ENHANCING FARMERS' ACCESS TO AND USE OF AGRICULTURAL INFORMATION FOR EMPOWERMENT AND IMPROVED LIVELIHOODS

A case of Morogoro Region, Tanzania

By

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A Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy of the University of Dar es Salaam

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the University of Dar es Salaam a thesis entitled: ***Enhancing farmers' access to and use of agricultural information for empowerment and improved livelihoods: a case of Morogoro region, Tanzania***, in fulfillment of the requirements for the degree of Doctor of Philosophy of the University of Dar es Salaam.

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DECLARATION

AND

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I, **Doris Siima Matovelo**, declare that this thesis is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature ----------

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Praise be to God the Almighty the creator and grantor of life and health.

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"Proverbs 22: 6"

ABSTRACT

This study aimed at exploring and testing an intervention that could stimulate and promote the practice of proactive information acquisition by farmers as a strategy for empowerment, reduction of poverty and improvement of livelihoods. It was conducted in Morogoro region in Tanzania in two main stages; the situation analysis survey stage in ten villages, and a longitudinal participatory action-oriented stage which was an intervention phase in four villages. The Village Information Centre (VIC) model was established, monitored and evaluated. This was preceded by the pre-intervention knowledge test in the four research villages and two control villages. Descriptive statistics and frequency distribution of variables were computed, a chi-square test and a regression analysis for selected sets of variables were done. The majority of farmers were between 28-47 years old. Slightly more than half (56%) of all farmers had completed primary school education. Furthermore, 76% of the farmers had functional literacy, and 55% of all respondents had a habit of reading at least once in several months. Close to 90% of all respondents had some printed information in their homes, with newspapers being the most common item. The VIC was highly acceptable in all villages, but the age, level of education and gender were significant factors ($p \leq 0.05$) influencing awareness of, visits to and use of the VIC. Farmers revealed diverse and unmet information needs that were not necessarily related to their agricultural activities. The "push" phenomenon inherent in some extension approaches may have led most farmers to develop passive recipience that does not necessarily promote a "pull" phenomenon. Exposure to information is probably needed in order to stimulate a demand for information. The VIC initiative has also demonstrated the presence of reading skills that are under-utilized. This is a challenge and opportunity for information professionals. Therefore it is recommended that documentary information workers prepare a strategy, which will have a complementary role to the regular extension services, on enhancing the practice of proactive information acquisition by farmers for their own empowerment and improvement of their livelihoods.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASDS	Agricultural Sector Development Strategy
CIAT	International Centre for Tropical Agriculture (Centro International de Agricultura Tropical)
CICs	Community Information Centres
CTA	Technical Centre for Agricultural and Rural Cooperation (Centre Technique de Cooperation Agricole et Rurale)
FAO	Food and Agriculture Organisation
FEPU	Farmer Education and Publicity Unity
FGD	Focus Group Discussion
GLM	General Linear Model
GIS	Geographical Information System
GDP	Gross Domestic Product
HIV/AIDS	Human Immune Deficiency Virus/Acquired Immunodeficiency Syndrome
ICTs	Information and Communication Technologies
INADES	African Institute for Economical and Social Development (The "Institut Africain pour le Développement Economique et Social)
ISPs	Internet Service Providers
KHK	Kituo cha Habari cha Kijiji
KNLS	Kenya National Library Service
MAFSC	Ministry of Agriculture Food Security and Cooperatives
MAFS	Ministry of Agriculture and Food Security
MEMKWA	Maendeleo ya Elimu ya Msingi kwa Walioikosa (Primary school education to those who did not had an opportunity)
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania
MKUMBITA	Mpango wa Kuboresha Mazingira ya Biashara Tanzania

MKURABITA	Mpango wa Kurasimisha Rasilimali na Biashara Tanzania (Tanzania Property and Business formalization Programme)
MVIWATA	Mtandao wa Vikundi vya Wakulima Tanzania
NGOs	Non Governmental Organisations
NSGRP	National Strategy for Growth and Reduction of Poverty
PADEP	Participatory Agricultural Development and Empowerment
PAR	Participatory Action Research
PRSP	Poverty Reduction Strategy Paper
REPOA	Research on Poverty Alleviation
SACCOS	Savings and Credit Cooperatives
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
TLS	Tanganyika library Services
TLSB	Tanganyika Library Services Board
UNESCO	United Nations Educational, Scientific and Cultural Organisation
URT	United Republic of Tanzania
USA	United States of America
USAID	United States Agency for International Development
VEO_1	Village Executive Officer
VEO_2	Village Extension Officer
VIC	Village Information Centre
VLIR	Interuniversity Development Cooperation (VLaamse Interunivesitaire Raad)
WAICENT	World Agricultural Information Centre

CHAPTER ONE

INTRODUCTION

1.1 Introduction to the research

Information is a critical resource for socio-economic development because it empowers people to make informed choices for attaining better livelihoods. The value of information however, can only be realized if it is accessed, used and understood. Furthermore, the practice of seeking, accessing and using information is better sustained by mainstreaming it into the lifestyles of target communities, thereby internalizing the information seeking practices of beneficiaries with a view to making the practice self-sustaining.

The importance of access to and use of information in rural areas, just like anywhere else, has been demonstrated in several quarters. The experiences of some of the rapidly growing economies such as China has shown that improvement in information services was one of the strategies used to achieve agricultural transformation (Xu, 2001; Delman, 1991). Similarly in Tanzania, Mchombu (2003) demonstrated a positive impact of information services on improvement in agricultural practices. Furthermore, studies in Malawi (Muyepa, 2002) identified agricultural information bottlenecks as being one of the causes of low productivity, thus contributing to deepening poverty levels. Given the similarities in socio-economic profiles between Malawi and Tanzania, it is reasonable to suppose that a similar situation applies in Tanzania.

One of the areas where information has an important role is in empowering people in the fight against poverty. Needless to say, poverty is such a serious problem that, globally, eradication of extreme poverty and hunger is the topmost goal of the eight Millennium Development Goals (MDGs) (UN, 2000). Although poverty has global effects and implications, problems and indignity of poverty are more pronounced in developing economies and in Sub-Saharan Africa in particular, whose share in global income poverty, for example, has risen in the recent past (White and Killick, 2001). In Tanzania for instance, half of the population is still basically poor and about one-third live in abject poverty[1] - below the poverty line (URT, 2000_a). This is the major reason why Tanzania identified poverty as one of its three major obstacles to development ever since her independence in 1961. The other two obstacles identified were ignorance and diseases (Nyerere, 1968:325; URT, 2000_a op. cit.). Today, poverty is still a big obstacle to development in the country, and it is with this understanding that there has been a call to revisit the approaches, strategies and campaigns for eradicating poverty by, for example, linking it to lack of information or ignorance of pertinent issues.

