designing and delivery of information services according to the needs of the individuals in that specific community. A similar observation was made by Bembridge (1997), who stated that effective provision of information in rural areas should consider the information needs of farmers in the planning, creation and packaging of information products (Bembridge, 1997). It is thus important for information providers to identify farmers' needs and involve farmers in the planning and dissemination of information.

Similarly, information products should be designed and repackaged based on farmers' needs and experiences. It is thus important for information providers to assess the information needs of farmers, and consider them during the designing of information products. This is confirmed by Ozowa (1995a), who recommended that information dissemination services should take the approach of having a clear understanding of farmers' information needs. A similar recommendation was made by Rosenberg (2001), who emphasised that information services must respond to the information needs of the local people, in order to satisfy their needs. Information products developed through farmers' involvement are usually appropriate to farmers and have a greater chance of benefiting them (Apantaku, Oloruntoba & Fakoya, 2003). Various studies (Lwoga, 2010; Yusuf, Masika & Ighodaro, 2013) have stressed the importance of involving the target beneficiaries in determining the information needs, in order to disseminate information that is relevant to their needs.

The study findings were in line with DeLone and McLean's model (DMM) of Information Systems Success. The model has three quality dimensions: information quality, systems quality, and service quality. Information quality refers to the content of the information disseminated.

The content offered should be complete, relevant, ease to understand, in the preferred format, useful, reliable, accurate and current.

6.3.3 Prioritisation of farmers' information needs

The study assessed whether or not the information providers prioritised farmers' information needs. The findings were in line with the information quality dimension of the DeLone and McLean model. The study findings show that only a few information providers prioritised farmers' information needs. A quarter of the respondents (93, 25.8%) indicated that information providers prioritised their information needs. The remaining respondents (267, 74.2%) indicated that information providers did not prioritise their information needs. These findings were confirmed by the findings from focus group discussions and semi-structured interviews. Most of the information providers (19, 86.4%) did not prioritise farmers' information needs, while a few (3, 13.6%) prioritised farmers' information needs. The findings indicate that there was a very low prioritisation of farmers' information needs in the surveyed communities. This may be directly associated with the fact that farmers' information needs were not assessed in the first place. Similarly, a study in Nigeria by Apantaku, Oloruntopa and Fakoya (2003) found that only 37.27% of the 220 farmers indicated that the agricultural technologies disseminated were based on their identified needs. It is thus important for the information providers to prioritise farmers' information needs, in order to ensure the optimum utilisation of the information disseminated and better management of poultry.

The findings also showed that extension officers were the only information providers who prioritised farmers' information needs. These findings indicate that the extension officers play a very important role in rural areas of developing countries. As highlighted by Aina (2007), farmers in rural areas of developing countries depend mainly on extension officers through face-to-face communication. A recent study by Yusuf, Masika and Ighodaro (2013) found that the majority (99.1%) of farmers believed more in extension officers than any other source of information.

The findings show that the strategies used for the identification and prioritisation of farmers' information needs were visits to the farmers' households, village meetings, school meetings,

farmers' groups, and organised seminars to discuss various problems facing farmers. The findings also showed that the information providers were aware that farmers had information needs. Likewise, they understood the importance of identifying and prioritising farmers' information needs. The findings again highlight the factors that hindered information providers from identifying and prioritising farmers' information needs. The factors were inadequate resources (19, 100%), unfavourable working conditions (15, 78.9%), lack of facilities to assist in prioritising farmers' needs (12, 63.2%), and inadequate support from the government (3, 15.8%). It is evident from the findings that with a favourable environment, adequate resources, and support from the government, information providers will be able to identify and prioritise farmers' information needs.

6.4 Information seeking behaviours of farmers

The study findings are discussed based on the second study objective, which sought to assess the information seeking behaviours of poultry farmers. The findings are presented in Section 5.5. The discussion of the findings is divided into four themes: information seeking practices, information sources used by poultry farmers to access information, use of poultry management information, and farmers' satisfaction with information dissemination services.

6.4.1 Information seeking practices of poultry farmers

The study findings show that most of the respondents (342, 96.3%) had tried to find information for solving the problems they were facing, while a few (13, 3.7%) had not sought a solution. Similar findings were reported by Chilimo (2008), who found that 93% of respondents had attempted to find information to solve their problems in rural Tanzania. The study findings also show that out of 342 respondents who tried to find solutions, slightly more than half (197, 57.6%) of them managed to get the information they needed to solve their problems. Although the findings show that the majority of the respondents managed to get information, a study by Lwoga, Ngulube and Stilwell (2010) reported a slightly lower percentage, with 57% of the respondents managing to get the information that they needed. Another study by Ikoja-Odongo (2001) indicated a higher percentage (87.5%) of respondents who managed to obtain the information that they needed. The findings of this and previous studies indicate that farmers are

able to identify a problem situation and take a further step to find information for solving the problem. It is thus important for information providers to ensure that adequate and useful information is accessible to farmers, so that they can easily find it when the need arises.

Furthermore, the study findings show that out of the 332 respondents who accessed information, the majority accessed information on disease control (307, 92.5%), protection (80, 24.1%), production (64, 19.3%), and shelter (62, 18.7%). Other types of information accessed were: breeds and breeding, hatching, and feeding and nutrition (See Section 5.5.2). The least accessed types of information were markets and competition with crops. The study findings are in line with the collection stage of the ISP model (See Section 3.3.2). The findings indicate that farmers mainly accessed information that had a direct impact on the wellbeing of poultry. The implication is that farmers tend to access information that is relevant to their farming activities. Similar observations were made by Elly and Silayo (2013), who stressed that farmers value information that is contextualised. This calls for information providers to ensure that the information disseminated to rural areas is context-specific and relevant for farmers.

The study findings show that poultry disease control and poultry protection were the main types of information accessed. Although the study findings from the survey questionnaire indicate that only a few farmers accessed information on breeds and breeding, as well as feeding and nutrition, findings from the focus group discussions indicated that breeds and breeding, and feeding and nutrition were among the main types of information that were accessed. This was also confirmed by data from interviews, which indicated that breeds and breeding, and feeding and nutrition were among the most commonly disseminated information (see Table 10). Despite this disparity, it is obvious that the major types of information accessed were poultry disease control, poultry protection, breeds and breeding, and feeding and nutrition. The study findings suggest that it is important for information providers to identify farmers' information needs, in order to disseminate information that satisfies farmers' needs. A similar observation was made by Dulle and Aina (1999), who affirmed that it is important to identify farmers' information needs, in order to provide appropriate and relevant information.

Furthermore, the study findings indicate that there was limited access to information on shelter, production, and hatching, while these were among the main information needs identified by farmers. The situation may be caused by the limited dissemination of such type of information or the unavailability of the information. Data from interviews with information providers indicated that information on poultry shelter, poultry production, and markets were among the least disseminated types of information. Information on hatching and competition with crops were not disseminated to the local communities. It is apparent from the findings that there is a need for information providers to assess the information needs of farmers, in order to disseminate information that is relevant and context-specific.

6.4.2 Information sources used by poultry farmers to access information

The study findings show that the main sources of poultry management information were family, friends and neighbours (288, 84.2%), extension officers (162, 47.4%), researchers (53, 15.5%), and radio (26, 7.6%). The findings from the focus group discussions confirmed that family, friends, neighbours and extension officers were the main sources of poultry management information. The least used sources of information were mobile phones, television, the Internet, and drama. Printed sources of information such as posters, leaflets, newspapers and books were only slightly used (See Section 5.5.1). This calls for information providers to identify the appropriate channels to use for dissemination of information to rural communities, in order for information to reach target beneficiaries. The over-reliance on family, friends and neighbours for information is a very worrying trend, particularly since those providing information are also dependent on the same sources.

It is evident from the study findings that farmers relied on interpersonal and informal sources of information. The findings also indicate that modern sources of information such as television and cell phones were not regarded as important sources of information. Similar findings were reported by other related studies (Lwoga, Ngulube & Stilwell, 2010; Njoku, 2004; Elly & Silayo, 2013; Okwu & Daudu, 2011; Ugboma, 2010; Daudu, Chado & Igbashal, 2009; Boz & Ozcatalbas, 2010) in developing countries. The findings of this and previous studies show that farmers relied on interpersonal and informal sources of information, such as family, friends and neighbours, extension officers, and village leaders. The findings are supported by Aina

(2004:17), who asserts that “when the need for information is for problem solving, the user approaches informal channels such as colleagues, friends, neighbours, family, chiefs, a religious body, the neighbourhood or a professional association”. While Garforth, Khatiwada and Campbell (2003) reported that neighbours were a very important source of information among farmers, a different observation was made by Opara (2008), who found that neighbours and friends were not the main information sources. Extension officers and radio were the main information sources for farmers in Imo State, Nigeria. This variation in the study findings may be due to the social, economic, cultural and political differences of the study areas.

The study findings regarding the use of radio were inconsistent with previous studies. A study by Chilimo, Ngulube and Stilwell (2011) found that radio was the major source of information for people in selected rural areas of Tanzania. A study by Mtega (2012) reported that radio was the main source of agricultural information in Kilosa district. The possible reasons for this difference may be the geographical locations of the study areas, economic development of the surveyed communities, and variation in agricultural activities. Likewise, Mtega (2012) reported that there was a community radio station in the study area, which might have influenced farmers’ choices. The low use of radio in this study could be attributed to the unavailability of a community radio station in surveyed communities. Farmers may be discouraged from listening to radio stations from urban areas because the information that is broadcasted is not context-specific.

Furthermore, the findings highlighted the fact that print sources (books, leaflets, posters and newspapers) were sparingly used. The limited level of education, cost of acquiring print materials, lack of libraries or information centres, and unavailability of print materials in the rural areas may have hindered farmers from using these sources. Despite the challenges, farmers consulted the print sources to access information. Similar findings were reported on farmers’ use of print sources of information by other studies (Garforth, 2001; Stefano *et al.*, 2005; Lwoga, Ngulube & Stilwell, 2010). Most of the publishing houses in Tanzania are located in urban areas. In such a situation, print information materials are prepared in the urban areas and transported to the rural areas for distribution. Most of the rural areas in Tanzania have a poor road infrastructure, which limits the transport services. Due to poor transport services to the rural areas, most of the print sources do not reach the rural communities on time. Even when the print

information materials reach the rural communities, the cost becomes higher, mainly because of transportation. It is obvious that this kind of information becomes expensive for the rural farmers with a low income, which only a few farmers can afford.

Again, the findings show that modern information sources (cell phones, Internet, and television) were the least used. Similar findings were reported by Elly and Silayo (2013), who found that modern means of communication were not considered to be important sources of agricultural information. This is probably because of limited ICT infrastructure, lack of ICT skills and lack of electricity in rural areas, which limit the availability and accessibility of modern communication technologies. However, it was observed that there were five mobile operators with the infrastructure to cover the surveyed communities, and some of the farmers owned mobile phones. Television frequencies were also available in the study area, but very few people owned a television. Despite the availability of mobile and television infrastructure in the area, the biggest challenge was lack of electricity to charge mobile phones and operate televisions. Sife, Kiondo and Lyimo-Macha (2010) found that farmers used cell phones to access market information for agriculture and livestock products. Elly and Silayo (2013) reported that farmers found television to be irrelevant because very few agricultural information sessions were televised, and most of the televised information was too general to satisfy their local needs. This calls for responsible agents to deliver context-specific information through modern information sources, so that farmers can access timely and current information to satisfy their needs.

It was evident from the study findings that there were variations in the information sources used in terms of educational levels. However, there were no differences in terms of gender, age and occupational categories. The findings revealed that printed sources were used more by farmers with a higher education level (secondary education and beyond). Farmers with limited education (primary education, informal education and illiterate) accessed information through researchers, neighbours and extension officers. There was very minimal use of digital sources of information, and it was therefore not necessary to draw comparisons on their use. Nevertheless, there were no variations in terms of the use of radio across all demographic characteristics. The findings suggest that educational level has an influence on the choice of information sources by farmers.

However, information providers are also challenged to package the information in ways that are able to attract farmers to digital media, which are a phenomenon of the current century.

6.4.3 Use of poultry management information

The study findings are in line with the presentation stage of the ISP model, where poultry farmers have completed information seeking and started to use the information. The study findings established that more than half of the respondents (187, 56.3%) used the poultry management information that they accessed. Most of the respondents (146, 78.1%) managed to solve the problems that they were facing. Only a few respondents (41, 21.9%) failed to solve their problems. Possible reasons for this failure were: unavailability of the extension officer for consultation, inadequate knowledge on how to use the information, high cost of implementing the advice, unavailability of drugs, long distance to the drug store, and loss of hope (See Section 5.5.3). Similarly, a study by Mtega (2012) found that lack of skills, cost of information, literacy levels, inadequate access to information sources, and geographical isolation were among the main barriers to effective information use in the rural communities.

The study findings demonstrate that accessing information does not guarantee that the information will be utilised for solving problems and improving poultry production. As emphasised by Coudel and Tonneau (2010:63), “Information may seem appropriate, usable, relevant, but it can only be useful if the actors have the capacity to use it and if their environment offers them the opportunity to use it”. It calls for agents responsible for information provision to devise follow-up strategies to ensure that farmers are able to use the information that they access. The optimal use of information can be realised if information is disseminated in the formats that are preferred by the target audience. This may be achieved with the full participation of all stakeholders, such as rural farmers, researchers and various information providers (Kalusopa, 2005). In order for users to access and use information, they must have economic resources, skills, technology, and social resources (Heeks, 2005). It is therefore important to take into consideration all the factors influencing the use of information when disseminating poultry management information to rural areas. Regular follow-ups may also shed light on what changes needs to be applied in order for the information to be useful - this may entail changing the format or delivery method.

Furthermore, farmers' ability to access and use information is largely dependent on their educational level (Waller *et al.*, 1998). Inadequate knowledge on how to use the information is directly related to the educational levels of farmers. Most of the farmers in rural areas of Tanzania have little education. As seen in the demographic characteristics of respondents, the majority of the respondents (287, 79.7%) had primary education. In most cases, those who achieve primary school education have a basic knowledge of reading and writing. With a low level of literacy, it is not guaranteed that the farmers will have the ability to access and use information disseminated in various formats. It is therefore crucial for information dissemination services to take the farmers' literacy level into consideration, in order to enable effective information utilisation.

The findings also demonstrate that the cost of using the information or applying the suggested farming practices was considered to be an important reason for the failure to use information. According to Opara (2010), the income level of farmers is very important in facilitating agricultural information use. Opara emphasises that farmers with a better income are more likely to spend money on looking for information and applying the recommended practices. Application of recommended practices will lead to improved productivity, which in turn leads to improved income. With improved income, the farmer will be able to spend more money on recommended practices, which will further increase agricultural productivity and income. However, most farmers in rural areas of Tanzania have very little income. Thus, the majority of rural farmers cannot afford to pay the cost of accessing and applying the recommended farming practices. Even when the information is provided free of charge, they can rarely afford to apply the recommended farming practices. There is therefore a need for the government to subsidise farm inputs, so that rural farmers can afford them.

The findings also show that the majority of information providers had no strategies for ensuring that farmers utilise the information (See Section 5.5.3). A few information providers had strategies such as following up with farmers at their homes, practicing together with farmers, demonstrating during the seminars, and requesting feedback from farmers. These findings indicate that most information providers disseminated information to the rural communities without making follow-ups on the usage of information. Furthermore, the findings demonstrate

that face-to-face communication was the main method used by information providers to make follow-ups on the usage of information in the surveyed rural communities. Taking the school poultry project as an example of a successful strategy (See Section 5.5.3), it is evident that poultry farmers were ignorant about the benefits of applying the recommended practices. They utilised the knowledge after becoming aware of the benefits of applying the best farming practices. Therefore, there is a need for information providers to educate farmers on the benefits of applying recommended farming practices.

In addition, farmers' access and use of poultry management information helps to increase poultry production and income, which translate into the improvement of farmers' standard of living and the national economy. Similarly, Bachhav (2012) stated that the use of agricultural information enhances farming productivity by assisting farmers to make proper decisions regarding their farming activities. It is therefore important for the government and other responsible agents to devise strategies for ensuring that farmers have the ability to apply the recommended farming practices, in order to improve poultry productivity. Kamba (2009) argues that a community can only develop if it recognises and uses information as a tool for development. Thus, it is imperative for the responsible institutions to ensure that rural communities utilise the information for the benefit of farmers, rural communities and the nation at large.

The findings also revealed that there was a variation in the use of information across different educational categories. Farmers with primary education and secondary education were the majority among those who utilised information, in comparison to illiterate farmers and those who had only informal education. The findings suggest that educational level has an influence on farmers' utilisation of poultry management information. The findings are inconsistent with those of Olaniyi and Adewale (2012), who reported that there was no relationship between educational level and level of utilisation of agricultural information. The difference may be attributed to the fact that the respondents in Olaniyi and Adewale's study were rural youth, while this study dealt with all age categories. Thus, educational levels in this study may seem to be important, particularly because of the disparity in terms of level of understanding. It is probable that youth educational levels did not have significant differences as far as understanding and using agricultural information are concerned.

6.4.3.1 Types of information used by poultry farmers

The study findings established that information on poultry disease control was the most used type of information. Other types of information that were commonly used were information on poultry protection and markets. The least used types of information were information on production and hatching (See Section 5.5.3). Data from focus group discussions indicated that there was a low use of information on feeding and nutrition, as well as housing and shelter. It was evident from the study findings that farmers mainly applied information that had a direct impact on their farming activities. The most used type of information was that which directly affected poultry health and production. For instance, diseases caused the death of poultry, and poultry protection was therefore crucial for poultry safety, and information on poultry markets was necessary for selling poultry products. These findings are in line with those of Byamugisha, Ikoja-Odongo and Nasinyama (2010), who found that farmers mainly used information on controlling animal diseases (51.5%) and crop diseases (48.2%). The implication is that information use highlights the information needs of poultry farmers and the value that poultry farmers attach to the particular information.

On the other hand, other types of information were rarely used by farmers. These findings imply that farmers viewed certain types of information as being more important than others, and utilised information which they considered to be important. For instance, farmers have traditionally been rearing poultry, leaving them to find poultry food on their own. Thus, information on feeding and nutrition would not be viewed as an important practice, especially if it requires money to buy the feeds. In such a situation, it takes a knowledgeable farmer who understands the importance of such practices to apply them. The implication is that poultry farmers need more education and training to make them understand the importance of various farming practices. This calls for information providers to devise strategies to ensure that farmers understand the benefits of utilising the information that they access.