Eradication of poverty calls for a multidimensional and multidisciplinary approach, in which all sectors have a definite role to play. It is with this understanding that the government of this country has consistently insisted on the country's commitment to eradication of poverty, urging people of all affiliations and ideologies to deliberately focus on what can reasonably be done to empower Tanzanians to break the chains of

[1] Living on less than one USD a day

poverty by also bringing forward "ideas" on poverty eradication strategies (Mkapa, 2002).

There are many factors behind the current state of poverty, but poor performance in agriculture and sub-optimal exploitation of natural resources are among the important contributing factors. The agricultural sector is singled out because, as highlighted in chapter two, agriculture has remained the main economic livelihood for the majority of the people and will continue to play a central role in the economy of the country into the foreseeable future. The key areas of the economy to which agriculture contributes decisively are the country's Gross Domestic Product (GDP), to which it contributes 48% (URT, 2001_a: 110), export earnings and employment, to which the sector accounts for 60% and 84% respectively (URT, 1997_a:1). The major components of the agricultural sector are food crops, livestock and traditional export crops.

However, the agricultural growth rate is unsatisfactory and has failed to improve the livelihoods of the rural people (URT, 2001_b: iv). This can be greatly attributed to the reliance on poor tools and equipment such as hand hoes, which is a major limitation considering the size of the land holdings and their utilization. Also there is limited adoption of agricultural innovations and ideas as well as minimal use of efficient techniques. Since the majority of the poor in Tanzania live in rural areas where the major economic activity is agriculture (ibid.), having rapid rural economic growth by improvements in agricultural performance, among other things, is expected to have a

great effect on the national poverty levels. Improving agricultural productivity, processing and marketing is currently and in the foreseeable future the surest way to raise household incomes for the majority of the rural population, reduce poverty and finally eradicate it. An increase in agricultural productivity in itself makes a direct contribution towards poverty eradication by lowering food costs among other things. It has been estimated that the poor spend about 80% of their income on food (USAID, 2000). and lowered food costs expand their disposable income and contribute to improved food security.

Agriculture being a lead sector has continuously been shown to play a major role in both the country's former poverty reduction strategy and the current National Strategy for Growth and Reduction of Poverty (NSGRP) known by its Kiswahili acronym, MKUKUTA (Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania) (URT, 2005_a: 5-6; URT, 2000_a, op. cit.: 14; URT, 1997_a: 1 op. cit.). In recognizing this fact, the Agricultural Sector Development Strategy (ASDS) stresses improvement of agricultural productivity by having a special focus on smallholder farmers (who use 85% of arable land) as a source of economic development (URT, 2001_b: 5, 7).

The levels of income poverty especially in rural communities, is also aggravated by information poverty, which in turn leads to lack of empowerment and confidence for making the right decisions and consequently socio-economic deprivation. The information needs of rural communities have been identified to rank high among key

areas that require intervention in the ASDS (URT, 2001_b: ix). However, given the many initiatives that have been attempted to address the information needs of the rural communities, one major question that remains to be answered decisively is on the approaches that are appropriate, effective and sustainable in as far as rural communities themselves are concerned (Kullaratne, 1997).

In an attempt to address this quagmire, the NSGRP in its communication strategy has urged for the establishing and strengthening ofcommunity information centres as one measure for providing cost-effective information services for improving information welfare for rural communities (URT, 2005_b: 18). It is in the light of the observations above, that concepts, policies and approaches for meeting the information needs of rural communities remain an attractive subject of research studies.

This research was motivated mainly by a wide range of literature indicating the information gap relating to existing agricultural information for farmers, emanating from research for the improvement of rural livelihoods, as cited by, among others; Ochieng', 2004 ; Muyepa, 2002 op. cit.; URT, 2001_b: 7 ; Laizer, 1999: 58; Matee and Mollel, 1990; ISNAR, 1989). In addition, discussion with some farmers during agricultural exhibitions ("Farmer's day") revealed farmers' craving need for agricultural information, while also expressing a desire for printed agricultural materials to meet their information needs. At this juncture, active involvement of the information sector to penetrate right down to the village level would contribute to enhanced access to

information resources at household level. In this respect, and as pointed out by Manda (2002) and Mascarenhas (1992), the information sector faces a number of challenges. One of the challenges is how to play an active role in enabling farmers to become proactive in seeking solutions to their information and knowledge problems, rather than remaining passive recipients of information, as appears to be the case in most extension-driven information delivery initiatives.

The research was confined to recorded information resources, not only because of their strength in terms of being relatively easily available to farmers at any particular time and place, but also because, with this media, users can set their own pace in the information communication process. In addition, farmers may actively inform themselves at any moment instead of waiting for an extension officer's visit or a radio broadcast (Carter, 1999). Furthermore, most of it is not dependent on the availability of electricity or different kinds of batteries, which for the time being are often scarce in rural environments. Although the gap is apparent, no approaches and mechanisms have yet been established in the country, specifically addressing information acquisition issues among farmers.

1.2 Background to the Problem

Agricultural research activities in Tanzania and elsewhere have generated and continue to generate useful information on various innovations and ideas that could empower

farmers to improve both their farming activities and their livelihoods. Most of this information is documented and normally recorded in print and/or electronically and repackaged so that it is available for use by target groups at any particular time and place. Utilizable information for basic and factual agricultural information needs is therefore abundantly available in places such as research institutions, public offices and public libraries, including the Sokoine National Agricultural Library (SNAL) at Sokoine University of Agriculture (SUA). However, it has been shown that only a small amount of such information is known to be accessed and used by the farmers in rural areas who need it most. (Ochieng', op. cit.; Wambura, 1992; Laizer, op. cit: 58; Matee and Mollel, op. cit; ISNAR, op. cit.). This gap has mostly been attributed to weaknesses in information delivery approaches and the absence of a practice of active acquisition of information by the end users, which Maru and Alluri have referred to as "shopping for information " (Maru and Alluri, 2004).

Although a number of initiatives to bridge the gap between information sources and the farmers have been taken by relevant sectors in the country, most of them have used conventional extension approaches, which have been a unidirectional initiative of giving information to farmers, but almost no farmers have taken the initiative to demand, shop and get information from the sources. Therefore the longstanding contribution and approaches of extension services to agricultural development, though well acknowledged, have tended to be prescriptive and package oriented, aimed at solving specific and predetermined farmers' problems. As put forward by Leeuwis with Ban

(2004: 11) in rethinking agricultural extension, these approaches tend to assume that farmers are homogeneous in terms of their needs, priorities, abilities and attitudes towards farming activities. In the process, it has become apparent that each farmer has different objectives in his/her farming activities that evolve in response to factors such as resource endowment, or market situations (Maru and Alluri, op. cit.). Furthermore, the emerging scenario for agricultural development indicates that "farmers need a basket of options of processes, products, technologies, skills, ideas and information from which to make a choice" (ibid.). The conventional extension approach by nature, therefore, does not cultivate the habit of proactive information acquisition by farmers, which is a gap to be addressed by alternative approaches being studied here.