6.4.4 Farmers' satisfaction with information dissemination services

The study findings (See Section 5.5.4) show that the majority of the farmers (216, 60%) were not satisfied with the information dissemination services. However, less than half (144, 40%) were

satisfied. Data from the focus group discussions showed similar observations that most farmers were dissatisfied with information dissemination services. The main reasons for this dissatisfaction were inadequate information services from extension officers, lack of reliable sources of information, lack of awareness on the availability of information, and unavailability of the extension officers. On the other hand, the main reasons for satisfaction were the availability of extension officers for consultation, availability of information from neighbours, and access of information and knowledge through seminars and training.

The findings suggest that the existence of information services alone does not satisfy farmers' needs. There is a need for the government and other responsible agents to improve rural information services. With improved information services, farmers will find the services useful and satisfactory. A similar observation was made by Mtega and Benard (2013). The authors pointed out that for rural information services to be successful, there is a need to determine the perceived benefits and usefulness of the information services to the rural communities. In so doing, the information providers will be able to disseminate information that satisfies farmers' needs, and the rural communities will recognise the benefits of using the information services.

The study findings also show that more than half of the information providers (15, 68.2%) acknowledged that the information dissemination services did not satisfy farmers' needs. Only a few information providers (7, 31.8%) indicated that the services satisfied farmers' needs. The reasons for unsatisfactory information services were poor infrastructure, poor facilities, limited transport services, lack of funds, insufficient number of extension officers, and a difficult geographical infrastructure (See Section 5.5.4). The study findings are in line with those reported by previous studies (Aina, 1991; Mtega & Benard, 2013; Mtega, 2012; Lwoga, Stilwell & Ngulube, 2011; Obidike, 2011). For instance, Obidike (2011) identified constraints to effective rural information services, such as lack of access to roads, poor public relations of extension officers, poor radio and television signals, unavailability of electricity, inadequate financial power to purchase print information materials, and illiteracy. This calls for the government and other responsible agents to create a reliable information services infrastructure, in order to enable the smooth delivery of information services to the rural communities. Such rural information infrastructures may include good access to roads, rural electrification,

community libraries and information centres, reliable transport, improving radio and television signals, increasing the number of extension officers, and improving the working conditions of extension workers.

6.5 Preference of information sources

The study findings indicated that extension officers (256, 71.7%), as well as family, friends and neighbours (241, 67.7%) were the most preferred sources of information. Other preferred sources, in order of preference were radio, researchers, books, leaflets, and posters (See Section 5.6). The least preferred sources were songs, newspapers, NGOs/CBOs, and cell phones. Internet, television, drama and films were not preferred. The findings indicate that farmers preferred interpersonal and informal sources to formal sources of information. The implication is that farmers in the surveyed communities preferred listening and talking, rather than reading. The findings agree with Kari (2007), who stated that rural communities in developing countries are naturally oral societies, and thus prefer information that is delivered through face-to-face communication. The study findings were found to be similar to those of other related studies (Okwu & Daudu, 2011; Egge *et al.*, 2011; Dutta, 2009; Daudu, Chado & Igbashal, 2009; Rezvanfar, Moradnezehadi & Vahedi, 2007). The findings of this and previous studies indicate that farmers preferred interpersonal interaction. This preference could be as a result of the oral tradition prevailing in rural areas. It is also probable that face-to-face contact with interpersonal sources allows for a two-way communication, which is more practical for rural farmers with limited literacy.

The findings also indicate that radio was among the most preferred sources of information, with a score of almost half of the respondents (47.5%), and was ranked in the third position. Although the use of radio (See Section 5.5.1) for accessing poultry management information was very low (7.6%), the findings on preference of sources demonstrate that poultry farmers preferred to receive information through the radio. The implication is that radio is the appropriate information source for disseminating poultry management information in the surveyed communities. Similar findings were reported by related studies (Nyareza & Dick, 2012; Okwu & Daudu, 2011; Egge *et al.*, 2011). For instance, Nyareza and Dick (2012) found that community radio was the most preferred information source among rural peasant farmers in Zimbabwe. Okwu and Daudu

(2011) stated that radio occupied the second position in the ranking of the most preferred information sources. The findings suggest that radio is an appropriate information source for reaching the surveyed rural societies. This observation is in agreement with other authors (Okwu, Kuku & Aba, 2007; Zijp, 1994; Kuponiyi, 2000), who recommended radio as the most appropriate communication medium for the rural population in developing countries.

Radio as a communication medium has a number of advantages. The radio is cheap to obtain and operate, which means that rural farmers can easily afford it. It overcomes long distances, has an immediate effect, does not require literacy, and is familiar to most rural households. With the oral culture prevailing in rural areas, listening to the radio is easier than reading. Listening to radio programmes can also stimulate discussion between farmers, which may turn into the sharing of knowledge among them. Local radio productions can overcome language barriers because programmes can be produced in local dialects. It can also be operated by battery, which is a solution to the problem of lack of electricity in some of the rural areas (Kuponiyi, 2000; Okwu, Kuku & Aba, 2007; Zijp, 1994). Therefore, efforts should be made to establish and equip community radios in rural areas, in order to improve the communication of agricultural information. This challenges the information providers to ensure that they prepare adequate and suitable content to address farmers' information needs through radio. Furthermore, the timing for agricultural programmes should take farmers' choices regarding suitable listening times into account.

The findings also indicate that there was a very low preference for the modern ICTs as sources of poultry management information in the surveyed communities. Cell phones were least preferred, while the Internet and television were not preferred at all. Similarly, a study by Elly and Silayo (2013) found that most of the modern means of communication were not regarded as important sources of agricultural information. The indications are that modern ICTs are not deemed to be effective ways of delivering poultry management information in surveyed rural communities. The low preference for modern ICTs could be as a result of the lack of electricity in most of the surveyed communities, unavailability of ICT facilities, lack of ICT skills, and non-affordability of ICTs. It is also probable that modern sources such as television, broadcast information that is too general and lacks local farming context, which means that it is irrelevant for rural farmers.

The findings have demonstrated that despite the remarkable developments in modern ICTs, rural farmers have continued to rely on interpersonal and informal sources of information. Elly and Silayo (2013) emphasised that modern sources do not accommodate farmers' needs within the local context, and are therefore of little interest to the rural farmers. This calls for responsible institutions to create a favourable environment for modern ICTs to be used for dissemination of agricultural information that will accommodate the needs of rural farmers.

The findings also indicate that there were variations in terms of the preference for print sources of information. Farmers indicated a greater preference for books, leaflets and posters, but a low preference for newspapers. This may be as a result of the availability and accessibility of these sources of information. Findings from the interviews with information providers indicated that posters (95.5%) and leaflets (81.8%) were the most preferred sources for disseminating poultry management information (See Section 5.6.1). Newspapers were not preferred by information providers (none of the respondents indicated a preference).

These findings suggest that preferences may be influenced by the availability and accessibility of the information source. If the source is easily available and provides quick access to information, there is a great possibility that information seekers will prefer it over other sources. This was also validated by the findings on the reasons for the preference of information sources. The findings showed that the availability and convenience of the information source were the major reasons for farmers' preferences. This observation is in agreement with Savolainen (2008), who reported that the availability and accessibility of information were of some importance in terms of the preference of information sources. The findings indicate that for the information source to be preferred by farmers, it should be available, easily accessible and provide quick access to information. It is therefore important for the information providers to ensure constant availability and accessibility of the information sources that are relevant to the rural communities.

The findings also indicate that there were slight variations in the preference for information sources according to gender. However, there was no difference in terms of age, educational level and occupational categories. A higher percentage of men preferred radio, leaflets, posters, mobile phones, newspapers, researchers, and books, while a higher percentage of women preferred

television, the Internet, films, songs and drama. There were no variations according to gender with regard to the preference for extension officers, family, friends, and neighbours.

The findings suggest that women preferred information sources that are more entertaining, while men preferred written and more informative information sources. Low literacy among rural women, gendered roles and oral culture may have contributed to women's low preference for written sources of information. The findings are supported by studies conducted by Ikoja-Odongo (2002) and Oдини (2014). These studies established that women do not recognise formal channels as being useful information sources. On the other hand, the findings of this study are in contrast to the findings of Adomi, Ogbomo and Inoni (2003), who found that a higher percentage of female farmers preferred written sources of information. Variations in the study findings may be attributed to the social, economic, cultural, and geographical differences of the study areas.

6.5.1 Criteria used for preference of information sources

Poultry farmers used different criteria for determining their preference of information sources. The study findings revealed that the main criteria used by farmers were availability and convenience of the information source. Other criteria were the reliability of the source, skills in using the source, affordability, and influence from a friend. A number of previous studies (Fisher *et al.*, 2005; Fisher & Naumer, 2006; Savolainen, 1995; 2007; 2008; 2010) reported similar findings. For instance, Savolainen (1995) found that the availability, accessibility and ease of use of the source were the main criteria used for the preference of information source in problem-specific information seeking. Fisher and Naumer (2006) found that the ease of use, convenience, accessibility, reliability and cost of the source were considered as important criteria for the preference of information sources. Savolainen (2010) identified criteria such as the content of information, availability and accessibility of the information source, easy and instant access to information, and usability of the information source. The findings suggest that information seekers prefer information sources that have previously functioned reliably. It is therefore important for the responsible agents to ensure that information sources provide effective and reliable services, in order to gain the trust of the target beneficiaries.

The findings demonstrate that interpersonal sources were most preferred. This preference may be due to their availability, convenience, reliability, economy, and ease of use. Interpersonal sources may provide easy and quick access to information. For instance, fellow farmers and neighbours may have experienced the same problems earlier, and are therefore in a position to provide experience-based information and immediate access to information. Furthermore, fellow farmers and neighbours may be available all the time, and do not require any literacy or skills to access information. In rural areas, interpersonal sources mostly provide information for free, which means that farmers find them economical, as no cost is involved in accessing information.

6.6 Effectiveness of information sources in disseminating poultry management information

The study findings are discussed in relation to the fourth study objective, which sought to assess the effectiveness of various information sources in disseminating poultry management information to the surveyed communities. The findings are presented in Section 5.7. The findings revealed that extension officers (268, 75.1%) were considered to be the most effective information source for delivery of information related to poultry management. Both the findings from the focus group discussions and semi-structured interviews confirmed the effectiveness of extension officers. Other sources considered to be very effective were family, friends and neighbours, radio and leaflets. The least effective sources were songs and newspapers, while the Internet, television and films were not considered to be effective (See Section 5.7). The findings indicate that information sources that use oral communication were regarded as the most effective in the delivery of poultry management information in the surveyed communities. This implies that if access to interpersonal sources of information is improved, it could have positive impacts on farmers' information access.

The findings of this study are inconsistent with the findings of Muhammad and Garforth (1999), who found that farmers regarded print media, researchers, and radio as the most effective sources for disseminating agricultural information in Pakistan. They also reported that extension officers, field assistants, neighbours, friends and relatives were regarded as the least effective sources. Nevertheless, the findings of this study are not surprising, considering the fact that education gives an individual the ability to access and apply information (Sheba, 1997). Farmers with limited education may not find print sources to be effective, and perceive interpersonal sources

to be the most effective sources. Low literacy levels combined with an oral culture may have prevented farmers from recognising the potential effectiveness of other sources of information. It is also probable that print materials fail to accommodate farmers' needs at the local level. Elly and Silayo (2013:559) state that:

“context-specific publications, in the form of newsletters, leaflets and others, as well as local radio and television sessions, could be potential sources of information if the producers of the information (research institutions, universities, government and others) choose to upload and use them as means of disseminating context-specific information to the farmers” .

Findings from the focus group discussions show variations across the three districts. Iringa rural and Morogoro rural indicated that family, friends and neighbours were the second most effective source of information. In Mvomero, participants indicated that researchers were the second most effective source of information. This variation may be as a result of the existence of an agricultural university near Mvomero district. Researchers from Sokoine University of Agriculture conduct studies and outreach programmes in the nearby communities. This was not the case for Iringa rural and Morogoro rural, where farmers regarded family, friends and neighbours as the most effective sources of information. These findings suggest that information sources that are constantly available to farmers are the ones that are regarded as effective. These findings demonstrate a contradiction in relation to the findings of Muhammad and Garforth (1999), who noted that information sources that are commonly used by farmers may be regarded as less effective. The findings of this study are not surprising, as one of the most important determinants of the effectiveness of an information source was the availability of an information source, as indicated in Section 6.6.1.

It was deemed to be important to understand the sources which were considered by the whole community to be appropriate in terms of their local situations, culture and traditions. The findings revealed that extension officers were considered to be the most appropriate source, followed by family, friends and neighbours. Other appropriate sources were radio, leaflets, researchers, books and cell phones (See Section 5.7). The Internet, television, and films were not considered to be appropriate sources for delivering poultry management information to the

surveyed communities. The extension officer was cited as the most appropriate source of information in both focus group discussions and semi-structured interviews. The findings from semi-structured interviews were slightly different, however, as meetings and researchers occupied the second and third positions respectively, while family, friends and neighbours occupied the fourth position.

Based on the findings, it appears that extension officers, meetings, researchers, family, friends and neighbours were the most appropriate sources of information. The findings suggest a significant reliance on oral communication among the surveyed rural communities. This is a reflection of the oral tradition prevailing in most rural areas of developing countries, as stated by Aina (2004). It is therefore important for responsible institutions to understand the culture, traditions and local situations before planning for information dissemination in the rural areas. Das emphasised that “choice of appropriate medium is crucial in agricultural information delivery” (Das, 2012:2). Similarly, Mtega and Benard (2013:69) noted that “for rural people to access information they require appropriate information sources”. Thus, the assessment of information sources considered to be most appropriate by the target rural communities is vital for successful agricultural information services. These findings also call for the government and other stakeholders to enhance agricultural extension services for effective poultry management.

6.6.1 Factors that determine the effectiveness of information sources

The study findings indicate that the convenience (259, 75.1%), availability (223, 64.6%), and reliability (157, 45.5%) of an information source were the main factors that influenced farmers’ view of an information source as effective. Other factors were skills in using the source, cost of getting the information, and influence from fellow farmers. Similar factors were identified in focus group discussions, with the exception of influence from fellow farmers. One of the participants in the focus group discussions stated that:

“... The information source that is available all the times can be considered as effective because it is easy for us to get information whenever we face problems”.

The findings indicate that the information source needs to be continuously available, convenient to access and trustworthy, in order for farmers to consider it to be effective. Therefore, there is a

need for agents responsible for rural information services to create conducive environment and good rapport, in order for information sources to be continuously available, convenient and reliable. Since most of poultry farmers have limited literacy, and depend largely on interpersonal communication to access information, it is important to ensure the constant availability of an adequate number of well-trained extension officers in the rural areas.

The findings of this study indicate that the convenience, availability and reliability of an information source were the major determinants of the effectiveness of information sources. However, in previous studies such as that of Rehman *et al.* (2011), quality of information, newness and farmers' interest were the key factors for determining the effectiveness of print information sources. The variations in the results may be attributed to the differences in personal and socio-economic circumstances of the farmers, together with geographical differences between the study areas. It is therefore important for information providers to have a clear understanding of the key determinants for the effectiveness of an information source for a target population, in order to improve the level of acceptance of an information source.

6.7 Factors influencing access and use of poultry management information

This section discusses the findings based on the fifth study objective, which focused on the identification of factors that influenced access and use of poultry management information. The positive factors (promote access and use of information) and negative factors (hinder access and use of information) are presented in separate sections. The findings are in line with the Quadratic Usage Framework (QUF), which explains the factors that underlie the acceptance and usage of information systems, and factors that lead to the intention to use (Mardis, Hoffman & Marshall, 2008).

6.7.1 Factors that hinder farmers from accessing poultry management information

The study findings indicate that the unavailability of extension officers and lack of awareness were the main factors that inhibited farmers from accessing information. Other factors were the unavailability of information, lack of electricity, poor infrastructure, limited literacy levels, long distance to find the extension officers, reluctance of farmers to share information, limited

transport services, unreliable information sources, and lack of funds to purchase printed information materials (See Section 5.8.1). The findings were also confirmed by results from both the focus group discussions and semi-structured interviews. The findings from semi-structured interviews indicated that the unavailability of extension officers was the main factor that hindered farmers from accessing information, followed by poor infrastructure limiting the movement of farmers and extension officers. Other factors included poor economic status, limited literacy level, lack of reading culture, lack of cooperation among farmers, lack of electricity, few choices of information sources, and lack of self-motivation among farmers. Similar findings related to lack of awareness on the availability of information as a barrier to information access were reported by previous studies (Byamugisha *et al.*, 2008; Stefano *et al.*, 2005; Iriwieri, 2007; Odini, 2014). The findings of this and previous studies indicate that farmers in the surveyed communities were not aware of where to find information to satisfy their information needs. There is therefore a need to create awareness regarding the available information and information sources.

The barriers identified by this study were similar to those established by previous related studies (Ikoja-Odongo & Mostert, 2006; Ikoja-Odongo & Ocholla, 2003; Njoku, 2004; Momodu, 2002; Aina, 2004; Siyao, 2012; Odini, 2014; Adomi, Ogbomo & Inoni, 2003; Ugboma, 2010). For instance, Momodu (2002) reported that illiteracy and language barriers limited rural dwellers from accessing information in Nigeria. A study by Adomi, Ogbomo and Inoni (2003) reported that lack of visitations by agricultural extension officers, absence of a community library, and illiteracy were the main factors that hindered farmers from accessing information. In Tanzania, Lwoga, Ngulube and Stilwell (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. Similarly, Siyao (2012) concluded that poor infrastructure, poor communication facilities, illiteracy, poor transport systems, poor power transmission, and lack of knowledge on how to access information hindered farmers from obtaining information. The findings from this and previous studies suggest that most of the barriers to information access in many rural parts of the developing countries are linked to lack of basic infrastructures such as electricity, telecommunications, utilities, roads and transportation.