The second major shortcoming, which prompts a fresh approach to the enhancement of farmers' access to and use of information, is the ratio of extension agents to farmers. Basically, extension agents are few in number and so they only make occasional visits to farmers. For this reason, the majority of farmers are never or are rarely visited by extension agents (Isinika and Mdoe, 2001: 29). Other researchers (Kitetu and Chai, 2004; Aboyade, 1983) have cited another shortcoming which lies in the nature of training provided to extension workers, which emphasizes technical proficiency but tends to ignore communication and persuasive strategies. He argues that, while extension professionals are more skilful in handling farmers and dealing with their farming needs, information professionals are stronger in mechanisms of information

transfer and information management, including training in handling different types of formal information and media.

In this respect, it is worth mentioning that informal sources of information are also known to play a useful role in enlightening farmers. Such informal sources include relatives, friends and neighbours through word of mouth. Although farmers sometimes attach great importance to such informal sources more than to extension agents (Isinika and Mdoe, op. cit.), such sources may not always be reliable because they are sometimes not well informed about the matter they share information on, they have inadequate information or may distort the information in the process of passing it on to others (Roling, 1988: 113). Consequently, there is a felt need to understand the diversity of problems of information acquisition from the farmers' perspective, using a combination of approaches to enhance access to and use of existing information in order to solve information and knowledge-related problems.

Information, particularly information on innovations and ideas in agriculture, that could be a great source of empowerment for farmers, is under-exploited (Wambura, op. cit.; URT, 2001_b op. cit.; ISNAR, op. cit.). Such information is available in libraries and many other information centres that hold an ever-growing collection of information generated by various research activities conducted to provide solutions to improve agricultural productivity and other societal problems. Examples include information on disease-resistant crops, high-yielding crop varieties, local chicken production systems and other livestock management techniques, techniques for processing and preserving

fruit and vegetables and high-value crops such as vanilla for areas adversely affected by the failure of traditional crops. Others include agricultural irrigation methods, rainwater harvesting techniques, agricultural mechanization and so on.

It is however known that the end users, particularly in rural areas, have limited information and knowledge emanating from research and other relevant information that could contribute to solving the production and livelihood problems. Information-starved farmers lack self-esteem, thus compelling them to remain passive receivers of supply-determined information packages. Problems in meeting farmers' information needs are longstanding, despite efforts by extension services. It would seem that other approaches are needed to bridge the gap not filled by the extension service. To this effect, it has been argued that information scientists could have a useful role in complementing the work of extension services by cultivating proactive information-seeking behaviours among farmers.

The formal information services, such as those offered by the public libraries, are concentrated in urban settings. However, following the decentralization exercise in 1997, and according to the Local Government Act of 1982 as amended in 1998, developmental activities including public library services were the mandate of the district and urban authorities that were under the then Ministry of Regional Administration and Local governments (URT, 1982). The results of decentralized governance were expected to include improved services that were more responsive to

the needs of the people of each village, township, town, and city (Johnson, 1996). Currently, more districts in Tanzania mainland are forming library boards that are supposed to work out library development plans that would include serving rural communities (Mollel, 2005 ; TLSB, 2005: 12). The national agricultural library and agricultural research centres, on the other hand, are relatively more endowed and have materials that could be utilized by the farmers as well to meet some of their information needs and agricultural development activities[2].

While the initiatives stated earlier and the possibility of addressing farmers' information needs are acknowledged, there are no models or arrangements through which the practice of proactive information seeking and use could be mainstreamed into the ordinary lives of farmers to encourage the practice of self-perpetuating knowledge building. Therefore the challenge is to formulate additional practical, effective and sustainable ways of unleashing the power of agricultural information for improved agricultural productivity and poverty eradication.

1.3 Statement of the problem

Information is an acknowledged key ingredient for development, and the rate of development is directly related to good information welfare. To speed up development

[2] Discussions with farmers who visited SNAL pavilion during Farmers' week exhibitions in Morogoro, in 2001. Following their interest in some reading materials the library ordered more materials for them.

therefore crucial information needs must be met. Unmet farmers' information needs is one of the critical constraints to their empowerment and agricultural development. According to the ASDS (URT, 2001_b: op. cit), there are many technological innovations, new ideas and information that are meant for farmers' use, such as improved seeds, food processing techniques, storage facilities, animal husbandry techniques and animal breeds as well as markets and weather information, to mention only a few, that remain unknown to the majority of smallholder farmers. The extension service is well acknowledged for its longstanding contribution in providing information to farmers. However, by its very nature, extension service approaches inherently relegate farmers to being passive information recipients (URT 2006, Neuchatel: 2004). The approaches tend to encourage farmers to wait and get what is brought to them instead of seeking out what information is available to them. This gap is probably due to the lack of strategies to cultivate the practice of proactive information seeking among end-users. This is further aggravated by the lack of a community institutional framework to cater for the cultivation of the practice of proactive information seeking by farmers. As a result of this gap, communities tend to be poorer in regard to information than they probably would be in presence of a community or institutional framework for cultivating and internalising the practice of proactive information seeking.

Although the approach for the active participation of farmers in acquiring information and knowledge has been pointed out by extension professionals (Mwaseba et al: 2006), there are no empirical studies that provide for its adoption in our situation.

On the other hand, cultivating the practice of proactive information seeking is a phenomenon well established in the information profession. It is the essence of the profession itself. It is therefore a realistic assumption that incorporation of information science methods in building up the information skills of farmers has a visible role to play in closing the gap above, which cannot be met by the extension service alone.

The challenge is to develop and validate effective models and a community or institutional framework to harness the essence of cultivating the practice of proactive information seeking for the improved and sustained information welfare of farmers.

1.4 Purpose of the study

This study was undertaken with the purpose of exploring and testing an intervention approach that could encourage farmers to actively get access to and use information, in order to become empowered and improve their livelihoods.

1.5 Objectives

i). To assess the current agricultural information needs of farmers in the study area.

ii). To identify printed information on agriculture that could be used by farmers in the study area.

iii). To assess farmers' ability and willingness to access and use printed information.

iv). To enhance farmers' access to and use of agricultural information.

v). To recommend an approach for promoting the practice of proactive information acquisition by farmers.

1.6 Research questions

i). What are the current agricultural information needs of the farmers in the region?

ii). Which printed sources of agricultural information are available and could be used by farmers?

iii) What are the farmers' abilities, attitudes and limitations in accessing and using printed information sources?

iv). How best could farmers access and use agricultural information in rural settings?

v). What should be done to promote the practice of proactive information acquisition by farmers?

1.7 Significance of the study

This study is a contribution to the agricultural information knowledge base about Tanzania and the study area in particular.

It is expected that the results of this research will provide additional information for developing a complementary and collaborative approach for farmers' optimal access to and use of recorded information on agricultural innovations and ideas. Furthermore, the research provides an empirical basis for recommending mainstreaming information literacy skills into farmers' development programmes.

Through a participatory process of information and knowledge acquisition, the possibility of farmers accessing and using information has been increased and their consciousness has also been raised. The research has reduced the gap of information needs of smallholder farmers to the extent of demanding not only information but also the possibility of making the information access centres permanent facilities in their villages. Furthermore, the research has also imparted knowledge to farmers which has a direct application to their families and the community. Therefore, through this research, smallholder farmers have to some extent become more empowered to be able to improve their livelihoods.

1.8 Definition of some selected terms and concepts

(i) Agricultural information

In this research agricultural information refers to information on agriculture aimed at imparting knowledge and skills, where agriculture in its broad sense means the science or art of cultivating the soil, growing, harvesting, processing and marketing crops and raising livestock (New Encyclopaedia Brittannica, 1997: 156)

(ii) Agricultural innovations

Include new ideas, products, techniques and technologies in agricultural practices resulting from research and other activities, aimed at solving certain problems in the society. This definition is adopted for this research.

(iii) Functional literacy

Refers to a state where a person has acquired essential knowledge which enables him/her to engage in activities for which literacy is required and whose attainment in reading, writing and arithmetic makes it possible for him/her to continue to use those skills in the development of their community (URT, 1997_b: 9).

(vi) Human Information Behaviour

All aspects of behaviour with respect to interaction with, and use of, all forms of information and knowledge, through all sources, channels and media, including informal and unrecorded communication (ibid.)

(v) Information literacy

Information Literacy (IL) is defined as the set of skills needed to find, retrieve, analyze and use information. IL therefore equips people with the critical skills necessary to become independent lifelong learners (American Library Association, 2005).

(vi) Information seeking

This is an aspect of Human Information Behaviour, referring to the purposeful activities of looking for information to meet a need, solve a problem or increase understanding (Kajberg and Lørring, 2005:88).

(vii) Information use

For the purpose of this research information use is used in the context of library and information science, meaning the deliberate effort of accessing, reading or by any means going through documents or any other information-containing resource for the purpose of getting knowledge on what is being communicated in the documents. It includes reading in a group using a group leader, but does not cover adoption of what is being communicated.

(viii) Information use Interface

This refers to the point of intersection between information generation and access points, such as libraries/information centres, schools, noticeboards, village administration/extension offices, open markets, and village meeting places.

(ix) Recorded information

This refers to information that has been documented and registered, is in a physical format and in a form that is retrievable and could be used at any particular time and place. It includes printed documents and documents in electronic devices such as CD-ROMs and Video cassettes. In this research, recorded information is restricted to printed materials.

(x) Smallholder farmers

According to the Ministry of Agriculture and Food Security (MAFS), smallholder farmers, who in this study will generally be referred to as "farmers", are farmers who cultivate an average farm size of 0.9 to 3.0 hectares each, and food crop production dominates their agricultural activities (URT, 2004_a). They include crop and livestock producers and together constitute the majority of the rural population in Tanzania.

(xi) Farmer empowerment

The concept of farmer empowerment has different meanings in different socio-cultural, economic and political contexts; hence there are many different definitions of empowerment. The following definition is adopted for the purpose of this study. Farmer empowerment is attained when farmers acquire the ability to determine their own destiny and assume the authority, resources and capabilities to hold accountable and influence the content of public and private agricultural services (URT, 2003_a: 20). The common elements that are present in a successful empowerment intervention include access to information among others (ibid).

(xii) Focus Groups

There are many definitions of a focus group in literature. For the purposes of this research, a definition by Powell et al cited by Gibbs (2005) has been adopted, where a focus group is defined as "a group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the

research. They can be used either as a method in their own right or as a complement to other methods for triangulation and validity checking".

(xiii) "Pull" and "push" phenomena

The "pull" and "push" phenomena are used as metaphors to contextualise the relation between source and recipient in the processes of transfer and/or acquisition of information. Metaphorically, the "pull" phenomenon in the practice of knowledge building among farmers is characterised by self-determination and the proactive pursuit of information to meet felt information needs. Therefore, the "pull" phenomenon tends to be consumer driven in terms of content and pace. It tends to be advocated due to its merit in stimulating the farmers' own capacities to build a knowledge base and its sustainability derived from voluntary internalization of the practice. On the the other hand, the "push" phenomenon is characterised by deliberate or incidental supplier-driven delivery of predetermined and prescribed packages of information based on needs as may be perceived by the suppliers, who are usually the development agents in their various forms. It is, however, worth observing that, to begin with, the push phenomenon may be used to stimulate adoption of the "pull phenomenon", thereby underscoring the benefits that may be realised from synergy.

(xiv) Out-scaling and up-scaling

In the context of this study, out-scaling is taken to mean looking at the model on the same scale but in close and more distant areas to test how much the model can be

adapted to slightly different circumstances (sharing the model with neighbours). On the other hand, up-scaling tries to influence 'higher' levels, by exploring how wider application of the model interacts with the policy, institutions and governance systems.

(xv) Participatory Action Research (PAR)

The term participatory action research, refers to activities or interventions intended to achieve tangible development goals while at the same time increasing our understanding of how those goals can be achieved (Moris and Copestake, 1993). It involves active participation of the respondents who are referred to as research participants in participatory approaches. Action research is known by many other names, including participatory research, collaborative inquiry, emancipatory research, action learning, and contextural action research (O'Brien, 1998). Action research therefore falls under "participatory approaches", an umbrella term for a wide range of similar approaches and methodologies continually and rapidly evolving (Lema and Kapange, 2004).

The term 'action research' can be traced back to the late 1940s. By the mid 1970s it had evolved, revealing four main types; traditional, contextural, radical and educational. (O'Brien, op. cit.). Participatory approaches in agriculture, for instance, have their origins in Rapid Rural Appraisal, and Farming Systems Research which gained popularity during the 1970s as alternative approaches to overcome the lack of involvement of stakeholders in agricultural development, which was considered one of the major causes of the failures to improve the livelihoods of the majority of poor

farmers in the developing world (Farrington and Martin, 1987). Involvement of stakeholders (farmers) is based on the premise that the farmers can effectively make a valuable contribution to research agenda and come up with effective solutions when they are active participants in the research than when they are treated as passive research subjects (ibid.). The main argument in favour of the participatory approach is based on its major outcome namely, the empowerment of individuals so that they can learn from the process of enquiry and use it to solve various problems that face them, thereby contributing to their self-improvement.