Apart from infrastructures, other factors such as personal, social, and economic aspects may also hinder farmers from accessing poultry management information. Dutta (2009:48) emphasised that “factors such as poverty, ignorance, disease, high rates of illiteracy, and lack of basic infrastructures are keeping the poor people in developing countries stagnant”. It is therefore important to deal with all the factors which limit access to information, in order to improve accessibility of agricultural information in rural areas of Tanzania. For effective access to poultry management information in the surveyed communities, there are important issues to be considered in order to deal with the factors that hinder access to information. Firstly, the number of extension officers in rural areas needs to be increased, so as to improve the interaction between extension officers and farmers. Secondly, awareness of the existing sources of information needs to be increased, in order to give farmers a wider choice of information sources. In addition, reliable transport for information providers should be provided, so that they can easily visit farmers and perform their duties more professionally. The cost of agricultural inputs and information services could also be subsidised by the government, so that farmers are able to afford them. Other factors such as reluctance of farmers to share information and lack of cooperation among farmers could be dealt with by encouraging farmers to share information, and creating farmers’ groups and information-sharing activities in the communities. Furthermore, the provision of adult education in the rural communities could improve literacy levels of rural farmers.

6.7.2 Factors that hinder farmers from using poultry management information

The study findings indicate that limited assistance from experts and lack of skills on how to use the information were the main hindrances to farmers’ use of information. Other factors were limited literacy levels, unreliable information, low economic status, and lack of cooperation among farmers. Findings from focus group discussions confirmed that the unavailability of assistance from experts such as extension officers was the main barrier. Other barriers included lack of cooperation among poultry farmers, unreliability of the information, poor economic status, high cost of implementing the information, and unavailability of poultry drugs in the community (See Section 5.8.2). The barriers identified in this study are similar to the obstacles reported by Odini (2014). Odini found that illiteracy, ignorance, poverty, inaccessibility of information, and unreliable information were among the main barriers to women farmers’ use of

information in Kenya. The findings demonstrate that the factors hindering the use of poultry management information mainly originate from illiteracy and poverty among the rural farmers. Similar observations were made by Opara (2010), who asserts that low literacy and high poverty levels of farmers could affect their access and use of agricultural information. Likewise, Dorsh (2000) reported that lack of skills, cost of information, and geographical isolation were among the major hindrances to information use. Mtega (2012) also stressed that literacy levels of information seekers limit the usage of information.

The findings also indicate that farmers needed assistance from experts in order to use the information, and they lacked skills on how to use the information. Accessed information can be effectively used by farmers if they know how to use it. Meyer (2005) emphasised that receivers of information must know how to use the information, otherwise the information will be useless. Mtega (2012) highlighted the fact that information can only be useful when effectively interpreted by the receivers. The implication is that farmers lack knowledge on how to use the accessed information. This situation is exacerbated by the fact that most of the farmers have low literacy levels, as reported in Section 6.2.3. Limited literacy level was one of the most cited barriers to information use. The findings from interviews with information providers indicated that the low literacy level of farmers was the main barrier to information use. This indicates that farmers need knowledge to enable their effective usage of information. Imparting the needed knowledge to farmers can be achieved through seminars, training and demonstration. Therefore, information providers need to consider having more seminars, training courses and demonstrations in order to increase farmers' skills on how to apply the information that they receive. This is supported by Opara (2010), who emphasised that education gives an individual the ability to seek and apply information.

The need for training and demonstration was also highlighted by some of the farmers in the surveyed communities, as clarified in the typical responses from the focus group discussions. One of the farmers stated that:

“..... They only give us information, but we don't know how to use it. For instance, I read a poster on vaccination of poultry against Newcastle Disease. I buy the drug, vaccinate the poultry,

and they die. They should demonstrate to us how to do it, when to do it, and how often we should do it”.

Thus, training of farmers is an important issue to be considered for the effective utilisation of poultry management information in the surveyed communities.

Furthermore, the study findings indicate that poverty among the rural population had a great influence on the way in which farmers utilised poultry management information. The findings revealed that poor economic status and the high cost of applying the suggested farming practices were among the most cited barriers to information use. This is an indication that poverty has an effect on information use. Similarly, Opara (2010) cited poverty as one of the main variables hindering information use. Daudu, Chado & Igbashal (2009) reported that financial difficulty was the major constraint to farmers’ use of information in Benue State, Nigeria. Thus, there is a need to find ways to make information services and agricultural inputs more affordable to farmers. This can be achieved through government subsidisation of agricultural inputs and all the information products distributed to the rural areas. Availability of farming inputs such as poultry vaccines at a subsidised price could enhance the use of poultry management information in the surveyed rural communities. However, eradicating poverty in rural areas is the only permanent solution.

6.7.3 Factors that promote farmers’ access to poultry management information

The findings show that convenience (262, 73.8%) and availability (245, 69%) of information were the main factors that encouraged farmers to access poultry management information. Other factors were the reliability of the information source, affordable cost of accessing information, influence from fellow farmers, familiarity with the information source, skills in using the information source, need-oriented information, training and seminars, and organised farmers’ groups (See Section 5.8.3). Both the findings from focus group discussions and semi-structured interviews confirmed that the availability of information was the most important factor motivating farmers to access information. It is apparent from the study findings that the availability of affordable information that is disseminated via media and in formats that farmers can understand may improve farmers’ access to poultry management information. It is also evident that the qualities of an information source have a great influence on farmers’ access to

information. This is obvious from the factors that are directly related to information source characteristics. Factors such as convenience of the source, reliability of the source, familiarity with the source, skills in using the source, and affordable cost are directly related to information source qualities. These findings are in line with those of Meyer (2005), who stressed that information will remain inaccessible if the information source used is unfamiliar to the intended beneficiaries. Therefore, the information providers should disseminate information using the information sources with which the intended users are familiar.

It is therefore important for information dissemination services to consider the assessment of potential information users before information provision takes place. Knowledge about potential information users is vital for planning the appropriate information sources to use. For instance, Meyer (2005) asserts that information in digital or written format may be inaccessible to rural people because they are not familiar with the source. In this case, they may prefer to access the information that is delivered through face-to-face communication because they are used to their oral tradition. Thus, a proper understanding of the farmers' situation in the rural community should be a prerequisite for information provision in rural areas of Tanzania. In such a case, information should be repackaged according to the needs of a particular situation, in order to make it more accessible for the target group.

6.7.4 Factors that promote farmers' use of poultry management information

The study findings indicate that organised farmers' groups (241, 67.7%) and reliable information (179, 50.3%) were the main factors that encouraged poultry farmers to use information. Other factors included the availability of assistance from experts, an information format that is easy to understand, affordable inputs, and availability of drugs. Findings from the focus group discussions were somehow different. These findings indicated that the availability of assistance from experts was the main factor for promoting the use of poultry management information. Other factors were reliable information, assistance from village leaders, training, and organised farmers' groups (See Section 5.8.4).

The findings from semi-structured interviews were also slightly different. Farmers' educational level was the main factor, followed by organised farmers' groups and other factors, as indicated

in Section 5.8.4. Overall, the findings indicate that assistance from experts, organised farmers' groups, affordable inputs, training, seminars and demonstrations were the important factors that positively influence the use of poultry management information. The study findings are slightly similar to those of Olaniyi and Adewale (2012), who observed that farmers' membership of social organisations, contact with extension agents, and availability of information had a positive influence on the utilisation of agricultural information. If these factors are taken into consideration during planning and dissemination of information to the rural communities, there is a possibility of improved information utilisation by farmers. There is therefore a need for information providers to consider the factors that have positive impact on information usage when planning for the dissemination of poultry management information.

6.8 Summary

Chapter Six presented the interpretation of the research findings. In interpreting the research findings, an attempt was made to show how this study's findings support or differ from the previous studies on farmers' information needs and information seeking behaviours, preference of information sources, effectiveness of information sources, and factors influencing farmers' access and use of information in rural areas of developing countries. This chapter discussed the findings of the five study objectives presented in Section 1.5. The sixth objective is covered in Chapter Seven.

Based on the study findings, Chapter Six established that poultry farmers have unmet information needs. The main information needs identified were poultry disease control, poultry protection, and shelter for poultry. It was also noted that very few information providers considered and prioritised farmers' information needs in the planning for and delivery of information to the rural communities. The extension officers were the only information providers who prioritised farmers' information needs. The main sources of information used by farmers were family, friends, neighbours, extension officers, researchers, and radio. The most accessed types of information were poultry disease control, poultry protection, breeds and breeding, and feeding and nutrition.

The majority of farmers utilised poultry management information, and managed to solve problems and improve poultry production. However, less than half of the surveyed farmers failed to utilise the information. Constraints to information use included the unavailability of the extension officer for consultation, inadequate knowledge on how to use the information, and high cost of implementing the recommended practices. Furthermore, most of the farmers were dissatisfied with information dissemination services. The main reasons for their dissatisfaction were inadequate information services from extension officers, lack of reliable sources of information, lack of awareness on the availability of information, and unavailability of the extension officers.

The study established that farmers have preferences in terms of information sources. The main information sources preferred were extension officers, and family, friends and neighbours. It was also noted that there was a very low preference for modern ICTs as sources of poultry management information. Cell phones were the least preferred, while the Internet and television were not preferred at all. There were variations in terms of preference for print sources of information, whereby farmers indicated a high preference for books, leaflets and posters, but a low preference for newspapers. The main criteria used by farmers for the preference of information sources were the availability and convenience of the information source.

The most effective information sources were extension officers, family, friends and neighbours. However, researchers were cited as the second most effective information source in Mvomero district. Furthermore, extension officers, meetings, researchers, family, friends and neighbours were the most appropriate sources of information. The key factors that influenced farmers' view of an information source as effective were the convenience, availability, and reliability of an information source.

The factors that influence access and use of poultry management information were identified. Unavailability of the extension officers and lack of awareness were the main factors that inhibited farmers from accessing information. Limited assistance from experts and lack of skills on how to use the information were the major hindrances to farmers' use of information. The convenience and availability of information were important factors that encouraged farmers to

access poultry management information. Assistance from experts, organised farmers' groups, affordable inputs, training, seminars and demonstrations were the key factors encouraging poultry farmers to use information.

Based on the findings, it was evident that the effectiveness of rural information services depends on: the planning for and delivery of information that will satisfy farmers' information needs and take into account farmers' preference of information sources; easy accessibility of information; adequate awareness of information; affordable information services; and effective communication with the target community.

Chapter Seven presents a summary of the research findings, as well as the conclusion and recommendations. A new model for effective dissemination of poultry management information in rural areas is also proposed.

CHAPTER SEVEN: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter presents a summary of the research findings. It provides conclusions and recommendations based on the study findings. Recommendations regarding a model that could be used for dissemination of poultry management information are presented in relation to the sixth objective of the study. The chapter also suggests areas for further research and highlights the significance and contributions of the study.

7.2 Summary of the research findings

This section presents a summary of the research findings based on the study objectives that were presented in section 1.5.1.

7.2.1 Characteristics of the respondents

- The majority of the poultry farmers were between the ages of 18 and 57 years. Younger and older people were not actively involved in poultry farming.
- More men than women participated in the study.
- The majority of the poultry farmers were literate, in the sense that they were able to read and write. More men were literate than women. A few farmers were illiterate, especially women.
- Most of the poultry farmers were involved with mixed farming, practising both crop farming and livestock keeping. A few farmers practised livestock keeping and small business.
- All of the farming activities in the surveyed communities were carried out at a subsistence level.

7.2.2 Information needs of farmers

- The majority of the respondents had information needs related to poultry management.
- Poultry farmers specifically needed information on poultry disease control, poultry protection, shelter for poultry and poultry production.

- The information needs were specific to locations, depending on various factors such as level of development, social settings, distance from urban areas, and presence or absence of active information providers.
- There were slight differences in information needs according to gender.
- There was a very low identification and prioritisation of farmers' information needs by the information providers in the surveyed communities.
- Extension officers were the only information providers who prioritised farmers' information needs in the surveyed communities.
- Visits to farmers' households, village meetings, school meetings, farmers' groups, and seminars were the strategies used for identification and prioritisation of farmers' information needs.
- Inadequate resources, unfavourable working conditions, lack of facilities, and inadequate support from the government were the factors that hindered information providers from identifying and prioritising farmers' information needs.

7.2.3 Information seeking behaviours of farmers

- Most of the respondents had tried to find information to solve the problems related to poultry management.
- Slightly more than half of the respondents managed to get poultry management information.
- Poultry disease control, poultry protection, breeds and breeding, and feeding and nutrition were the most frequently accessed types of information.
- There was limited access to information on poultry shelter, poultry production, and poultry hatching.
- Farmers accessed poultry management information mainly from family, friends, neighbours, extension officers, researchers and radio.
- Print sources of information (books, leaflets, posters and newspapers) were sparingly used, and modern information sources (cell phones, the Internet, and television) were the least used.
- There were variations in terms of the information sources according to educational level. Farmers with a higher education level (secondary education and beyond) utilised printed

sources, while farmers with limited education (primary education, informal education and illiterate) relied on interpersonal sources.

7.2.4 Use of poultry management information

- More than half of the respondents used the poultry management information that they accessed, and most of the farmers managed to solve the problems that they were facing.
- Information on poultry disease control was the most used, followed by poultry protection and markets.
- Most of the information providers had no strategies for making follow-ups on the usage of information.
- Face-to-face communication was the main method used by information providers to make follow-ups on the usage of information in the surveyed rural communities.
- There were variations in the use of information according to educational level. The majority of farmers who used information had primary and secondary education.

7.2.5 Farmers' satisfaction with information dissemination services

- Most of the farmers were not satisfied with the information dissemination services.
- Inadequate information services from extension officers, lack of reliable sources of information, lack of awareness of the availability of information, and unavailability of the extension officers were the main reasons for dissatisfaction.
- Most of the information providers admitted that information dissemination services did not satisfy farmers' needs.
- Poor infrastructure, poor facilities, limited transport services, lack of funds, insufficient number of extension officers, and a difficult geographical infrastructure were the main constraints to effective dissemination of poultry management information in the surveyed communities.

7.2.6 Preference of information sources

- Poultry farmers had preferences for information sources.

- Most of the poultry farmers preferred interpersonal and informal sources to formal sources of information.
- Extension officers, family, friends and neighbours were the most preferred sources of information, followed by radio and researchers. Internet, television, drama and films were not preferred.
- There was a very low preference for the modern ICTs as sources of poultry management information. Cell phones were least preferred, while the Internet and television were not preferred.
- There were variations in terms of the preference for print sources of information. Farmers indicated a greater preference for books, leaflets and posters, but a low preference for newspapers.
- There were slight variations in the preference for information sources according to gender. Women preferred information sources that are more entertaining, while men preferred written and more informative information sources.
- Availability and convenience of the information source were the major criteria for preference of information sources.

7.2.7 Effectiveness of information sources

- The extension officers were considered to be the most effective information source.
- There were variations in terms of the information sources considered to be most effective across the three districts. Family, friends and neighbours were the second most effective source of information in Iringa rural and Morogoro rural, while in Mvomero, researchers were the second most effective source of information.
- Generally, the extension officers, meetings, researchers, family, friends and neighbours were considered to be the most effective sources of information. The Internet, television and films were not considered to be effective sources.
- Convenience, availability and reliability of an information source were the major determinants of the effectiveness of information sources.

7.2.8 Factors that hinder access and use of poultry management information

- Unavailability of extension officers, lack of awareness, unavailability of information, lack of electricity, and poor infrastructure were the major barriers to farmers accessing poultry management information. Other factors were: limited literacy levels, long distances, lack of cooperation among farmers, limited transport services, unreliable information sources, and poor economic status.
- Limited assistance from experts, lack of skills in how to use the information, limited literacy levels, and unreliable information were the main factors that hindered farmers from using poultry management information. Other factors were poor economic status, lack of cooperation among farmers, expensive inputs, and unavailability of poultry treatment drugs in the community.

7.2.9 Factors that promote access and use of poultry management information

- 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. Other factors were familiarity with the information source, skills in using the information source, needs-oriented information, training and seminars, and organised farmers' groups.
- Assistance from experts, organised farmers' groups, affordable inputs, and awareness of the benefits of information usage were the major factors that encouraged farmers to use poultry management information. Other factors were reliable information, meetings, trainings, seminars, demonstrations, and availability of poultry treatment drugs.

7.3 Conclusions

This section presents the conclusions based on the research findings. The conclusions return to the research questions and determine the implications of the study findings (Bryman, 2004). An attempt was made to link the research findings to the meanings that can be attached to them. The conclusions were guided by the themes drawn from the research questions presented in Appendix 1.

7.3.1 Information needs of farmers

The study findings on the information needs of poultry farmers indicated that farmers in the surveyed communities had unmet information needs. It is the conclusion of this study that most of the information providers were not aware of farmers' information needs, and as a result, they were not in a position to disseminate information that was relevant to farmers' needs. This situation was attributed to the limited identification of farmers' information needs in the surveyed communities.

The information needs of poultry farmers were location-specific due to different factors. Likewise, there were slight variations in information needs according to gender. Gender differences may be attributed to culture and traditions that attach specific responsibilities to each gender. It can be concluded that farmers' information needs were dynamic, depending on specific circumstances and the purpose for which the information was needed.

It was evident from the findings that there was very low prioritisation of farmers' information needs by the information providers, and the extension officers were the only information providers who prioritised farmers' information needs in the surveyed communities. It can be concluded that the rural information services inadequately prioritised farmers' information needs. The findings also indicated that visits to the farmers' households, village meetings, school meetings, farmers' groups and seminars were the key strategies used for the identification and prioritisation of farmers' information needs. This implies that face-to-face communication was the main method used by information providers to reach farmers in the rural areas. It is apparent that farmers are more likely to understand the information disseminated through oral communication because of the oral culture prevailing in most rural areas of developing countries.

Furthermore, the findings indicated that inadequate resources, unfavourable working conditions, lack of facilities and inadequate support from the government hindered information providers from identifying and prioritising farmers' information needs. It is concluded that information providers in the surveyed communities were inadequately equipped to perform their responsibilities effectively and professionally. Without proper resources and support,

information providers cannot undertake the identification and prioritisation of farmers' information needs.

7.3.2 Information seeking behaviours of farmers

The study findings showed that most of the respondents had tried to find information to solve their problems, and slightly more than half of the respondents managed to get the information. The findings suggest that farmers are able to identify a problem situation and take a further step to find information for solving these problems. It is thus important for information providers to ensure that adequate and useful information is accessible to farmers.

The findings also indicated that information on poultry disease control, poultry protection, breeds and breeding, and feeding and nutrition were the most accessed types of information. There was limited access to information on poultry shelter, poultry production, and poultry hatching. The implication is that farmers tend to access information that has a direct impact on their farming activities. It is therefore important for information providers to disseminate information that is context-specific.

The study findings revealed that farmers accessed poultry management information mainly from family, friends, neighbours, extension officers, researchers and radio. Farmers sparingly used print sources of information (books, leaflets, posters and newspapers) and modern information technologies (cell phones, Internet and television). The findings suggest that poultry farmers relied on face-to-face communication for accessing poultry management information. It is concluded that farmers in rural areas are used to their oral culture, and will therefore probably continue to depend on interpersonal sources of information, regardless of the availability of formal channels and modern technologies.

Furthermore, the findings indicated that there were variations in terms of the information sources used across different educational levels. Farmers with a higher education level (secondary education and beyond) utilised printed sources, while farmers with limited education (primary education, informal education and illiterate) relied on interpersonal sources. The implication is that farmers with higher education levels tend to use sources that are more informative, probably

because they understand the benefits of using such sources and are able to comprehend the contents. The study concludes that educational levels of farmers have an influence on farmers' choice of information sources, and may therefore lead to different patterns of seeking information.

7.3.3 Use of poultry management information

The findings indicated that more than half of the respondents used the poultry management information they accessed, and most of the farmers managed to solve the problems they were facing. Information on disease control, poultry protection, and markets were the most used, while information on production and hatching were the least used. The findings suggest that farmers tended to use information that had a direct impact on their farming activities, and if not applied, consequences could immediately follow. The high use of information on disease control and protection explains the need to ensure that poultry are healthy and protected, while markets bring monetary gain. The low use of information on production and hatching indicates a lack of knowledge regarding the benefits of applying such information. The study concludes that farmers in the surveyed communities were ignorant about the benefits of applying poultry management information. It is therefore important for farmers to be well informed of the benefits of applying information for effective poultry management.

The findings established that most of the information providers had no strategies for making follow-ups on the usage of information. These findings indicate that information providers were disseminating information without making follow-ups on information usage. It is concluded that information providers inadequately supported farmers in the use of the information that they accessed. This calls for agents responsible for information provision to devise follow-up strategies to ensure that farmers are able to use the information that they access. The findings also indicated that face-to-face communication was the main method used by information providers to make follow-ups on the usage of information in the surveyed rural communities. Thus, not only did farmers prefer face-to-face communication, but the information providers also relied on oral communication. The implication is that oral communication appears to be the preferred channel for delivery of information in rural areas. It is concluded that face-to-face

communication remains the most appropriate method for delivery of poultry management information in rural areas of developing countries.

There were variations in the use of information across different educational levels. The majority of farmers who used information had primary and secondary education. The findings suggest that the use of information is dependent on the educational level of farmers. It is concluded that farmers' education level has an influence on the use of information. It is thus important for information services to take the various educational levels of farmers in the rural communities into consideration. This may entail delivering information messages in various formats, in order to accommodate farmers with different educational levels.

7.3.4 Farmers' satisfaction with information dissemination services

The findings established that most farmers were not satisfied with the information dissemination services. Inadequate information services from extension officers, lack of reliable sources of information, lack of awareness of the availability of information, and unavailability of the extension officers were the main reasons for dissatisfaction. The implication is that, farmers' information needs were not met, which led to dissatisfaction with the information services. The findings suggest that the existing information services provided information that was not perceived as useful by the farmers. It is concluded that information services in the surveyed communities were inadequate. It is thus important to devise strategies for delivery of information services that will satisfy farmers' needs and eliminate the barriers to farmers' satisfaction.

Most of the information providers admitted that information dissemination services did not satisfy farmers' needs. Poor infrastructure, poor facilities, limited transport services, lack of funds, insufficient number of extension officers, and a difficult geographical infrastructure were the main barriers to effective dissemination of poultry management information in the surveyed communities. The findings indicate that information providers were faced with obstacles that limited the effective dissemination of poultry management information. The study concludes that there is a need to identify the constraints to effective rural information services and eliminate them, in order to enable the smooth delivery of information to the rural communities.

7.3.5 Preference of information sources

The study findings showed that most of the poultry farmers preferred interpersonal and informal sources to formal sources of information. Extension officers, family, friends and neighbours were the most preferred sources of information, followed by radio and researchers. Internet, television, drama and films were not preferred at all. The findings suggest that farmers in the surveyed communities preferred listening and talking, rather than reading. Furthermore, farmers preferred to use information sources that were local, informal and easily accessible. This study concludes that farmers preferred information sources that were conveniently accessible and allowed for interpersonal interaction.

There was very low preference for the modern ICTs as sources of poultry management information. Cell phones were the least preferred, while Internet and television were not preferred. The findings indicate that despite the availability of modern ICTs in rural areas, farmers do not consider them to be effective sources for poultry management information. The study concludes that rural farmers will continue to rely on interpersonal and informal sources of information, regardless of the availability of modern ICTs in the rural areas.

The findings revealed slight variations in terms of preference for information sources according to gender. Women preferred information sources that were more entertaining, while men preferred written and more informative information sources. These findings may be a reflection of the gendered nature of responsibilities in rural societies. Most of the time, women in rural areas are faced with a lot of responsibilities, and hardly have time to relax. Thus, they would prefer information sources that do not require effort and are entertaining. The findings suggest that information provision services should consider gender differences, so that women are not left behind. The study concludes that there are gender differences in terms of the preference for information sources in rural areas.

The findings demonstrated that the availability and convenience of the information source were the major criteria for preference of information sources, followed by reliability of the source, skills in using the source, cost, and influences from friends. Thus, all these factors contributed to farmers' preference of information sources. The findings suggest that farmers prefer information

sources that are easily accessible and regarded as trustworthy. It is thus important for information providers to ensure that information sources offer effective and consistent service.

7.3.6 Effectiveness of information sources

The findings indicated that the extension officers were considered to be the most effective information source, followed by family, friends, neighbours, radio and leaflets. The Internet, television and films were considered to be ineffective sources. The findings suggest that oral communication channels were regarded as the most effective sources for the delivery of poultry management information. The study concludes that interpersonal sources remain the most effective sources for delivery of agriculture-related information in the rural areas.

There were variations in terms of the information source considered to be most effective across the three districts. Family, friends and neighbours were the second most effective source of information in Iringa rural and Morogoro rural, while in Mvomero, researchers were the second most effective source of information. As discussed in Section 6.6, the findings suggest that information sources that are constantly accessible to farmers are the ones considered to be most effective. It is concluded that constant availability of an information source in the local community increases its popularity, and as a result, farmers may regard it as an effective source.

The extension officers, meetings, researchers, family, friends, and neighbours were considered to be the most effective sources of information. The Internet, television and films were not considered to be effective sources. The findings suggest a significant reliance on face-to-face interactions in the rural communities. This situation may be as a result of the oral culture that dominates the rural communities, coupled with limited literacy among rural farmers. The study concludes that oral communication channels are the most effective information sources for reaching most of the rural population.

The findings revealed that the convenience, availability and reliability of an information source were the major determinants of the effectiveness of information sources. Thus, in order for an information source to be considered effective, it has to be continuously available, convenient to access and trustworthy. The study concludes that information sources need to be consistently

available, conveniently accessible and trusted by farmers, in order to provide effective information services.

7.3.7 Factors that hinder access and use of poultry management information

The findings established that unavailability of the extension officers, lack of awareness, unavailability of information, lack of electricity, poor infrastructure, and limited literacy were the major barriers to farmers accessing poultry management information. The study concludes that problems related to infrastructure, knowledge, culture and funds were the main factors hindering farmers from accessing poultry management information.

The main barriers to farmers' use of poultry management information were related to limited assistance from experts, lack of skills in how to use the information, limited literacy levels, and unreliable information. The study concludes that farmers face various challenges in using poultry management information, which are mostly related to poverty, ignorance and limited literacy.

7.3.8 Factors that promote access and use of poultry management information

The findings indicated that availability of information, convenience and reliability of the information source, affordable information, and skills in using the information source were the main factors that motivated farmers to access poultry management information. It is concluded that issues related to qualities of an information source, skills and financial and physical resources were the key factors that motivate farmers to access poultry management information.

The main factors which motivated farmers to use poultry management information were assistance from experts, organised farmers' groups, affordable inputs, and awareness of the benefits of information use. The study concludes that issues related to knowledge and poultry inputs need to be taken into consideration in order to achieve effective information usage in the rural communities.

7.4 Recommendations

This section presents the author's views regarding what should be done in order to improve the situation in the study areas and beyond. The study identified a number of issues which affect access and use of poultry management information in the surveyed rural communities. Thus, the study makes recommendations to address the issues identified, in order to improve access and use of poultry management information in rural areas. The recommendations address each of the research questions presented in Appendix 1.

7.4.1 Information needs of farmers

The findings showed that farmers had information needs related to poultry management, and that the needs were specific to locations. There was very low identification and prioritisation of farmers' information needs. This study recommends that information providers conduct regular assessments of information needs, and ensure that the information disseminated takes farmers' needs into consideration. Likewise, they should devise better strategies for identification and prioritisation of farmers' information needs. Furthermore, it was found that the extension officers were the only information providers who prioritised farmers' information needs. In view of this, the study recommends that all the information providers consider the prioritisation of farmers' information needs as the key aspect of information dissemination. It is further recommended that extension officers be updated regularly to ensure that they communicate relevant and up-to-date information to farmers.

The findings indicated that information providers faced various challenges, which hindered them from identifying and prioritising farmers' information needs. The challenges were related to facilities, resources and government support. The study recommends that the government and other responsible actors create conducive environment for information providers to conduct the assessment of information needs and to prioritise the identified needs.

The findings also showed that the information needs were specific to locations. Various factors such as level of development, social setting, distance from urban areas, and presence or absence of active information providers may influence farmers' information needs. It is recommended

that agencies responsible for information dissemination provide unique attention to each target group of information beneficiaries with a focus on their identified information needs. In this way, farmers from different locations will be able to access information services which are context-specific.

7.4.2 Information seeking behaviours of farmers

The findings showed that farmers were able to identify a problem situation and find solutions by seeking information. It is recommended that the information providers ensure that adequate and useful information is accessible to farmers, so that they can easily access it when the need arises. The findings further indicated that farmers accessed information that had a direct impact on their farming activities. Information on poultry disease control and poultry protection were the most accessed types of information. It is recommended that information providers disseminate information that is context-specific.

The findings revealed that farmers relied on face-to-face communication for accessing poultry management information. Since the availability of an information source was found to be a contributing factor for source preference, it is implied that there was limited availability of other sources, such as print and ICT sources. The study recommends that multiple sources of information be used to disseminate information to the rural areas, in order to support and complement interpersonal information sources. The responsible actors should create awareness of the available information sources. Equally important, the availability of multiple sources will accommodate farmers with different educational levels. In addition, information should be repackaged into the formats that are most appropriate for the target community.

7.4.3 Use of poultry management information

The findings revealed that farmers used information which had a direct impact on their farming activities. They used information on disease control and protection, in order to ensure poultry health and protection, and information on markets for monetary gain. The limited use of other types of information implied lack of knowledge regarding the benefits of applying such types of information. The study recommends that information providers conduct regular training on the

benefits of applying poultry management information. They should also devise better strategies for informing farmers about the benefits of information usage, such as farmers' field schools.

The findings established that information providers inadequately supported farmers in terms of the usage of the information that they accessed. Most of the information providers disseminated information without making follow-ups on the usage. It is recommended that agents responsible for information provision devise follow-up strategies to ensure that farmers are able to use the information. Furthermore, the findings showed that face-to-face communication was the main method used by information providers to make follow-ups on the usage of information. Although oral communication seems to be popular in rural areas, the study recommends the use of a variety of channels to complement each other. For instance, print media could be used to supplement oral messages communicated during meetings or demonstrations. It is also recommended that information providers deliver information in a variety of formats, in order to accommodate various educational levels of farmers. The findings indicated that the use of information was dependent on the educational level of farmers. Thus, delivery of information in a variety of formats would enable all categories of farmers to understand the message and use the information.

7.4.4 Farmers' satisfaction with information dissemination services

Despite the fact that farmers accessed and used poultry management information, most of them were not satisfied with the information dissemination services. Several issues were cited as reasons for their dissatisfaction. It was evident from the findings that information providers faced obstacles that limited the effective dissemination of poultry management information. The obstacles included poor facilities, limited transport services, lack of funds, insufficient number of extension officers, and a difficult geographical infrastructure. The study recommends that the government and other responsible institutions identify the constraints to effective rural information services and minimise them, in order to enable the smooth delivery of information to the rural communities. Furthermore, the government should increase the number of extension officers, and equip them with adequate resources and facilities for performing their duties.

7.4.5 Preference of information sources

The findings revealed that poultry farmers preferred interpersonal and informal sources of information. They preferred to use information sources that were local, informal, accessible, and which allowed for interpersonal interaction. It is recommended that information dissemination through face-to-face interaction between individual farmers and groups of farmers be encouraged. This may involve demonstrations, meetings, seminars and discussion groups. It is important for the information providers to organise and facilitate these sessions, in order to ensure that relevant information is communicated and shared among farmers.

It was established that there were gender differences in terms of preference of information sources. Women preferred information sources that are entertaining, while men preferred written and more informative information sources. The study recommends that information providers consider gender differences in planning and implementation of information dissemination in the rural areas. The findings also indicated that the availability and convenience of the information source were the major criteria for preference of information sources. This implies that farmers preferred information sources that were easy to access and considered to be trustworthy. It is recommended that agents responsible for information dissemination ensure that the information sources offer effective and consistent services.

7.4.6 Effectiveness of information sources

The findings indicated that oral communication channels were the most effective sources for the delivery of poultry management information. Farmers in the surveyed rural communities depended largely on face-to-face interactions, which explains their choice of effective sources of information. Similarly, it was revealed that interpersonal sources were the most appropriate sources. Furthermore, the major determinants of the effectiveness of information sources were the convenience, availability and reliability of an information source. In view of this, the study recommends that information providers ensure that information sources are easily accessible, constantly available and trustworthy. Equally important, the continuous availability of an information source in a local community may increase its acceptance, which will result in it being considered an effective source (See section 6.6).

7.4.7 Factors that hinder access and use of poultry management information

The findings showed that farmers faced various barriers in terms of accessing and using poultry management information. These barriers were related to infrastructure, culture, resources and ignorance. This study recommends that all the barriers to information access be eliminated, in order to improve farmers' access to information. To achieve information access without barriers, several suggestions are presented below.

The findings established that the rural communities lacked basic infrastructures such as electricity, telecommunications, utilities, roads and transportation. Rural infrastructure is vital for the delivery of information services to the rural communities. Thus, a reliable infrastructure is a prerequisite for successful information services in rural areas. In view of this, the study recommends that the government and other responsible institutions give priority to improving electrification, telecommunications, roads and transport in the rural areas. Government and local leaders should collaborate with farmers to design affordable services for rural communities, such as building community libraries.

The findings also showed that traditional culture hindered farmers from accessing and sharing information. For instance, their oral culture hindered farmers from accessing printed information. Similarly, there was lack of an information-sharing culture among farmers. The study recommends that information providers devise strategies to promote the culture of reading and information sharing. This may entail creating activities which cultivate the reading habit in the communities, such as reading competitions and campaigns. Furthermore, organising farmers' groups and discussion groups may foster an information-sharing culture among the farmers. The presence of dedicated reading centres such as community libraries will also serve the purpose of encouraging a reading culture.

The findings indicated that farmers lacked various resources to facilitate access and use of poultry management information. Farmers needed financial and physical resources for accessing and using information. For instance, farmers needed television, radio and cell phones in order to access information disseminated through these media. They also needed money to use or act on the information. Lack of these resources hindered them from accessing and using information. It

is recommended that the government subsidise the resources which are needed for effective functioning of the information system in rural areas.

Ignorance was one of the issues which hindered farmers' access and use of poultry management information. The findings indicated that limited literacy, lack of awareness, and lack of skills were factors that hindered access and use of information. The study recommends that capacity building be the priority of the government, local authorities and other responsible institutions. This should involve providing training for farmers, as well as information providers. The training programmes for farmers should be geared towards imparting knowledge and skills for accessing and using information. The training programmes for information providers should focus on improving and updating their information provision skills. These programmes should be continuous, in order to strengthen and update the knowledge base of both farmers and information providers in rural areas.

7.4.8 Factors that promote access and use of poultry management information

The findings indicated that several factors motivated farmers to access and use poultry management information. The factors were linked to qualities of an information source, skills, financial and physical resources, capacity building, and poultry inputs. It is recommended that the government and other responsible agents consider all the identified factors during the planning and implementation of information dissemination. Furthermore, it is suggested that different actors should collaborate to ensure that sufficient attention is given to each of the elements which enhance access and use of poultry management information. This requires the government, private institutions, information providers and village leaders playing a key role in this aspect. All actors responsible for information provision should ensure that the information sources used are of good quality, capacity building programmes are designed and implemented, poultry inputs are affordable, and information resources are available.

7.5 A proposed model for dissemination of poultry management information in rural areas

A model is a simplified representation of a real situation, which includes the main features of the real situation that it represents (Kousoyiannis, 1979). The sixth objective of this study was to

recommend a model that can be used for dissemination of poultry management information in rural areas. This section presents a proposed model for effective dissemination of poultry management information in rural areas.

The proposed model is based on the study findings and the theoretical framework that guided this study, as presented in Section 3.4. The models which guided this study provide valuable factors in relation to access and use of information. The DeLone and McLean's model (DMM) of Information Systems Success represented the poultry information dissemination success concept, which is the focus of this section. The quadratic usage framework (QUF) was used to explain the factors that underlie the acceptance and usage of an information system.

The concepts of DMM and QUF can be adapted in order to build a framework that can guide the dissemination of information in local communities. In this regard, the proposed model draws largely on the ideas extracted from the DMM and QUF. The proposed model is presented in Figure 22 below. The model provides a basis for understanding various aspects which contribute to effective information dissemination in the local context. The proposed model combines the ideas from the DMM, QUF and the study findings, in order to develop a framework that focuses on farmers in a rural setting. The model may be useful in planning for information dissemination services to rural areas or during the assessment of the existing information services in rural areas.