The type, mode and level of participation may vary from one piece of research to another, depending on a number of factors, such as objective and goal of the research, issues to be captured, required intensity of farmer participation and the situation on the ground (Okali et al 1994: 19, 23). In this research, the educational participatory action type was adopted, which is based on the writings of an educational philosopher Thomas Dewey, who argues that professionals should become involved in community problem-solving (O'Brien, op. cit). Practitioners of this type operate mainly out of educational institutions where, for instance, university-based action researchers work with teachers in a community (ibid).

1.9 Key assumptions

Adoption of the intervention research model in this study greatly depended on the functional or useful literacy of the farmers, because farmers' level of literacy is known to be a hindrance in using printed information. According to the available literature, there have been a number of literacy campaigns in this country since independence and the literacy rate has gradually improved. It was therefore assumed that literacy levels among most of the smallholder farmers in the study area would be high enough for the purposes of the study.

It was also assumed that, if there was be a rise in the scores in the test of farmers' information and knowledge concerning basic farming and livestock keeping activities in the villages under intervention, the difference would be attributed mainly to the information acquired after farmers' access to and use of materials that were available in the Village Information Centres (VICs).

1.10 Theoretical Background

A number of elements from some of the communication models and theories have to some extent guided this study. Communication is deeply rooted in human behaviours and the structures of society so that it is present in almost all social or behavioural events. Despite this fact and the frequent casual use of the word, communication as a concept does not have a precise definition agreeable to most scholars of communication.

Furthermore, the field of communication, like many other fields, has evolved considerably over time, although the models used to conceptualise it have remained the same, with slight modifications or updating to better account for changes, such as those related to technological developments.

Communication is defined as the process of transferring information from a sender to a receiver with the use of a medium in which the communicated information is understood by both sender and receiver. Authors such as Laswell (1948) explain the communication process as "who says what to whom in what channel with what effect." Shannon and Weaver (1949) view communication as a process of transmitting a message in an input and output sequence under a given channel capacity. King (1968) views communication as a two-way process which operates in changing patterns of events or contacts between the constituent components of a transactional situation.

Communication is also viewed as an information-related behaviour, manifesting as a process of information flow by which living creatures can convey and acquire information related to their surroundings in order to carry out their daily life activities (Organizational Communications, 2007).

Andersen (in Dance, 1970) is concerned with the aspect of understanding, and so, he defines communication as a process by which we understand others and, in turn, endeavour to be understood. Behavioural change is an aspect of concern to

psychologists. Thus they define communication in behavioural terms and view it in terms of discriminative responses, behaviour modifying, stimulus and responses.

Berlo (1960) contends that every communication situation differs in some ways from another, yet scholars have attempted to isolate certain elements that all communication situations have in common. The commonality is in aspects that are seen in any communication situation, such as the process, ingredients, time, and context. For the process of communication to start, there must be ingredients to interact. Berlo (ibid) also points out that all communication situations are time and context bound.

Three common communication settings have been identified as

i. Interpersonal or face-to-face. In this setting there is direct one-to-one communication.
ii. Machine assisted (e.g. computers, cell phones, etc.). This setting makes use of a machine as a channel for information exchange, such as the use of email, instant (sms) messages, conversation over cell phones.
iii. Mass communication. In this setting information to be conveyed is targeted at a larger audience that is scattered. The medium of communication in this setting includes print media of various formats, television and radio.

In conceptualizing communication the most difficult and probably the most important part is to determine whether or not communication has occurred. Conceptualizing

human communication relates to a diversity of theories that attempt at explaining when communication is said to have occurred. Below are a selected few:

- Shannon-Weaver Model of communication.

This is often referred to as an 'information model' of communication, and for the purpose of this framework, could be taken to represent models in the information transmission theory of communication. The theory is based on the work of Shannon of 1948 and the Shannon model of communication process. The model is said to be the beginning of the modern field (Foulger, 2004). It provided, for the first time, a general model of the communication process that could be treated as the common ground of such diverse disciplines as journalism, rhetoric, linguistics, and speech and hearing sciences.

The Shannon-Weaver Model (op. cit.) proposes a theory that all communication must include six elements: a source; an encoder; a message; a channel; a decoder; and a receiver. During message transmission through a channel, the receiver may come across noises, which are any mental or physical distraction that interferes with the transmission of a signal from the source to the destination. The problems created by noise may be overcome by the introduction of "correction channels" so that the information in the message finally reaches the receiver. In this theory, communication is determined to have occurred when the message has been delivered to the receiver in a clearly recognised form, without necessarily calling for feedback. In general, this model being

one-way does not give receivers an active role. Thus receivers may tend to become passive recipients of messages.

It is because of the above weaknesses that Foulger (op. cit.) argues that Shannon's model is not really a model of communication. It is, instead, a model of the flow of information through a medium, and an incomplete and biased model that is far more applicable to the system it maps, a telephone or telegraph, than it is to most other media. It suggests, for instance, a "push" model, which can inflict information on its destinations. In the real world of media, destinations are more typically self-selecting "consumers" of information, who have the ability to select the messages they are most interested in, turn off messages that do not interest them, or focus on one message in preference to another.

- Lasswell's model

Laswell's (1947) model focuses primarily on verbal communication. It is a simple description of a one-way communication process, which comprises a speaker who communicates a message to a receiver by making use of any of the media like print, radio, television, etc, to finally convey the information.

- The S-M-C-R (Source-Message-Channel-Receiver) Model

Berlo (op. cit.) provides a model which is very much related to the acquisition of information and knowledge. He explains that the model emphasizes the importance of a thorough understanding of human behaviour in relation to communication analysis. He

further illustrates that for learning to occur and for behaviour to change, the brain and central nervous system have to function. The stimulus has to be interpreted apart from being perceived.

- Weiner's Cybernetic model

This is sometimes referred to as the interactional or cybernetic theory of communication and it relates to a number of theories that explain communication. Sometimes it is referred to as the gatekeeper model of the two-step flow (Foulger op. cit.). It is one of the theories whereby the communication process calls for continued feedback until the expected results are experienced by the receiver. Communication in such theories is said to have occurred when the intended behaviour change is displayed by the receiver.

- The medium theory

The medium theory (McLuhan, 1964) states that "the medium is the message", and is also known as the channel theory or media formalism. It equates the message to the medium, contending that content can never be separate from the medium itself. This theory stresses how channels differ, not only in terms of their content, but also in regard to how they awaken and alter thoughts and senses. This theory advances the idea that channels are a dominant force that must be understood to know how the media influence society. This model seeks, more than anything else, to position language and media as the intermediate building blocks on which communication is built.