The model proposes that information dissemination initiatives focus on the target community or intended beneficiaries. The focus should be on the community of beneficiaries, rather than on the information alone. Thus, the information providers should make it a priority to understand the target community before embarking on information dissemination activities. This may entail assessing their information needs, how they seek information, information sources that they prefer, and other factors which may contribute to information access and usage. The findings of this study showed that it is important to understand the target community in advance, in order to have successful information services. Adequate understanding of the local community provides guidance on the information source to use, and the formats and type of information to disseminate, depending on farmers' requirements. This may necessitate the repackaging of information messages in order to reach the intended group.

The study findings revealed that farmers in rural areas have limited education and lack various basic services. Thus, they may not be able to use print media, electronic resources and other formal sources of information. The proposed model is designed to accommodate the demographic and socio-economic factors that may influence the process of information seeking. For instance, the illiteracy or limited education of the rural farmers has a significant influence on farmers' information seeking habits, as evidenced by the study findings. In the review of information seeking models, Aina (2004) noted that these models did not take the education of users into account. The failure to take these factors into account during information dissemination may affect farmers' information access, which means that information will not reach the target beneficiaries. The need to have a model that addresses the educational background of farmers is thus important for effective dissemination of information in semi-literate rural communities.

Furthermore, a decision regarding which information sources to consult depends on demographic and socio-economic factors. The study findings showed that farmers preferred to access poultry management information through face-to-face communication. They preferred consulting family, friends, neighbours and information providers. In such a situation, individual and collective interactions within the local community would be the appropriate means to reach the majority of the target beneficiaries. However, the use of other media to complement the messages communicated orally would increase the reach to other members of the community, who may not be interested in face-to-face communication. Availability of other sources of information, apart from the oral sources, will also serve as a validation mechanism for orally delivered information. Thus, the proposed model suggests that the focus should not be just on interpersonal sources, but also on other sources that are deemed to be appropriate by the target community. For instance, radio was found to be among the most appropriate sources for the rural community, and it could therefore serve as a supplementary source to the oral communication.

In order for the information to be used, the content should be relevant to the farmers' needs and the formats should be easy to understand. The study findings established that farmers tended to use information that had a direct impact on their farming activities, and preferred to use fellow farmers as sources, because of the convenience of engaging in two-way communication which is

easier to understand than reading or watching. The proposed model suggests that the information disseminated to the rural areas should comprise local content and be context-specific. Farmers in the local communities will be motivated to use information that has a local content and fits within their prevailing circumstances. The usage of such types of information can easily result in the satisfaction of farmers' needs, which is the ultimate goal of disseminating information to the rural communities. Since farmers are likely to use information that has immediate benefits, the outcome of information usage may result in further usage because of the realised benefits. Thus, if relevant information is disseminated to the rural communities, farmers will be motivated to use the information because of the benefits that they achieve after information usage. Figure 22 below presents the proposed model for the dissemination of poultry management information in the rural areas.

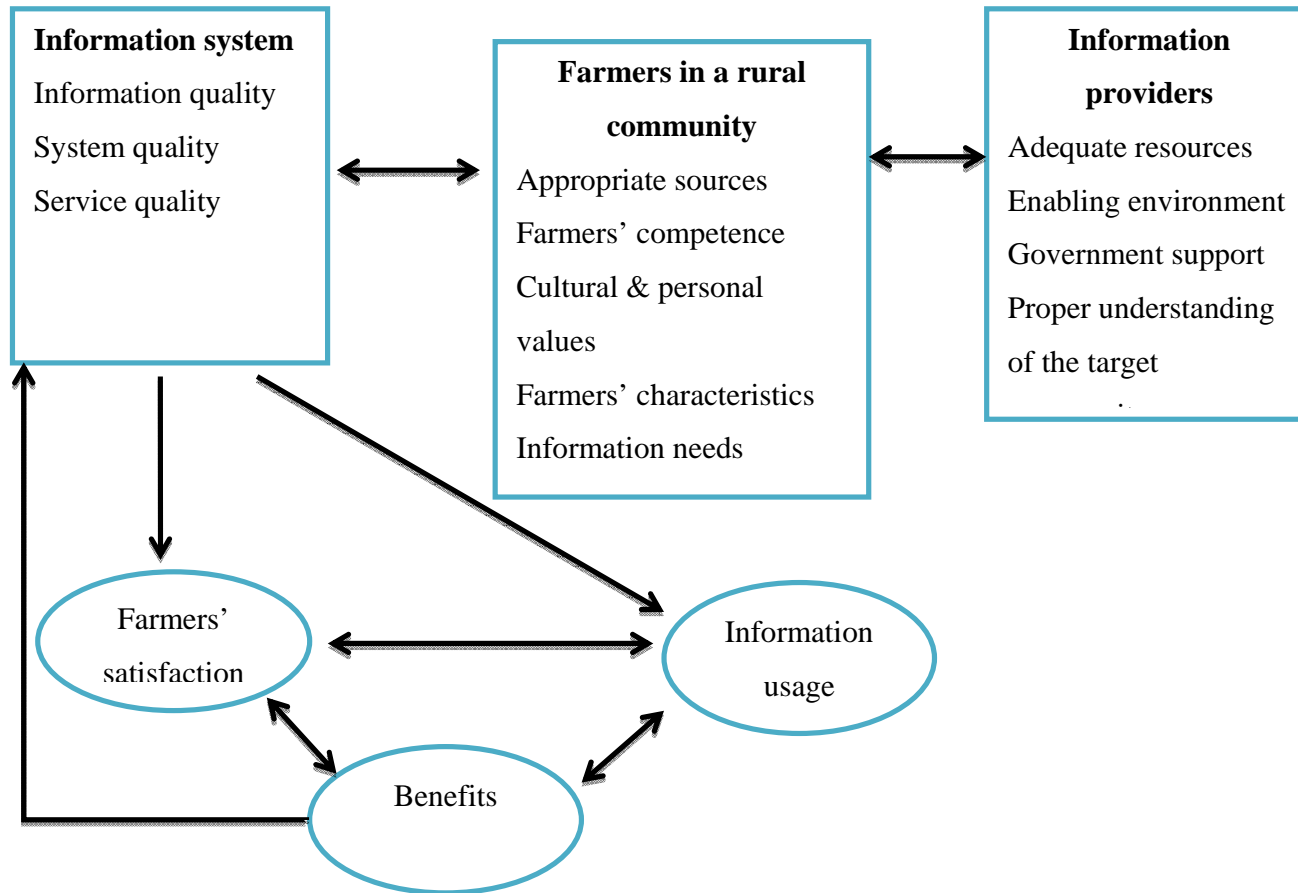


Figure 22: A proposed model for dissemination of poultry management information in rural areas

The proposed model has six interrelated components for effective information dissemination: farmers in the rural community, information providers, the information system, farmers' satisfaction, information usage, and benefits. Each component requires important elements for successful information dissemination. The key elements to be considered are farmers' information needs; appropriate information sources; farmers' competence; cultural and personal values; farmers' characteristics; and information seeking patterns. In order for the information providers to accomplish their work effectively, several factors need to be taken into consideration. These include adequate resources; an enabling environment; support from the government; and proper understanding of the target community. The information system should be designed with the target rural community in mind. The elements to be taken into account in designing the information system include: information quality, system quality, and service quality. The three elements of the information system may result in information usage and farmers' satisfaction. After using the information and being satisfied with the benefits, farmers may consult the information system again, in order to access more information to improve their farming activities. This will only happen if the information disseminated is relevant to farmers' needs, and if its usage thus improves poultry management and results in noticeable benefits.

7.6 Significance and contribution of the study

For a research to be significant, it should address issues which are important to a particular community or society (Wassenaar, 2006). The significance of a study is based on three major questions, as identified by Creswell (1994). These questions are as follows: why and how the study adds to the scholarly research and literature in the field; how the study helps to improve practice; and why the study will improve policy making in that particular field of study. This section looks at the significance and contributions of this study.

This study is set out to investigate access and use of poultry management information in selected rural areas of Tanzania, where poultry management is an important undertaking. Studies have been conducted on access and use of agricultural information, but very little has been done specifically in relation to poultry farmers. A few studies have attempted to assess the information needs of farmers (Aina, 1991; Byamugisha, Ikoja-Odongo & Nasinyama, 2010; Chisenga, Entsua-Mensah & Sam, 2007; Kalusopa, 2005; Meitei & Devi, 2009; Ozowa, 1995a), access to

agricultural information (Adomi, Ogbomo & Inoni, 2003; Lwoga, Stilwell & Ngulube, 2011; Matthewman, Ashley & Morton, 1998) and farmers' information sources and usage (Fawole, 2008). This study complemented previous studies and added to the scholarly research and literature in the field by assessing the information needs and information seeking behaviours of farmers, and establishing the most preferred information delivery channels. It also identified the most effective information sources and the factors which influence farmers' access and use of poultry management. It went further by recommending a model for disseminating poultry management information in rural areas. Therefore, this study made an original contribution to knowledge by carrying out the most comprehensive investigation focusing on farmers.

In addition, this study showed that the use of triangulation assisted the researcher to integrate the views provided by quantitative and qualitative approaches. Although qualitative and quantitative approaches are perceived to be different, this study has demonstrated that multiple methods can be combined to provide a comprehensive understanding of the topic. Triangulation allowed for the harnessing of the strengths of both approaches, in order to obtain complete data.

It is expected that the study findings will be of importance to policy makers, agricultural specialists, researchers, librarians, extension workers, and students undertaking studies on access and use of information in rural areas of developing countries. The study can also be of value to the private sector, other information professionals and farmers in the surveyed districts and Tanzania as a whole. Furthermore, the study has recommended a model for dissemination of poultry management information in rural areas. It is hoped that such a model may provide a basis for effective delivery of agriculture-related information in rural areas of Tanzania and other developing countries.

In addition, the study is of significance because the findings have the potential to improve practice. The study has identified the information needs of farmers and the types of information that are required to satisfy farmers' needs. It has shed more light on information seeking and usage patterns, types of information used, preferred information sources, and effectiveness of information sources. The study has identified the factors that influence farmers' access and use of poultry management information. Furthermore, the study has highlighted the views of

information providers regarding various aspects related to access and usage of information, which provided a better understanding of the situation. Finally, the recommendations have pointed out immediate, short-term and long-term practices for improving access and use of information in rural communities. The study also highlighted several gaps in the existing information, which are possible areas for further research. When these leads are followed, more information will be obtained and impacts realised, thereby further contributing to what the study has already achieved. It is hoped that the findings will be used to improve information dissemination services in rural areas for the benefit of farmers.

The study was also significant because the findings have the potential to influence policy. The findings have provided guidance to policy makers, information providers, planners and local leaders on how to improve access and use of poultry management information in the rural communities of Tanzania. Thus, the study was of significance because it provided a framework for how to improve information dissemination services in rural areas of Tanzania, and elsewhere in developing countries. Specifically, the findings can contribute towards the implementation of agriculture, extension services, information services, education, and social services. For instance, the study showed that cost of inputs was one of the factors that hindered farmers' use of poultry management information. In such a situation, the priority should be to develop pro-poor policies with the purpose of making agricultural inputs affordable. As a final point, this study provided a basis for further related studies, and will serve as a reference tool for students in the field of library and information science.

7.7 Suggestions for further research

This study investigated access and use of poultry management information in three rural districts of Tanzania. As noted in Section 1.11, there are obvious limitations of this study, which provide opportunities for further investigation. The study identified several issues that require further investigation in order to provide a better understanding of the topic and more practical solutions to the issues involved. This section highlights some of the themes that require further investigation.

The study revealed that few youth were involved in farming, including poultry-raising activities. The limited number of youth participating in farming activities is a threat to the future of agriculture and rural development. Further research on information needs and information seeking behaviours of rural youth would provide an in-depth understanding of the types of information that they need and how they seek information to satisfy their needs. This knowledge will provide guidance for information providers on delivering information to this group, so that they are not left out.

The study showed that there was low usage of modern ICTs (cell phones, Internet, and television) for accessing poultry management information, despite the fact that ICTs were available in some of the communities. Further research on the challenges of using ICTs for accessing agricultural information in rural areas would provide a better understanding of the limitations that farmers encounter in terms of exploiting ICTs. This knowledge will enable the information providers to devise strategies for better utilisation of ICTs for delivery of information to the rural communities. It would also be informative to know which of the ICTs are more acceptable to farmers and what message formats are most suited to the easy access and use of poultry management information. Furthermore, the study showed that farmers relied on radio. Radio programmes can be very useful in delivering messages to remote, marginalised and unreached rural areas. It is recommended that studies be conducted to assess farmers' use of radio as a source of agricultural information, as well as the usefulness of community radio.

This study was conducted in order to investigate access and use of poultry management information in rural areas only, where the level of development is different from urban areas. It is recommended that studies be conducted in urban areas in order to understand the situation regarding access and use of poultry management information in the urban areas of Tanzania. In addition, it has been indicated in this study that oral culture dominated the rural communities and had a significant impact on farmers' access to information. Farmers preferred to use information sources that allowed for face-to-face interactions. It would therefore be worthwhile to investigate the extent to which formal information sources, including print media, could be useful for delivering information to semi-literate rural communities. It would be very informative to

determine whether or not the availability of specific information centres with formal sources of information would encourage farmers to use these sources more often.

Identification and prioritisation of farmers' information needs are essential for the effective dissemination of information. The study established that information providers inadequately identified and prioritised farmers' information needs. However, the extension officers were cited as the only information providers who prioritised farmers' information needs. It would therefore be worthwhile exploring the factors that motivate information providers to identify and prioritise farmers' information needs. This knowledge will assist the government and other actors to provide a favourable environment for information providers, so that they can successfully identify and prioritise farmers' needs.

7.8 Overall conclusion

The study established that there was limited access and use of poultry management information. This observation was supported by the findings that there were unmet information needs; inadequate access to information, low usage of information; and dissatisfaction among farmers. Farmers received most of their information orally and less so through print and formal media. In addition, farmers faced challenges in accessing and using information, while information providers encountered obstacles during the dissemination of poultry management information. To foster effective access and use of poultry management information, a number of recommendations based on the findings were presented. Furthermore, a model for dissemination of poultry management information in the rural areas was proposed. The study also identified areas for further research, as well as highlighting the significance and contributions of the study.

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APPENDICES

Appendix 1: Objectives, research questions and possible sources of data

Research Objectives	Research Questions	Questions addressing the objectives		
		Questionnaire	Focus group discussions	Interviews
To assess the information needs of poultry farmers	What are the information needs of poultry farmers?	Questions: 11, 12, 18, 19	Questions: 5, 6, 7	Questions: 13, 18, 19, 20, 21, 22, 23, 24, 25
To assess the information-seeking behaviours of poultry farmers	How do farmers access poultry management information?	Questions: 13,14, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29	Questions: 4, 8	Questions: 15, 16
	How do farmers use poultry management information?	Questions: 30, 31, 32, 33	Questions: 9	Questions: 17
	Are farmers satisfied with information dissemination?	Questions: 48, 49, 50	Questions: 10, 11	Questions: 26, 27
To establish the information sources most preferred by farmers	Which information sources are most preferred by farmers?	Questions: 40, 41, 42, 43, 44	Questions: 12, 13	Questions: 28, 29, 30, 31, 32

To assess the effectiveness of various information sources	How effective are the information sources used for delivering poultry management information?	Questions: 45, 46, 47	Questions: 14, 15, 16, 17	Questions: 33, 34, 35
To determine factors related to access and use of poultry management information in the rural communities	Which factors promote access and use of poultry management information?	Questions: 53, 54, 55, 56	Questions: 18	Questions: 39, 40
	Which factors hinder access and use of poultry management information?	Questions: 57, 58, 59	Questions: 19	Questions: 36, 37, 38
To recommend a model for dissemination of poultry management information	What recommendations can improve the dissemination of poultry management information in rural areas?	Questions: 60	Questions: 20	Questions: 41

Appendix 2: Questionnaire for farmers

Section A: Characteristics of respondent

1. Gender: 1= Female 2= Male

2. Age categories

(i) Below 18 years (iv) 38 – 47 years

(ii) 18 – 27 years (v) 48 – 57 years

(iii) 28 – 37 years (v) 58 years and above

3. Educational level

(i) Informal schooling (iv) Secondary education

(ii) Primary education (v) Illiterate

(iii) Post-secondary (please specify).....

4. Occupation:

5. Region:

6. District:

7. Division:

8. Ward:

9. Village:

10. Date:

Section B: Poultry management information

1. Information needs and information seeking behaviours

11. Have you had problems related to poultry management in your community?

1= Yes 2= No

12. If yes, what were the problems related to?

1= Diseases 2= Shelter 3= Market 4= Competition with crops

5= Feeding 6= Production 7= Protection 8= Breeds and breeding

9= Hatching 10= Other (please specify)

.....
.....

13. How did you find a solution to the problem that you were facing?

- 1= Radio 5= Television 9= Films 13= Family/friends/neighbours
2= Posters 6= Newspapers 10= Songs 14= Extension officers
3= Cell phone 7= Researchers 11= Drama 15= NGOs/CBOs
4= Leaflets 8= Internet 12= Books
16= Other (please specify)

.....
.....

14. Did you face any difficulties in finding a solution to your problem?

- (a) Yes (b) No

15. If yes, what were the difficulties?

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.....
.....

16. Have you heard of poultry management information before this interview?

- 1= Yes 2= No

17. If yes, how did you hear about it?

- 1= Radio 5= Television 9= Films 13= Family/friends/neighbours
2= Posters 6= Newspapers 10= Songs 14= Extension officers
3= Cell phone 7= Researchers 11= Drama 15= NGOs/CBOs
4= Leaflets 8= Internet 12= Books
16= Other (please specify)

.....
.....

18. Did you have any questions related to poultry management activities?

- (a) Yes (b) No

19. If yes, what were they related to?

- 1= [] Diseases 2= [] Shelter 3= [] Market 4= [] Competition with crops
 5= [] Feeding 6= [] Production 7= [] Protection 8= [] Breeds and breeding
 9= [] Hatching 10= [] Other (please specify)

.....

20. Did you try to find answers to your questions?

- (a) Yes (b) No

21. If no, what are the reasons?

.....

22. If yes, mention the sources which you used to find the answers?

- 1= [] Radio 5= [] Television 9= [] Films 13= [] Family/friends/neighbours
 2= [] Posters 6= [] Newspapers 10= [] Songs 14= [] Extension officers
 3= [] Cell phone 7= [] Researchers 11= [] Drama 15= [] NGOs/CBOs
 4= [] Leaflets 8= [] Internet 12= [] Books
 16= [] Other (please specify)

.....

23. Why did you choose to use these sources to get your answers?

- (i) Availability of the source
- (ii) Convenience of the source
- (iii) Influence from a friend
- (iv) Skills in using the source
- (v) Cheaper in terms of cost
- (vi) Reliability of the source
- (vii) Other (please specify)

.....

24. Were there any other sources that you could use to find answers, but chose not to use them?

- (a) Yes (b) No

25. If yes, what are they?

- 1= [] Radio 5= [] Television 9= [] Films 13= [] Family/friends/neighbours
2= [] Posters 6= [] Newspapers 10= [] Songs 14= [] Extension officers
3= [] Cell phone 7= [] Researchers 11= [] Drama 15= [] NGOs/CBOs
4= [] Leaflets 8= [] Internet 12= [] Books
16= [] Other (please specify)

.....
.....

26. Why did you choose not to use these sources to find the answers?

- (i) Not available
(ii) Not convenient
(iii) Influence from a friend
(iv) Limited skills in using the source
(v) Expensive
(vi) Not reliable
(viii) Other (please specify)

.....
.....
.....

27. Did you face any difficulties in finding the answers?

- (a) Yes (b) No

28. If yes, what were the difficulties?

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.....

29. Did you finally get answers to your questions?

- (a) Yes (b) No

30. Did you use the answers that you got?

- (a) Yes
- (b) No

31. If yes, did they help to solve the problems that you were facing?

- (a) Yes
- (b) No

32. If no, what do you think were the reasons for the failure to solve your problems?

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33. Please mention the types of information that you have used in poultry management.

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34. If you face problems related to poultry management, will you use the same sources that you used before?

- (a) Yes
- (b) No

35. If no, what are the reasons?

- (i) Not available
- (ii) Not convenient
- (iii) Influence from a friend
- (iv) Limited skills in using the source
- (v) Expensive
- (vi) Not reliable
- (vii) Other (please specify)

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36. Do the information providers inquire about your information needs before disseminating poultry management information in the community?

- (a) Yes
- (b) No

37. If yes, how do they inquire about your information needs?

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38. Do the information providers prioritise your information needs when they disseminate poultry management information in the community?

(a) Yes (b) No

39. If yes, how do they prioritise your information needs?

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.....

2. Preference and effectiveness of information sources

40. Which of the following have you used as a source for finding information on poultry management?

- | | | | |
|--|---|------------------------------------|--|
| 1= <input type="checkbox"/> Radio | 5= <input type="checkbox"/> Television | 9= <input type="checkbox"/> Films | 13= <input type="checkbox"/> Family/friends/neighbours |
| 2= <input type="checkbox"/> Posters | 6= <input type="checkbox"/> Newspapers | 10= <input type="checkbox"/> Songs | 14= <input type="checkbox"/> Extension officers |
| 3= <input type="checkbox"/> Cell phone | 7= <input type="checkbox"/> Researchers | 11= <input type="checkbox"/> Drama | 15= <input type="checkbox"/> NGOs/CBOs |
| 4= <input type="checkbox"/> Leaflets | 8= <input type="checkbox"/> Internet | 12= <input type="checkbox"/> Books | |
- 16= Other (please specify)

.....

41. Which source do you turn to most often when seeking information on poultry management?

- | | | | |
|--|---|------------------------------------|--|
| 1= <input type="checkbox"/> Radio | 5= <input type="checkbox"/> Television | 9= <input type="checkbox"/> Films | 13= <input type="checkbox"/> Family/friends/neighbours |
| 2= <input type="checkbox"/> Posters | 6= <input type="checkbox"/> Newspapers | 10= <input type="checkbox"/> Songs | 14= <input type="checkbox"/> Extension officers |
| 3= <input type="checkbox"/> Cell phone | 7= <input type="checkbox"/> Researchers | 11= <input type="checkbox"/> Drama | 15= <input type="checkbox"/> NGOs/CBOs |
| 4= <input type="checkbox"/> Leaflets | 8= <input type="checkbox"/> Internet | 12= <input type="checkbox"/> Books | |
- 16= Other (please specify)

.....
.....

42. What influenced your choice of information source for accessing poultry information?

- (i) Availability of the source
- (ii) Convenience of the source
- (iii) Influence from a friend
- (iv) Skills in using the source
- (v) Cheaper in terms of cost
- (vi) Reliability of the source
- (vii) Other (please specify)

.....

43. If you were to choose a source for accessing poultry management information, which of the following information sources do you most prefer? (Please circle the number that is appropriate, 1 = most preferred, 2 = preferred, 3 = least preferred, 4 = not preferred)

(i)	Radio	1	2	3	4
(ii)	Posters	1	2	3	4
(iii)	Cell phone	1	2	3	4
(iv)	Leaflets	1	2	3	4
(v)	Television	1	2	3	4
(vi)	Newspapers	1	2	3	4
(vii)	Researchers	1	2	3	4
(viii)	Internet	1	2	3	4
(ix)	Films	1	2	3	4
(x)	Songs	1	2	3	4
(xi)	Drama	1	2	3	4
(xii)	Books	1	2	3	4
(xiii)	Family/friends/neighbours	1	2	3	4
(xiv)	Extension officers	1	2	3	4
(xv)	NGOs/ CBOs	1	2	3	4
(xvi)	Other (please specify)				

.....

.....
 44. What are the reasons for your preferences of information sources?

- (i) Availability of the source
 - (ii) Convenience of the source
 - (iii) Influence from a friend
 - (iv) Skills in using the source
 - (v) Cheaper in terms of cost
 - (vi) Reliability of the source
 - (vii) Other (please specify)
-

45. What information sources do you think are most appropriate for accessing poultry management information for you and the community at large? (Indicate all of the items that are appropriate: 1= very appropriate, 2= appropriate 3= least appropriate 4= not appropriate)

(i)	Radio	1	2	3	4
(ii)	Posters	1	2	3	4
(iii)	Cell phone	1	2	3	4
(iv)	Leaflets	1	2	3	4
(v)	Television	1	2	3	4
(vi)	Newspapers	1	2	3	4
(vii)	Researchers	1	2	3	4
(viii)	Internet	1	2	3	4
(ix)	Films	1	2	3	4
(x)	Songs	1	2	3	4
(xi)	Drama	1	2	3	4
(xii)	Books	1	2	3	4
(xiii)	Family/friends/neighbours	1	2	3	4
(xiv)	Extension officers	1	2	3	4
(xv)	NGOs/ CBOs	1	2	3	4
(xvii)	Other (please specify)				

.....

.....
46. In your opinion, what makes certain information sources more appropriate than others?

- (i) Availability of the source
- (ii) Convenience of the source
- (iii) Influence from a friend
- (iv) Skills in using the source
- (v) Cheaper in terms of cost
- (vi) Reliability of the source
- (vii) Other (please specify)

.....
.....
47. Which information source did you find to be most effective? (Please circle the appropriate number: 1 = very effective, 2 = effective, 3 = least effective, 4 = not effective)

(i) Radio	1	2	3	4
(ii) Posters	1	2	3	4
(iii) Cell phone	1	2	3	4
(iv) Leaflets	1	2	3	4
(v) Television	1	2	3	4
(vi) Newspapers	1	2	3	4
(vii) Researchers	1	2	3	4
(viii) Internet	1	2	3	4
(ix) Films	1	2	3	4
(x) Songs	1	2	3	4
(xi) Drama	1	2	3	4
(xii) Books	1	2	3	4
(xiii) Family/friends/neighbours	1	2	3	4
(xiv) Extension officers	1	2	3	4
(xv) NGOs/ CBOs	1	2	3	4
(xvi) Other (please specify)				

48. Are you satisfied with the way in which poultry management information is disseminated?

(a) Yes (b) No

49. If no, what are the reasons for your dissatisfaction?

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.....
.....

50. If yes, what are the reasons for your satisfaction?

.....
.....
.....

3. Factors that hinder access and use of poultry management information

51. Do you access poultry management information?

(a) Yes (b) No

52. If you do not access poultry management information, what are the reasons?

- (i) Information is not available
- (ii) It is expensive to access the information
- (iii) Limited skills in using the source of information
- (iv) It is not convenient to use the source of information
- (v) The information is not reliable
- (vi) Other (please specify)

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53. Do you encounter any problems in accessing poultry management information?

(a) Yes (b) No

54. If yes, what are the problems?

.....
.....
.....

55. Do you encounter problems in using poultry management information?

- (a) Yes (b) No

56. If yes, what are the problems?

- i. The information is not reliable
- ii. The format is not easy to understand
- iii. Few people in the community are using the information, and it is not easy to share knowledge
- iv. Limited assistance from experts
- v. Other (please specify)

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.....
.....

4. Factors that promote access and use of poultry management information

57. What encourages you to seek access to information on poultry management?

- (i) Availability of the source
- (ii) Convenience of the source
- (iii) Influence from a friend
- (iv) Skills in using the source
- (v) Cheaper in terms of cost
- (vi) Reliability of the source
- (vii) Other (please specify)

.....
.....
.....

58. What motivates you to use the poultry management information?

- i. The information is reliable

- ii. The format is easy to understand
- iii. Many people in the community are using the information, and it is easy to share knowledge
- iv. Availability of assistance from experts
- v. Other (please specify)

.....

59. Do you get professional assistance for using poultry management information?

- (a) Yes (b) No

5. General opinion

60. What do you recommend in order to improve dissemination and accessibility of poultry management information in your community?

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.....

Thank you very much for your cooperation

Appendix 3: Swahili version of the questionnaire for farmers

Mwongozo wa mahojiano na wafugaji wa kuku na ndege wengine

Kifungu A: Taarifa za mshiriki

1. Jinsia: 1= [] Kike 2= [] Kiume

2. Miaka

(i) Chini ya miaka 18 (iv) Kuanzia miaka 38- 47

(ii) Kuanzia miaka 18- 27 (v) Kuanzia miaka 48- 57

(iii) Kuanzia miaka 28- 37 (v) Kuanzia miaka 58 na kuendelea

3. Kiwango cha juu cha elimu

(i) Elimu isiyo rasmi (iv) Elimu ya sekondari

(ii) Elimu ya msingi (v) Hajasoma

(iii) Elimu zaidi ya sekondari (Tafadhali fafaua)

4. Kazi unayofanya:

5. Mkoa:

6. Wilaya:

7. Tarafa:

8. Kitongoji:

9. Kijiji:

10. Tarehe ya mahojiano:

Kifungu B: Taarifa kuhusu ufugaji wa kuku na ndege wengine

1. Mahitaji ya taarifa na namna ya kutafuta taarifa

11. Umewahi kupata matatizo yanayohusiana na ufugaji wa kuku na ndege wengine?

1= [] Ndio 2= [] Hapana

12. Kama ndio, ni matatizo gani?

1= [] Magonjwa 2= [] Malazi 3= [] Masoko 4= [] Ushindani na mazao

5= [] Ulishaji 6= [] Uzalishaji 7= [] Ulinzi 8= [] Uzaaji na uzalishaji

9= [] Utotoaji 10= [] Vinginevyo (Tafadhali fafaua)

.....
.....
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13. Ulitafutaje ufumbuzi/majawabu ya matatizo hayo yaliyo kukumba?

- 1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia
2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo
3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya
kiserikali
4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu
16= [] Vinginevyo (Tafadhali fafanua)

.....
.....

14. Je ulipata matatizo yoyote/vikwazo kwenye kupata ufumbuzi/majawabu?

- (a) Ndio (b) Hapana

15. Kama ndio, ulipatwa na matatizo/vikwazo gani?

.....
.....

16. Je umeshawahi kusikia habari zozote zinazohusu ufugaji wa kuku na ndege wengine kabla ya usaili huu?

- 1= [] Ndio 2= [] Hapana

17. Kama ndio, ulisikia wapi/kupitia njia gani?

- 1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia
2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo
3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya
kiserikali
4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu
16= [] Vinginevyo (Tafadhali fafanua)

.....
.....

18. Je umeshawahi kuwa na maswali yoyote yanayohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

19. Kama ndio, maswali yanahusu nini?

1= [] Magonjwa 2= [] Malazi 3= [] Masoko 4= [] Ushindani na mazao

5= [] Ulishaji 6= [] Uzalishaji 7= [] Ulinzi 8= [] Uzaaji na uzalishaji

9= [] Utotoaji 10= [] Vinginevyo (Tafadhali fafaua)

.....
.....

20. Je ulijaribu kuyatafutia majawabu?

(a) Ndio (b) Hapana

21. Kama hapana, ni kwasababu gani?

.....
.....
.....

22. Kama ndio, taja njia ulizotumia kupata majawabu?

1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia

2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo

3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya kiserikali

4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu

16= [] Vinginevyo (Tafadhali fafaua)

.....
.....

23. Kwanini uliamua kutumia njia hizo?

(i) Upatikanaji wa chanzo hicho

(ii) Chanzo kinachofaa

(iii) Ushawishi wa marafiki

(iv) Ujuzi wa kutumia chanzo hicho

- (v) Gharama nafuu
- (vi) Uhakika wa chanzo hicho
- (vii) Vinginevyo (Tafadhali fafanua)

.....

24. Je kulikuwa na njia nyingine ambazo ungeweza kutumia kupata majawabu, lakini ukaamua usizitumie?

- (a) Ndio (b) Hapana

25. Kama ndio, ni njia zipi hizo?

- 1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia
- 2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo
- 3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya kiserikali
- 4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu
- 16= [] Vinginevyo (Tafadhali fafanua)

.....

26. Je kwanini ukaamua usizitumie hizo njia nyingine kutafuta majawabu?

- (i) Kutopatikana kwa chanzo
- (ii) Chanzo kutokuaminika
- (iii) Ushawishi toka kwa Marafiki
- (iv) Kutokuwa na ujuzi wa kutumia chanzo
- (v) Gharama
- (vi) Kutokuwa na uhakika na chanzo
- (vii) Vinginevyo (Tafadhali fafanua)

.....

27. Je ulikutana na vikwazo vyovyote katika kutafuta majawabu ya maswali yako?

- (a) Ndio (b) Hapana

28. Kama ndio, ni vikwazo gani hivyo?

.....
.....
.....

29. Je hatimaye ulipata majawabu ya maswali yako?

- (a) Ndio (b) Hapana

30. Je uliyafanyia kazi majawabu uliyoyapata?

- (a) Ndio (b) Hapana

31. Kama ndio, yalikusaidia kutatua matatizo uliyokuwa nayo?

- (a) Ndio (b) Hapana

32. Kama hatimaye ulishindwa kupata ufumbuzi/majawabu ya maswali yako, unafikiri nini kilikuwa ni kikwazo/tatizo?

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.....
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33. Tafadhali taja aina yahabari ambazo umezitumia kwenye ufugaji wa kuku na ndege wengine

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.....

34. Kama ukipata shida/matatizo/maswali katika ufugaji wa kuku na ndege wengine, utatumia njia ulizotumia awali kutafuta ufumbuzi/majawabu ya maswali/matatizo?

- (a) Ndio (b) Hapana

35. Kama hapana, ni kwa sababu gani?

- (i) Kutopatikana kwa chanzo
(ii) Chanzo kutokuaminika
(iii) Ushawishi toka kwa Marafiki
(iv) Kutokuwa na ujuzi wa kutumia chanzo
(v) Gharama
(vi) Kutokuwa na uhakika na chanzo
(vii) Vinginevyo (Tafadhali fafanua)

.....
.....

36. Je huwa watoa taarifa wanauliza kuhusu mahitaji yako/yenu ya taarifa au habari kabla ya kuwaletea taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

37. Kama ndio, elezea jinsi watoa taarifa wanavyopata mahitaji yako/yenu ya taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine

.....
.....
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38. Je watoa taarifa wanatoa kipaumbele kwa mahitaji yako/yenu ya taarifa wakati wanawasilisha taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

39. Kama ndio, tafadhali elezea

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.....
.....

2. Upendeleo na ufanisi wa vyanzo vya taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine

42. Vipi kati ya vyanzo vifuatavyo vya habari umeshawahi kutumia vyanzo gani vya habari katika kupata taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine? (Chagua kati ya vyanzo vifuatavyo zungushia vyanzo vyote ulivyowahi kutumia)

1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia

2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo

3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya kiserikali

4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu

16= [] Vinginevyo (Tafadhali fafanua)

.....
.....
41. Je ni chanzo gani unatumia mara nyingi wakati unatafuta taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- 1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia
2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo
3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya
kiserikali
4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu
16= [] Vinginevyo (Tafadhali fafanua)

.....
.....
42. Je ni vitu gani vinavyokufanya/vinachokusukuma kuchagua chanzo cha taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (i) Upatikanaji wa chanzo hicho
- (ii) Chanzo kinachofaa
- (iii) Ushawishi wa marafiki
- (iv) Ujuzi wa kutumia chanzo hicho
- (v) Gharama
- (vi) Uhakika wa chanzo hicho
- (vii) Vinginevyo (Tafadhali fafanua)

.....
.....
43. Je kama ungetakiwa kuchagua chanzo cha taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine, vipi kati ya vyanzo hivi ungependa zaidi? (Tafadhali zungushia namba unayoona ni sahihi kwenye vyanzo vyote kama ifutavyo 1=napenda zaidi, 2=napenda, 3= napenda kiasi, 4=sipendi)

(i) Redio	1	2	3	4
(ii) Machapisho	1	2	3	4
(iii) Simu za mkononi	1	2	3	4
(iv) Vipeperushi	1	2	3	4
(v) Luninga	1	2	3	4
(vi) Magazeti	1	2	3	4
(vii) Watafiti	1	2	3	4
(viii) Mtandao	1	2	3	4
(ix) Filamu	1	2	3	4
(x) Nyimbo	1	2	3	4
(xi) Ngoma	1	2	3	4
(xii) Books	1	2	3	4
(xiii) Books	1	2	3	4
(xiv) Maafisa kilimo	1	2	3	4
(xv) Mashirika yasiyo ya kiserikali/kijamii	1	2	3	4
(xvi) Vinginevyo (Tafadhali fafaua)				

.....
.....