The overview of a few theories above shows that there is a diversity of conceptualization about human communication. Theorists belonging to the information transmission theory, for example, tend to regard communication as a one-way process with the communicator delivering information to the receiver. Communication is determined to have occurred when the message has been delivered to the receiver in a clearly recognised manner without necessarily calling for feedback. Those holding to the cybernetic theory of communication regard communication as a two-way trafficking of information, with greater emphasis on a feedback mechanism between the communicator and the receiver. The third category belongs to the multidimensional theory of communication but has competing theoretical orientations. In this category, communication is identified as an aspect of human behaviour and a dynamic process of changing the behaviour of the receivers of information.

1.11 Conceptual Framework

The framework for this study identifies information access and use as a dependent variable that has to be studied. It focuses on only three fundamental elements of communication from one of the basic communication models by Berlo (in Carey, 1999: 11-14) (see model below), namely: (a) the farmer as a receiver of information, including personal attributes and the environment surrounding him/her, (b) the channel or medium of information, including formats and access interfaces, and (c) the information

(message) being delivered, including content and relevance to the farmer. The fourth factor, i.e. the sender or source of information (see figure 1), is not being considered in this framework because, according to the literature above, the supply of agricultural information is not a constraint. It can be hypothesized that, if farmers have conducive attributes and environment (minimal interferences/noises), and use relevant information, in the right format, through the right channel and interfaces, they would be empowered to have the basic abilities for making more rational and effective decisions. Rational and effective decisions have been shown to contribute to higher productivity and better livelihoods. However, the ensuing increase in productivity and improved livelihood is currently beyond the scope of this work.

The Berlo model is being adopted because it takes into account most of the communication factors. However, it has been slightly modified to leave out the sender (source) of information as stated above for the purpose of this research, but without altering the rest of its concepts that include:

- Farmers' attributes and environment

The indicators that were determined and analysed included age group, functional literacy, gender and gender-related decision-making limitations, socio-economic category, knowledge of existing innovations, attitudes or interest and practice concerning actual access and use of information, particularly recorded agricultural information.

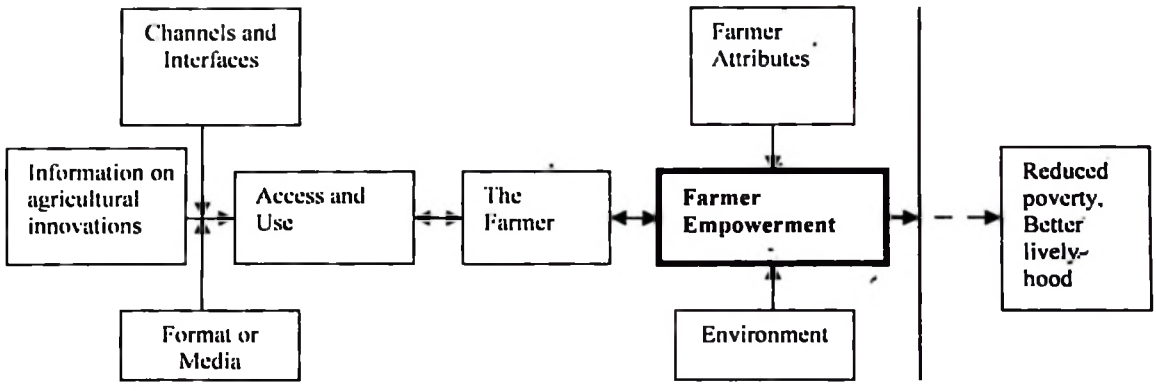
- Channel, interfaces and media for information delivery

These considered the information infrastructure, formats of information resources (including those in modern technology where applicable), whether or not there were any kind of rural information centres, including their accessibility by farmers.

- The nature and type of information being accessed (message)

The indicators included availability and relevance of agricultural information in the area, in relation to predetermined information needs, clarity of the message, and farmers' attitudes to and preference for the message communicated.

Figure 1: Diagrammatic representation of the Conceptual framework



Source: Modified based upon Berlo's model (Carey, 1999:11-14). The vertical line at the side of figure 1 above, demarcates the end of the study, while the dotted line points to the subsequent results of empowerment; reduced poverty and better livelihood as explained in the conceptual framework, which was however not examined as it was beyond the scope of this research.

CHAPTER TWO

OVERVIEW OF THE COUNTRY

2.1 Introduction

This chapter gives some highlights on the geographical, ecological and socio-economic aspects of the study area so that readers unfamiliar with this area may relate the subject to the research area.

2.2 Factual information

The nation of Tanzania came into being in April 1964 after the union of two free states, that of Tanganyika (now Tanzania mainland) and Zanzibar (The isles of Unguja and Pemba). While Tanzania mainland obtained her independence from colonial rule of Great Britain in 1961 and became a Republic in 1962, Zanzibar became independent from British rule in 1963, and overthrew the Arab minority ruling class in January 1964. Tanzania is currently divided into 26 regions, out of which 21 are on Tanzania mainland and five are in Zanzibar.

2.2.1 Geographical location

The country is situated along the Indian Ocean extending north-westward to Lake Victoria, and to the Great Rift Valley lakes of Tanganyika and Nyasa in the west. It lies between latitude 1° and 12° south of the Equator and between longitude 29° and 41° East of Greenwich. It borders Kenya and Uganda in the north; Zambia, Malawi and

Mozambique in the south; Rwanda, Burundi and Democratic Republic of Congo are found in the west while the Indian Ocean is to the east of the country.

2.2.2 Land coverage

Tanzania occupies a total area of 945,000 sq km, of which 881,00 sq km are occupied by Tanzania mainland while Zanzibar occupies a total land area of 2,000 sq km. Water area is about 62,000 sq km and 3,300 sq km is occupied by forest and woodland.

2.2.3 Weather and Climate

Tanzania has a tropical climate. While the highlands have temperatures ranging between 10°C and 20°C during the cold and hot season respectively, the temperatures for the rest of the country is normally never below 20°C. The hottest period is between November and February with temperatures between 25°C and 31°C. The coldest period is between May and August, when temperatures are usually between 15°C and 20°C.

2.2.4 Administration and political system

The country has two capital cities, Dar es Salaam which is the commercial capital and a major sea port for Tanzania, and Dodoma the political capital, located 309 km west of Dar es Salaam. Tanzania is a unitary republic based on multiparty parliamentary democracy. It has 26 administrative regions (21 on the mainland and 5 in Zanzibar). The regions are subdivided into 130 districts (120 on the mainland and 10 in Zanzibar).