44. Sababu zako za kuchangua vyanzo hivyo vya habari ninini?

- (i) Upatikanaji wa chanzo hicho
- (ii) Chanzo kinachofaa
- (iii) Ushawishi wa marafiki
- (iv) Ujuzi wa kutumia chanzo hicho
- (v) Gharama nafuu
- (vi) Uhakika wa chanzo hicho
- (vii) Vinginevyo (Tafadhali fafaua)

.....
.....
.....

45. Je unafikiri ni vyanzo vipi vya taarifa vinafaa zaidi katika kupata taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine? (Tafadhali zungushia namba unayoona ni sahihi kwenye vyanzo vyote kama ifuatavyo 1=kinafaa zaidi, 2=kinafaa, 3=kinafaa kiasi, 4=hakifai)

(i)	Redio	1	2	3	4
(ii)	Machapisho	1	2	3	4
(iii)	Simu za mkononi	1	2	3	4
(iv)	Vipeperushi	1	2	3	4
(v)	Luninga	1	2	3	4
(vi)	Magazeti	1	2	3	4
(vii)	Watafiti	1	2	3	4
(viii)	Mtandao	1	2	3	4
(ix)	Filamu	1	2	3	4
(x)	Nyimbo	1	2	3	4
(xi)	Ngoma	1	2	3	4
(xii)	Books	1	2	3	4
(xiii)	Familia/marafiki/majirani	1	2	3	4
(xiv)	Maafisa kilimo	1	2	3	4
(xv)	Mashirika yasiyo ya kiserikali/kijamii	1	2	3	4
(xvi)	Vinginevyo (Tafadhali fafanua)				

.....

46. Kwa mawazo yako, ni sababu gani zinazofanya chanzo cha taarifa kuwa kinafaa zaidi kuliko kingine?

- (i) Upatikanaji wa chanzo hicho
- (ii) Chanzo kinachofaa
- (iii) Ushawishi wa marafiki
- (iv) Ujuzi wa kutumia chanzo hicho
- (v) Gharama
- (vi) Uhakika wa chanzo hicho
- (vii) Vinginevyo (Tafadhali fafanua)

.....

 47. Je ni vyanzo gani vya taarifa unavyoviona kuwa na uwezo zaidi katika kutoa taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine? (Tafadhali zungushia namba unayoona ni sahihi kwenye vyanzo vyote kama ifuatavyo 1=kina uwezo zaidi, 2= kina uwezo, 3=kina uwezo kiasi, 4= hakina uwezo)

(i)	Redio	1	2	3	4
(ii)	Machapisho	1	2	3	4
(iii)	Simu ya mkononi	1	2	3	4
(iv)	Vipeperushi	1	2	3	4
(v)	Luninga	1	2	3	4
(vi)	Magazeti	1	2	3	4
(vii)	Watafiti	1	2	3	4
(viii)	Mtandao	1	2	3	4
(ix)	Filamu	1	2	3	4
(x)	Nyimbo	1	2	3	4
(xi)	Ngoma	1	2	3	4
(xii)	Books	1	2	3	4
(xiii)	Familia/marafiki/majirani	1	2	3	4
(xiv)	Maafisa kilimo	1	2	3	4
(xv)	Mashirika yasiyo ya kiserikali/kijamii	1	2	3	4
(xvi)	Mengineyo (Tafadhali fafaua)				

.....

 48. Je unaridhika na jinsi taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine zinavyotolewa kwenu?

(a) Ndio (b) Hapana

49. Kama hapana, ni sababu gani?

.....

50. Kama ndio, ni sababu gani?

.....
.....
.....

3. Vitu vinavyokwamisha upatikanaji na utumiaji wa taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine

51. Je unapata taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (a) Ndio (b) Hapana

52. Kama hupati taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine, unafikiri ni kwasabu gani?

- (i) Kutopatikana kwa habari
(ii) Ni gharama sana kupata habari
(iii) Kutokuwa na ujuzi wa kutumia chanzo cha habari
(iv) Ugumu wa kutumia chanzo cha habari
(v) Habari sio za uhakika
(vi) Mengineyo (Tafadhali fafana)

.....
.....

53. Je unapata matatizo yoyote katika kupata taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (a) Ndio (b) Hapana

54. Kama ndio, tafadhali eleza ni matatizo gani?

.....
.....
.....

55. Je unapata matatizo yoyote katika kutumia taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (a) Ndio (b) Hapana

56. Kama ndio, tafadhali eleza ni matatizo gani?

- i. Kutokuwa na uhakika na habari
- ii. Ni vigumu kuelewa muundo wa habari
- iii. Watu wachache wanatumia habari, ni vigumu kushirikishana ujuzi
- iv. Usaidizi mdogo toka kwa wataalamu
- v. Mengineyo (Tafadhali fafaua)

.....
.....

4. Vitu vinavyosaidia katika upatikanaji na utumiaji wa taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine

57. Ni vitu gani vilikusukuma/vilikushawishi kutafuta taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (i) Urahisi wa upatikanaji wa habari
- (ii) Habari inapatikana kwenye chanzo kinachofaa
- (iii) Ushawishi kutoka kwa marafiki au ndugu
- (iv) Ujuzi wako katika kutumia chanzo cha taarifa
- (v) Gharama ya kupata taarifa
- (vi) Uhakika wa upatikanaji habari
- (vii) Mengineyo (Tafadhali fafaua)

.....
.....

58. Ni kitu gani kinakusukuma/kinakushawishi kutumia taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- i. Urahisi wa kuelewa taarifa
- ii. Ushawishi kutoka kwa marafiki
- iii. Upatikanaji wa msaada kwa wajuzi
- iv. Vinginevyo (Tafadhali fafaua)

.....
.....

59. Je huwa mnapata ushauri wa kitaalamu wa namna ya kutumia taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

5. Maoni kwa ujumla

60. Kwa maoni yako, unadhani ni mikakati gani itumike kuboresha upatikanaji wa taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

.....
.....
.....

Asante sana kwa ushirikiano wako

Appendix 4: Interview schedule for information providers

Section A: Information about respondent

- 1. Designation
 - a) Extension officer
 - b) Poultry researcher
 - c) Non-governmental organisation (NGO) officer
 - d) Community-based organisation (CBO) officer
 - e) Other:
- 2. Organisation:
- 3. Gender: (a) Female (b) Male
- 4. Age (years):
- 5. Educational level
 - (a) PhD (c) Bachelor (e) High school (g) Secondary school
 - (b) Masters (d) Diploma (f) Certificate (h) Primary school
- 6. Region:
- 7. District:
- 8. Division:
- 9. Ward:
- 10. Village:
- 11. Date of the interview:

Section B: Information dissemination and access to information

- 12. Do you disseminate poultry management information to the local communities?
 - (a) Yes (b) No
- 13. If yes, what type of information on poultry management do you disseminate?
.....
.....
.....
- 14. Are farmers aware of the information services provided by your organisation?

(a) Yes (b) No

15. What strategies do you use to make sure that farmers get access to the information that you disseminate?

.....
.....
.....

16. Which information sources do you use for information dissemination?

.....
.....
.....

17. What strategies do you use to make sure that farmers use the information that they access?

.....
.....
.....

Section C: Information needs and information seeking behaviour

18. Are you aware that farmers need information on poultry management?

(a) Yes (b) No

19. Do you think that it is important to first inquire about farmers' information needs?

(a) Yes (b) No

20. If yes, why?

.....
.....
.....

21. Do you determine what farmers need before disseminating information to them?

(a) Yes (b) No

22. How do you determine farmers' needs before disseminating information to them?

.....
.....
.....

23. Do you prioritise farmers' information needs during information dissemination?

(a) Yes (b) No

24. If yes, how do you prioritise farmers' needs?

.....
.....
.....

25. If no, why not?

.....
.....
.....

26. Do you think that your organisation satisfies most of the farmers' information needs?

(a) Yes (b) No

27. If no, why not?

.....
.....
.....

Section D: Preference of information sources

28. Which information sources do you prefer to use for disseminating poultry management information?

- | | | | |
|--|---|------------------------------------|--|
| 1= <input type="checkbox"/> Radio | 5= <input type="checkbox"/> Television | 9= <input type="checkbox"/> Films | 13= <input type="checkbox"/> Family/friends/neighbours |
| 2= <input type="checkbox"/> Posters | 6= <input type="checkbox"/> Newspapers | 10= <input type="checkbox"/> Songs | 14= <input type="checkbox"/> Extension officers |
| 3= <input type="checkbox"/> Cell phone | 7= <input type="checkbox"/> Researchers | 11= <input type="checkbox"/> Drama | 15= <input type="checkbox"/> NGOs/CBOs |
| 4= <input type="checkbox"/> Leaflets | 8= <input type="checkbox"/> Internet | 12= <input type="checkbox"/> Books | |
- 16= Other (please specify)

.....

29. What influenced your choice of sources for disseminating poultry management information?

- (i) Availability of the source
- (ix) Convenience of the source
- (x) Influence from a colleague
- (xi) Skills in using the source
- (xii) Cost of using the source
- (xiii) Reliability of the source

(xiv) Other (please specify)

.....

30. Do you inquire about farmers' opinions on the information sources that they prefer?

(a) Yes (b) No

31. If yes, please explain how you inquire about farmers' preference of information sources?

.....
.....
.....

32. If no, why not?

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.....
.....

Section E: Effectiveness of information sources

33. What information sources do you think are most appropriate for disseminating poultry management information to the farmers? (Indicate all the items that are appropriate: 1= very appropriate, 2= appropriate 3= least appropriate 4= not appropriate)

(i)	Radio	1	2	3	4
(ii)	Posters	1	2	3	4
(iii)	Cell phone	1	2	3	4
(iv)	Leaflets	1	2	3	4
(v)	Television	1	2	3	4
(vi)	Newspapers	1	2	3	4
(vii)	Researchers	1	2	3	4
(viii)	Internet	1	2	3	4
(ix)	Films	1	2	3	4
(x)	Songs	1	2	3	4
(xi)	Drama	1	2	3	4
(xii)	Books	1	2	3	4
(xiii)	Family/friends/neighbours	1	2	3	4
(xiv)	Extension officers	1	2	3	4

- | | | | | |
|------------------------------|---|---|---|---|
| (xv) NGOs/ CBOs | 1 | 2 | 3 | 4 |
| (xvi) Other (please specify) | | | | |

.....

34. In your opinion, what makes certain information sources more appropriate than others?

.....

35. Which information source did you find to be most effective in disseminating poultry management information? (Please circle the relevant number: 1 = very effective, 2 = effective, 3 = least effective, 4 = not effective)

- | | | | | |
|----------------------------------|---|---|---|---|
| (i) Radio | 1 | 2 | 3 | 4 |
| (ii) Posters | 1 | 2 | 3 | 4 |
| (iii) Cell phone | 1 | 2 | 3 | 4 |
| (iv) Leaflets | 1 | 2 | 3 | 4 |
| (v) Television | 1 | 2 | 3 | 4 |
| (vi) Newspapers | 1 | 2 | 3 | 4 |
| (vii) Researchers | 1 | 2 | 3 | 4 |
| (viii) Internet | 1 | 2 | 3 | 4 |
| (ix) Films | 1 | 2 | 3 | 4 |
| (x) Songs | 1 | 2 | 3 | 4 |
| (xi) Drama | 1 | 2 | 3 | 4 |
| (xii) Books | 1 | 2 | 3 | 4 |
| (xiii) Family/friends/neighbours | 1 | 2 | 3 | 4 |
| (xiv) Extension officers | 1 | 2 | 3 | 4 |
| (xv) NGOs/ CBOs | 1 | 2 | 3 | 4 |
| (xvi) Other (please specify) | | | | |

.....

Section F: Factors that influence access and use of poultry management information

36. Do you have follow-up mechanisms to ensure that farmers access and use the poultry management information that you disseminate to them?

- (a) Yes (b) No

37. In your opinion, what do you think are the barriers to farmers accessing poultry management information?

.....
.....
.....

38. In your opinion, what do you think are the barriers to farmers using poultry management information?

.....
.....
.....

39. In your opinion, what are the factors that motivate farmers to access the information that you disseminate?

.....
.....
.....

40. In your opinion, what are the factors that motivate farmers to use the information that they have accessed?

.....
.....
.....

Section G: General opinion

41. What do you recommend in order to improve dissemination and accessibility of poultry management information in the rural communities?

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.....
.....

Thank you very much for your cooperation

Appendix 5: Swahili version of the interview schedule for information providers

Mwongozo wa mahojiano na watoa habari/taarifa

Kifungu A: Taarifa za walengwa

1. Cheo

- f) Afisa kilimo
- g) Mtafiti wa kuku na ndege wa kufugwa
- h) Afisa wa mashirika yasiyo ya kiserikali
- i) Afisa wa mashirika ya kijamii
- j) Vinginevyo:

2. Shirika:

3. Jinsia: (a) Mke (b) Mume

4. Miaka:

5. Kiwango cha elimu

(a) Shahada ya uzamivu (c) Shahada (e) Kidato cha sita (g) Elimu ya sekondari

(b) Shahada ya uzamili (d) Stashahada (f) Cheti (h) Elimu ya msingi

6. Mkoa:

7. Wilaya:

8. Kitongoji:

9. Tarafa:

10. Kijiji:

11. Tarehe ya kufanyiwa usaili:

Kifungu B: Huduma za usambazaji wa taarifa/habari

12. Je huwa unasambaza taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine katika jamii inayokuzunguka?

- (a) Ndio (b) Hapana

13. Kama ndio, ni aina gani ya taarifa unazotoa/unazosambaza zinazohusu ufugaji wa kuku na ndege wengine?

.....

.....
.....
14. Je wakulima wanaufahamu kuhusu huduma hii ya otaji wa taarifa/habari inayotolewa na ofisi yako?

(a) Ndio (b) Hapana

15. Je ni mikakati gani mnayotumia kuhakikisha wakulima wote wanapata taarifa/habari mnazotoa/mnazosambaza?

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.....
.....
16. Je, ni vyanzo gani vya habari ambavyo unatumia kusambaza habari?

.....
.....
.....
17. Je, ni mikakati gani unatumia kufanya wafugaji watumie taarifa/habari wanazozipata juu ya ufugaji wa kuku na ndege wengine?

.....
.....
.....
Kifungu C: Mahitaji ya taarifa na namna ya kutafuta taarifa

18. Je unafahamu kuwa wakulima wana mahitaji yao ya taarifa zinazohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

19. Je unafikiri ni muhimu kuchunguza kwanza mahitaji ya taarifa ya wafugaji?

(a) Ndio (b) Hapana

20. Kama ndio, kwanini?

.....
.....

.....
.....
21. Je huwa unachunguza/unauliza kuhusu mahitaji ya wakulima kabla ya kuwasambazia/kuwapelekea taarifa?

(a) Ndio (b) Hapana

22. Unayajuaje mahitaji ya Wakulima/wafugaji kabla ya kusambaza habari zake kwao?

.....
.....
.....

23. Je, unatoa kipaumbele kwa wakulima/wafugaji juu ya mahitaji ya habari wakati wa kusambaza?

(a) Ndio (b) Hapana

24. Kama ni ndio, unatoaje kipaumbele cha mahitaji ya wakulima/wafugaji?

.....
.....
.....

25. Kama ni hapana, kwanini?

.....
.....
.....

26. Je unafikiri ofisi/shirika yako inatosheleza mahitaji ya taarifa ya wafugaji?

(a) Ndio (b) Hapana

27. Kama hapana, kwanini?

.....
.....
.....

Kifungu D: Vyanzo vya taarifa vinavyopendwa zaidi na vyenye uwezo zaidi wa kusambaza taarifa/habari

28. Je ni vyanzo gani vya habari unavyovitumia katika kusambaza taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- 1= [] Redio 5= [] Luninga 9= [] Filamu 13= [] Majirani/marafiki/familia
2= [] Machapisho 6= [] Magazeti 10= [] Nyimbo 14= [] Maafisa Kilimo
3= [] Simu ya mkononi 7= [] Watafiti 11= [] Ngoma 15= [] Mashirika yasiyo ya
kiserikali
4= [] Vipeperushi 8= [] Mtandao 12= [] Vitabu
16= [] Vinginevyo (Tafadhali fafaua)

29. Je ni sababu zipi zilizokufanya uchague vyanzo hivyo kwa ajili ya kusambaza taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

- (i) Upatikanaji wa chanzo
- (ii) Urahisi wa kutumia chanzo
- (iii) Ushawishi kutoka kwa marafiki
- (iv) Ujuzi wa kutumia chanzo hicho
- (v) Gharama za kutumia chanzo
- (vi) Uhakika wa chanzo katika kufikisha habari
- (vii) Mengineyo (Tafadhali fafaua)

30. Je huwa unachunguza/unatafuta maoni ya wafugaji kuhusu vyanzo vya taarifa wanavyopendelea?

- (a) Ndiyo (b) Hapana

31. Kama ndio, eleza jinsi unavyotafuta/unavyochunguza maoni ya wafugaji kuhusu vyanzo vya taarifa wanavyopendelea?

32. Kama hapana, kwanini?

.....
.....
.....
.....

Kifungu E: Ufanisi wa vyanzo cha Habari

33. Je unafikiri ni vyanzo gani vya taarifa vinafaa zaidi katika kusambaza taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine? (Tafadhali zungushia namba unayoona ni sahihi kwenye vyanzo vyote kama ifuatavyo 1=kinafaa zaidi, 2= kinafaa, 3=kinafaa kiasi, 4= hakifai)

(i)	Redio	1	2	3	4
(ii)	Machapisho	1	2	3	4
(iii)	Simu ya mkononi	1	2	3	4
(iv)	Vipeperushi	1	2	3	4
(v)	Luninga	1	2	3	4
(vi)	Magazeti	1	2	3	4
(vii)	Watafiti	1	2	3	4
(viii)	Mtandao	1	2	3	4
(ix)	Filamu	1	2	3	4
(x)	Nyimbo	1	2	3	4
(xi)	Maigizo	1	2	3	4
(xii)	Vitabu	1	2	3	4
(xiii)	Familia/marafiki/majirani	1	2	3	4
(xiv)	Maafisa kilimo	1	2	3	4
(xv)	Mashirka yasiyo ya kiserikali/kijamii	1	2	3	4
(xvi)	Mengineyo (Tafadhali fafanua)				

.....
.....

34. Kwa maoni yako, nini kinasababisha chanzo fulani cha habari kiwe sahihi kuliko vingine?

.....
.....
.....

35. Je ni vyanzo gani vya habari ambavyo umeona vina uwezo zaidi katika kusambaza taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine? (Tafadhali zungushia namba unayoona ni sahihi kwenye vyanzo vyote kama ifuatavyo 1=kina uwezo zaidi, 2= kina uwezo, 3=kina uwezo kiasi, 4= hakina uwezo)

(i)	Redio	1	2	3	4
(ii)	Machapisho	1	2	3	4
(iii)	Simu ya mkononi	1	2	3	4
(iv)	Vipeperushi	1	2	3	4
(v)	Luninga	1	2	3	4
(vi)	Magazeti	1	2	3	4
(vii)	Watafiti	1	2	3	4
(viii)	Mtandao	1	2	3	4
(ix)	Filamu	1	2	3	4
(x)	Nyimbo	1	2	3	4
(xi)	Maigizo	1	2	3	4
(xii)	Vitabu	1	2	3	4
(xiii)	Familia/marafiki/majirani	1	2	3	4
(xiv)	Maafisa kilimo	1	2	3	4
(xv)	Mashirika yasiyo ya kiserikali na ya kijiji	1	2	3	4
(xvi)	Mengineyo (Tafadhali fafaua)				

.....

Kifungu F: Vitu vinavyokwamisha upatikanaji na utumiaji wa taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine

36. Je kuna utaratibu wa kufuatilia na kuhakikisha wafugaji wanapata na kutumia taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine?

(a) Ndio (b) Hapana

37. Kwa maoni yako, ni vikwazo gani ambavyo mkulima anakumbana navyo wakati wa upataji wa habari za ufugaji wa kuku na ndege wengine?

.....

.....

.....

38. Kwa maoni yako, ni vikwazo gani ambavyo vinawakumba wakulima/wafugaji wakati wa utumiaji wa habari juu ya ufugaji wa kuku na ndege wengine?

.....
.....
.....

39. Kwa maoni yako, ni vitu gani vinavyowasukuma wakulima/wafugaji kufuatilia/kuchukua/kupata habari mnazosambaza?

.....
.....
.....

40. Kwa maoni yako, ni vitu gani vinapelekea wakulima/wafugaji watumie habari wanazozipata?

.....
.....
.....

Kifungui G: Maoni kwa ujumla

41. Je unatoa mapendekezo gani ili kuongeza usambazaji na upatikanaji wa habari/taarifa zihusuzo ufugaji wa kuku na ndege wengine?

.....
.....
.....

Asante sana kwa ushirikiano wako

Appendix 6: Focus group discussion guide

1. Name of the community
2. Date of the discussion.....
3. Number of participants.....
4. Do you have access to poultry management information in your community?
5. In your opinion, what are the information needs of poultry farmers?
6. Do the information providers inquire about your information needs before disseminating poultry management information?
7. Do the information providers prioritise your information needs in delivering information?
8. In your opinion, how do farmers access poultry management information?
9. In your opinion, how do farmers use poultry management information?
10. Are you satisfied with the information dissemination services?
11. What are the reasons for your satisfaction or dissatisfaction?
12. In your opinion, which information sources are most preferred by farmers?
13. What are the reasons for preferring certain information sources over others?
14. In your opinion, which information sources were the most appropriate for delivering information?
15. What makes a certain information source more appropriate than others?
16. In your opinion, which information sources were the most effective in delivering information?
17. What makes the information source more effective than the others?
18. Which factors promote access and use of poultry management information?
19. What are the major problems that this community faces in terms of accessing and using poultry management information?
20. What do you recommend in order to improve dissemination and accessibility of poultry management information in the rural communities?

Thank you very much for your cooperation

Appendix 7: Swahili version of the focus group discussion guide

Mwongozo wa majadiliano lengwa katika vikundi

1. Jina la jamii
2. Tarehe ya majadiliano.....
3. Idadi ya washiriki.....
4. Je, huwa mnapata taarifa/habari zinazohusu ufugaji wa kuku na ndege wengine katika jamii yenu?
5. Kwa maoni yenu, wafugaji wa kuku na ndege wengine wanahitaji taarifa/habari gani?
6. Je, watoa taarifa/habari huuliza kuhusu mahitaji yenu kabla ya kusambaza habari zihusuzo ufugaji wa kuku na ndege wengine?
7. Je, watoa taarifa/habari hutoa kipaumbele kwa mahitaji yenu katika utoaji wa taarifa?
8. Kwa maoni yenu, wafugaji wanapataje habari za ufugaji wa kuku na ndege wengine?
9. Kwa maoni yenu, wafugaji wanatumiaje taarifa/habari wanazozipata?
10. Je, mnaridhika na huduma ya usambazaji wa habari/taarifa za ufugaji wa kuku na ndege wengine??
11. Ni sababu gani zinafanya uridhike au usiridhike na usambazaji wa habari?
12. Kwa maoni yenu, ni vyanzo gani vya habari hupendelewa zaidi na wafugaji?
13. Ni sababu gani zinapelekea vyanzo fulani vya habari vipendelewe kuliko vingine?
14. Kwa maoni yenu, ni vyanzo gani vya habari vinafaa zaidi katika utoaji wa habari?
15. Nini kinapelekea chanzo cha habari kionekane kinafaa zaidi kuliko vingine?
16. Kwa maoni yenu, ni vyanzo gani vya habari vina ufanisi zaidi katika kusambaza taarifa/habari?
17. Nini kinapelekea chanzo cha habari kuwa na ufanisi zaidi ya vingine?
18. Ni mambo gani huhamasisha upatikanaji na utumiaji wa habari juu ya ufugaji wa kuku na ndege wengine?
19. Je, ni matatizo gani ambayo jamii hii inakabiliwa nayo katika kupata na kutumia habari za ufugaji kuku na ndege wengine?
20. Mapendekezo yenu ninini ili kuboresha usambazaji na upatikanaji wa habari zihusuzo ufugaji wa kuku na ndege wengine katika jamii za vijijini?

Asanteni sana kwa ushirikiano wenu

Appendix 8: Letter of introduction from the Sokoine University of Agriculture for Iringa Rural District

**KIBALI CHA KUFANYA UTAFITI NCHINI TANZANIA**

CHUO KIKUU CHA SOKOINE CHA KILIMO
OFISI YA MAKAMU WA MKUU WA CHUO
S.L.P. 3000, MOROGORO, TANZANIA
Simu: 023-2604523/2603511-4; Fax: 023-2604651, MOROGORO

Kumb. Zetu : SUA/CB/26 **Tarehe 08/07/2013**

Katibu Tawala wa Wilaya,
Private Bag,
IRINGA.

UTAFITI WA WAALIMU NA WANAFUNZI WA CHUO KIKUU

Madhumuni ya barua hii ni kumtambulisha kwako **Bi. Grace E.P. Msoffe** ambaye ni Mwanafunzi wa Shahada ya **Uzamivu PhD** katika Chuo Kikuu cha South Afrika kikishirikiana na Chuo Kikuu Sokoine cha Kilimo. Huyu hivi sasa yuko katika shughuli za utafiti.

Chuo Kikuu cha Sokoine cha Kilimo (SUA) kilianzishwa chini ya Sheria ("Universities Act No.7 of 2005") na Hati Idhini ("SUA Charter, 2007") ambayo ilianza kutumika Januari 1, 2007. Hati Idhini ilichukua nafasi ya Sheria Na.6 ya mwaka 1984. Moja ya majukumu ya SUA ni kufanya tafiti mbalimbali na kutumia matokeo ya tafiti hizo. Kwa sababu hiyo, waalimu, wanafunzi na watafiti wa Chuo hufanya tafiti mbalimbali katika nyakati zinazostahili.

Ili kufanikisha utekelezaji wa tafiti hizo Makamu wa Mkuu wa Chuo SUA amepewa mamlaka ya kutoa vibali vya kufanya utafiti nchini kwa waalimu, wanafunzi na watafiti wake kwa niaba ya Serikali na Tume ya Sayansi na Teknolojia.

Hivyo basi tunaomba umptie Mtaalamu aliyetajwa hapo juu msaada atakaohitaji ili kufanikisha uchunguzi wake. Gharama za malazi na chakula chake pamoja na usafiri wake atalipia mwenyewe. Msaada anaohitaji zaidi ni: **Kuruhusiwa kufanya utafiti katika Wilaya ya Iringa Vijijini**

Kiini cha Utafiti wa Mtaalamu aliyetajwa hapo juu ni: **"Access and use of Poultry Management Information in Selected Rural Areas of Tanzania"**

Sehemu anazofanyia utafiti huo ni: **Wilaya ya Iringa Vijijini.**

Muda wa Utafiti huo ni kuanzia **Julai, 2013 hadi Desemba, 2013.**

Ikiwa utahitaji maelezo zaidi tafadhali wasiliana nami.

Wasalaam,

Prof. Gerald C. Monela
MAKAMU WA MKUU WA CHUO

Nakala: Mwanafunzi: **Bi. Grace E.P. Msoffe.**

MAKAMU WA MKUU WA CHUO
CHUO KIKUU CHA SOKOINE CHA KILIMO
S. L. P. 3000
MOROGORO, TANZANIA

Appendix 9: Letter of introduction from the Sokoine University of Agriculture for Morogoro Rural District

**KIBALI CHA KUFANYA UTAFITI NCHINI TANZANIA**

CHUO KIKUU CHA SOKOINE CHA KILIMO
OFISI YA MAKAMU WA MKUU WA CHUO
S.L.P. 3000, MOROGORO, TANZANIA
Simu: 023-2604523/2603511-4; Fax: 023-2604651, MOROGORO

Kumb. Zetu : SUA/CB/26 **Tarehe 08/07/2013**

Katibu Tawala wa Wilaya,
S.L.P. 681,
MOROGORO.

UTAFITI WA WAALIMU NA WANAFUNZI WA CHUO KIKUU

Madhumuni ya barua hii ni kumtambulisha kwako **Bi. Grace E.P. Msoffe** ambaye ni Mwanafunzi wa Shahada ya **Uzamivu PhD** katika Chuo Kikuu cha South Afrika kikishirikiana na Chuo Kikuu Sokoine cha Kilimo. Huyo hivi sasa yuko katika shughuli za utafiti.

Chuo Kikuu cha Sokoine cha Kilimo (SUA) kilianzishwa chini ya Sheria ("Universities Act No.7 of 2005") na Hati Idhini ("SUA Charter, 2007") ambayo ilianza kutumika Januari 1, 2007. Hati Idhini ilichukua nafasi ya Sheria Na.6 ya mwaka 1984. Moja ya majukumu ya SUA ni kufanya tafiti mbalimbali na kutumia matokeo ya tafiti hizo. Kwa sababu hiyo, waalimu, wanafunzi na watafiti wa Chuo hufanya tafiti mbalimbali katika nyakati zinazostahili.

Ili kufanikisha utekelezaji wa tafiti hizo Makamu wa Mkuu wa Chuo SUA amepewa mamlaka ya kutoa vibali vya kufanya utafiti nchini kwa waalimu, wanafunzi na watafiti wake kwa niaba ya Serikali na Tume ya Sayansi na Teknolojia.

Hivyo basi tunaomba umpatie Mtaalamu aliyetajwa hapo juu msaada atakaohitaji ili kufanikisha uchunguzi wake. Gharama za malazi na chakula chake pamoja na usafiri wake atalipia mwenyewe. Msaada anaohitaji zaidi ni: **Kuruhusiwa kufanya utafiti katika Wilaya ya Morogoro Vijijini**

Kiini cha Utafiti wa Mtaalamu aliyetajwa hapo juu ni: **"Access and use of Poultry Management Information in Selected Rural Areas of Tanzania"**

Sehemu anazofanyia utafiti huo ni: **Wilaya ya Morogoro Vijijini.**

Muda wa Utafiti huo ni kuanzia **Julai, 2013 hadi Desemba, 2013.**

Ikiwa utahitaji maelezo zaidi tafadhali wasiliana nami.

Wasalaam,

Prof. Gerald C. Morela
MAKAMU WA MKUU WA CHUO

Nakala: Mwanafunzi: **Bi. Grace E.P. Msoffe.**

MAKAMU WA MKUU WA CHUO
CHUO KIKUU CHA SOKOINE CHA KILIMO
S. L. P. 3000
MOROGORO, TANZANIA

Appendix 10: Letter of introduction from the Sokoine University of Agriculture for Mvomero District

**KIBALI CHA KUFANYA UTAFITI NCHINI TANZANIA**

CHUO KIKUU CHA SOKOINE CHA KILIMO
OFISI YA MAKAMU WA MKUU WA CHUO
S.L.P. 3000, MOROGORO, TANZANIA
Simu: 023-2604523/2603511-4; Fax: 023-2604651, MOROGORO

Kumb. Zetu : SUA/CB/26 **Tarehe 08/07/2013**

Katibu Tawala wa Wilaya,
S.L.P. 58,
MVOMERO .

UTAFITI WA WAALIMU NA WANAFUNZI WA CHUO KIKUU

Madhumuni ya barua hii ni kumtambulisha kwako **Bi. Grace E.P. Msoffe** ambaye ni Mwanafunzi wa Shahada ya **Uzamivu PhD** katika Chuo Kikuu cha South Afrika kikishirikiana na Chuo Kikuu Sokoine cha Kilimo. Huyo hivi sasa yuko katika shughuli za utafiti.

Chuo Kikuu cha Sokoine cha Kilimo (SUA) kilianzishwa chini ya Sheria ("Universities Act No.7 of 2005") na Hati Idhini ("SUA Charter, 2007") ambayo ilianza kutumika Januari 1, 2007. Hati Idhini ilichukua nafasi ya Sheria Na.6 ya mwaka 1984. Moja ya majukumu ya SUA ni kufanya tafiti mbalimbali na kutumia matokeo ya tafiti hizo. Kwa sababu hiyo, waalimu, wanafunzi na watafiti wa Chuo hufanya tafiti mbalimbali katika nyakati zinazostahili.

Ili kufanikisha utekelezaji wa tafiti hizo Makamu wa Mkuu wa Chuo SUA amepewa mamlaka ya kutoa vibali vya kufanya utafiti nchini kwa waalimu, wanafunzi na watafiti wake kwa niaba ya Serikali na Tume ya Sayansi na Teknolojia.

Hivyo basi tunaomba umpatie Mtaalamu aliyetajwa hapo juu msaada atakaohitaji ili kufanikisha uchunguzi wake. Gharama za malazi na chakula chake pamoja na usafiri wake atalipia mwenyewe. Msaada anaohitaji zaidi ni: **Kuruhusiwa kufanya utafiti katika Wilaya ya Mvomero.**

Kiini cha Utafiti wa Mtaalamu aliyetajwa hapo juu ni: **"Access and use of Poultry Management Information in Selected Rural Areas of Tanzania"**

Sehemu anazofanyia utafiti huo ni: **Wilaya ya Mvomero.**

Muda wa Utafiti huo ni kuanzia **Julai, 2013 hadi Desemba, 2013.**

Ikiwa utahitaji maelezo zaidi tafadhali wasiliana nami.

Wasalaam,

Prof. Gerald C. Monela
MAKAMU WA MKUU WA CHUO

Nakala: Mwanafunzi: **Bi. Grace E.P. Msoffe.**

MAKAMU WA MKUU WA CHUO
CHUO KIKUU CHA SOKOINE CHA KILIMO
S. L. P. 3000
MOROGORO, TANZANIA

Appendix 11: Letter of introduction from the University of South Africa



University of South Africa
College of Graduate Studies
School of Interdisciplinary Research and
Postgraduate Studies
Department of Interdisciplinary Research
P. O. Box 392
0003
UNISA
South Africa
Theo van Wijk Building - Room 4-2
Tel: +27 (0) 12 429 2832
Email: ngulup@unisa.ac.za

19 June 2013

TO WHOM IT MAY CONCERN,

**Letter of introduction: PhD candidate Grace E. P. Msoffe, student No. 48091103
(Information Sciences)**

This letter serves to introduce Ms. Grace Msoffe who is registered as a PhD student at the University of South Africa (UNISA). Ms. Msoffe is currently carrying out a study on access and use of poultry management information in selected rural areas of Tanzania. The study is set out to assess access to, and use of poultry management information in rural areas of Tanzania in order to recommend the best ways of disseminating information for poultry management.

In order to achieve the objectives of this study Ms. Msoffe will carry out interviews and discussions with selected members within the local communities such as farmers, extension officers, agricultural officers, researchers, and non-governmental organisation officers. Therefore, UNISA College of Graduate Studies is kindly requesting you to render any possible assistance to Ms. Msoffe in order for her to undertake the study.

If you require any further clarification about the study, please contact Prof. Patrick Ngulube, who is supervising Ms. Msoffe on telephone +27 (0) 12 429 2832 or email ngulup@unisa.ac.za

Thank you in advance in anticipation.

Yours faithfully

A handwritten signature in blue ink, appearing to read "Patrick Ngulube".

Prof. Patrick Ngulube (Supervisor)

Appendix 12: An informal consent form for collecting data

Dear Participant,

My name is Grace Msoffe. I am a PhD student in Information Science at the University of South Africa (UNISA). My PhD study is entitled “Access and use of poultry management information in selected rural areas of Tanzania”. I am seeking your assistance with my study. The study aims to assess access and use of poultry management information in rural areas of Tanzania, in order to recommend the best ways of disseminating information for poultry management. The study includes everyone who is involved in poultry farming in your village. Participation is voluntary. You can withdraw from the study at any time. The interview will take 40 minutes of your time. The information that you provide will help to improve the dissemination of poultry management information.

The information that you provide will be kept strictly confidential and will only be used for this study. Your credentials will not be included in the final report. Failure to participate in the research will not prejudice you in any way.

AUTHORIZATION: I have read the above and understand the nature of this study. I understand that by agreeing to participate in this study, I have not waived any legal or human right. I understand that if there is a need for any clarification about this study, I may contact the student’s promoter, Prof. Patrick Ngulube (ngulubep@unisa.ac.za), or the student, Grace Msoffe (48091103@mylife.unisa.ac.za) at any time.

I agree to participate in this study and I understand that I may refuse to participate or may withdraw from the study at any time without prejudice.

Participant’s signature_____ Date_____

Researcher’s signature_____ Date_____