2.2.5 The Population

Tanzania is made up of two major indigenous groups, the Bantu people forming the majority followed by the Nilotic. The other two minor groups are the Cushitic and Khoisan groups. There are also small groups of Europeans, Indians and Arabs found mostly in urban areas. The population census of 2002 (URT, 2003_b) recorded a population of 34.5 million people, with an annual average inter-censual growth rate of 2.9. Females outnumber males by only a small percentage; out of the total number of people, about 17 million are males and 17.5 million are females. The country has experienced a rapid increase in the rate of urban growth. However, Tanzania remains largely rural with about 80% of the population residing in rural areas, while the remaining 20 per cent are clustered around the major towns.

2.2.6 Language and Culture

Tanzania has more than 120 distinct ethnic languages. However, Kiswahili is the national and official language, which is spoken national-wide by the majority of the population. Likewise, Kiswahili is the medium of instruction in public primary schools, the language of communication in the parliament, lower judicial institutions and for most government business. The country uses English as the medium of instruction in post-primary education, higher judicial institutions and documents, international business, banking and in medical diagnosis and treatment. Tanzania has a mixed culture as a result of African, European, Arabic and Indian influences.

2.3 Education in Tanzania

The structure of the formal education in the country is pyramidal and hierarchically divided into three levels: primary, secondary and tertiary. The system follows a 7-4-2-3+ structure, meaning 7 years of primary education, 4 years of junior secondary (ordinary level), 2 years of senior secondary (Advanced level) and up to 3 or more years of tertiary education. The pre-primary education of up to two years in most cases is not compulsory. The age for attending school ranges being 5-6 years for pre-primary education, 7-13 years for primary education, 14-17 years for ordinary level secondary school and 18-19 years for advanced level secondary school (URT 2004_b: xi; URT 2004_a op. cit.)

During the first two decades after independence in 1961, the country achieved a dramatic increase in primary school enrolment when the gross enrolment rose from less than 50% to almost 95% in 1976 (URT, 1989: 7). Illiteracy rates were reduced from 66 percent in 1967 to 9.6 percent in 1986 (ibid). The country declared the year 1975 as the year by which illiteracy would be wiped out in the country (URT, 1989 op. cit: 6). Deliberate efforts towards achieving the goals included such policies as Universal Primary Education. However, the enrolment rate declined to below 80% by the mid-1990s, mainly due to economic decline (URT, 2003_c). The official abolition of the Universal Primary Education Levy and other mandatory contributions, as well as the launch of the Primary Education Development Programme 2002-2006, are said to have contributed significantly to the huge gains in primary school enrolment observed

between 2002-2003 (ibid). If the current rate of school enrolment is maintained and new entrants retained, Tanzania could achieve the longer-term MDG target of 100 percent primary school completion much earlier than the projected year 2015.

2.4 Agriculture in the economy

Tanzania is endowed with 88.6 million hectares of land suitable for agricultural production, of which 60 million hectares (67.7%) are range land ideal for livestock production. Out of the total agricultural land only 6.7 million hectares (7.9%) are used for rain-fed agriculture while 24 million hectares (27.1%) are used for livestock keeping. Agriculture has remained the single most important sector in Tanzania's economy. It employs about 80 percent of the active workforce, accounts for about 50 percent of GDP, about 50 percent of merchandise exports, and is the main source of food supply and raw materials for national industries. Agriculture in Tanzania is highly diversified to include export crops, food crops, livestock, fishery, forestry products and so on.

Small-scale subsistence farmers comprise more than 90 percent of the farming population, with medium and large-scale farmers accounting for the rest. It is predominantly rain-fed farming using the hand hoe as the major cultivating tool. The use of poor cultivating tools has been a major limitation on land holding size (URT, 2003c op. cit: 9). However, the longer-term objective of the agricultural sector is for a modernized, commercial sector, while one of the main priorities for the immediate

future is to improve labour productivity of small farmers through the use of affordable technology and improving access to credit, information and markets (ibid). The Tanzanian Development vision 2025 points out its strategy to encourage the use of modern and new technologies to facilitate an increase in productivity in all activities in agriculture (URT, 2000$_b$:11).

2.5 Information and other support services for Farmers

2.5.1 Conventional agricultural extension services

Farmers' information services have mostly been provided by the government through agricultural extension services such as extension visits, radio and TV programmes particularly the radio programme "Ukulima wa Kisasa" (Modern Agriculture) and a newsletter with the same title.

The Tanzanian government through the World Bank has been implementing different approaches for improving the information services to farmers. Such approaches include the establishment of the Agricultural Services Support Programme where the Farmers' Education and Publicity Unit (FEPU) ("Elimu kwa Wakulima" in Kiswahili) has been established as a separate unit under the National Agricultural Extension Programme. FEPU uses agricultural officers who have additional training in publicity. FEPU has developed and or strengthened initiatives such as the Farmers' Training Centres, a Newsletter mentioned above, some brochures, booklets and leaflets, a radio programme

that is being aired once a week and documenting some farmers' educational materials on videotapes. In recent developments however, several non-governmental organizations (NGOs) and farmer-led initiatives are supplementing the extension services delivered by the government sectors (Rutatora and Mattee, 2001).

Following a reform of the government administrative structure in 1996, the agricultural extension activities, like all other community service sectors, now fall under the Prime Minister's Office Regional Administration and Local Government in an effort to integrate all sectors to work together so that the development plans cover all sectors. Consequently all development sectors are under the Executive Officers who are development facilitators starting with the village, i.e. Village Executive Officer (VEO_1)[3] to the Regional level. With this approach the farmer is supposed to be looked at in his/her totality of needs and can be served from a single office that has different sectors put together to form a kind of "one-stop centre" office.

2.5.2 Participatory and farmer empowerment approaches

In recognition of the need for farmer involvement, in 1994 the Government of Tanzania and the Food and Agriculture Organization of the United Nations (FAO) made an attempt to utilize participatory approaches to facilitate agricultural production. One of the initiatives for implementing the approach is the formation of participatory farmers' groups within the National Special Programme on Food Production. The programme

[3] Note that VEO_1 refers to the Village Executive Officer as opposed to VEO_2 which refers to the Village Extension Officer

was initially implemented in two regions of Tanzania mainland, namely Morogoro and Dodoma.

Currently, the government of Tanzania, with support from the World Bank, is implementing a Participatory Agricultural Development and Empowerment project (PADEP) planned to run for five years starting from 2003. It is an intervention to enhance agricultural development through the promotion and adoption of improved technologies by the target community, in enhancing active participation of the private sector in input and output markets, and in the provision of services to rural communities. The project's objective is to increase farm incomes and reduce food insecurity, thereby contributing to reduction of rural poverty. The project is coordinated by the Ministry of Agriculture, Food Security and Cooperatives and is implemented through small agricultural development sub-projects that are planned and managed by the community and groups of farmers. It is envisaged that through this project rural communities and farmer groups will be empowered to make decisions regarding the choice of sustainable and remunerative productive technologies.

2.6 Library and information services in Tanzania mainland

Tanzania has gradually been developing its library and information sector since independence in 1961. The sector is divided into the public library, academic and school libraries, specialized libraries and documentation centres.

2.6.1 Past and present public library services

Tanzania (then Tanganyika) was the first country to introduce the public library organ in East Africa in 1963, two years after independence. The formation resulted from separating the former East African Literature Bureau following the Hockey report of 1960 (Broome, 1965; IFLA, 1999).

The public library services are run by the Tanganyika Library Services Board (TLSB) which was established by a government Act in 1963 under the Ministry of Education and Vocational Training (until 2005 known as the Ministry of Education and Culture). The TLSB was empowered, among other things, to establish, equip, manage, maintain and develop libraries in the country. The Act envisaged the Board's overall coordination of libraries of all kinds (Ilomo, 1972). One of the important goals of the TLSB was to have a public library in all regional and district headquarters.

Tanzania has no National library, which under normal circumstances collects and manages literature produced in the country. In the absence of such a library, the Central Library in Dar es Salaam, which is a public library, also functions as the national library of Tanzania. On top of other responsibilities the Central Library has the task of serving as a "hub" from which to reach out to towns and villages. Reaching villages in rural areas by using rural and mobile libraries was especially important in an effort to eradicate illiteracy and bring knowledge to farmers for the purposes of rural development (Nyerere, op. cit.: 323).

The Tanzania Library Service (TLS) was established in 1972 with the financial and administrative support of the central government and town councils. By 1989, TLS had altogether 15 regional (urban) libraries, the National Central Library, 9 district libraries and 300 village libraries or static village library centres (Kaungamno and Ilomo, 1989: 173-4). However, the target to reach all regions as stated in the development plan was not reached, mainly due to lack of capital. For instance, the mobile library service was established in only three areas, namely Mwanza, Tanga and Kibaha. It has been reported in other documents that the rural libraries functioned in 3,167 villages (out of 8,200 villages at that time) in the country and that each village had around 500 volumes of books (URT, 1989 op. cit.: 6).

The centralized library management system had financial and administrative problems that resulted in its inability to deliver information services as expected. As one of the strategies to overcome these problems, the services were decentralized in 1997 and brought under the local administration in order to make the library more community based, and in so doing give more responsibility to the local authority and general public (Mollel, op. cit: 6). The TLS addressed some of these bottlenecks and started expanding its services. In Tanzania mainland for example, libraries and the library boards have been established in all (19 out of 21) except two regions of Coast and Manyara, in 29 out of 119 districts, and two wards/divisions. The only two ward libraries are Lupembe in Njombe District in Iringa region and one ward in Tanga region (see ward library, Photo

1 and 2). Plans and clearance for establishing public libraries for the remaining regions and for all districts in the country are on-going.[4]

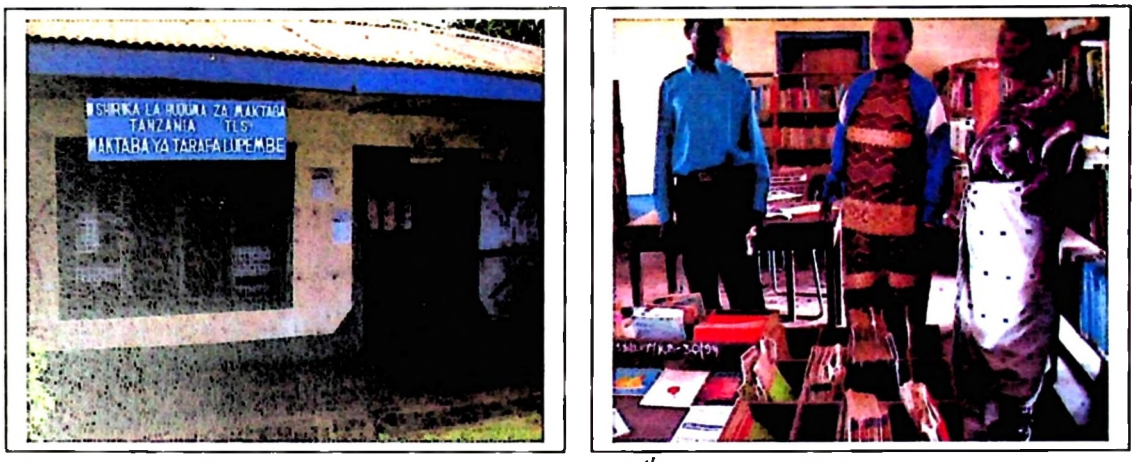
Apparently, more and more government leaders are acknowledging the role of libraries in the development process, thus encouraging and facilitating the establishment of library boards in the remaining regions (Mollel, op. cit.). For instance, during the "Book festival", an annual week-long event organized by the public libraries, the government leaders at district, regional and national level were involved in campaigns that, among other things, encourage people at all levels to make a habit of reading for personal and national development.

According to the Local Government (District Authority) Act of 1982 (URT, 1982 op. cit.), and as underscored by Johnson (op. cit.), improvement of the services was envisaged to focus on the needs of people starting at village level. Apart from the two ward libraries, the TLS is currently not active in rural communities.

[4] Personal communication with TLSB Leadership at the headquarters in Dar es Salaam, 28/02/2008.

Photo 1 & 2: A Division/Ward library in Lupembe, October 2006

Photograph 1 Photograph 2



Source: Photograph taken by the researcher on 27th October 2006

2.6.2 Academic and special libraries

Academic libraries serve teaching and research communities in various training institutions. They include the university libraries, which are comparatively well stocked and have skilled manpower. Generally, they have better resources than other libraries in the country. Two university libraries, the University of Dar es Salaam and Sokoine University of Agriculture (SUA) are legal depositories for all materials published in the country, as well as some publications by the UN departments and other international organisations.

In most cases special libraries belong to research institutions, government departments and industries. Some of these receive some professional assistance from the TLS. Other libraries under in category are those belonging to international organizations, especially

the UN departments, and those of foreign countries. In some cases libraries in this category are also referred to as documentation or information centres.

2.6.3 The national library for agriculture

The Sokoine National Agricultural Library (SNAL) was established by Act of Parliament No. 21 of 1991 from the former SUA library, to serve both as a University library as well as a National Agricultural Library for the United Republic of Tanzania (URT, 1992). Being the largest agricultural library in the country, it has a collection of about 80,000 volumes of books and bound periodicals and by June 2007 it had access to more than 20,000 e-resources available online and offline. It serves more than 4,000 users from within and outside the university community. The library is mandated to serve not only the needs of the university community but also that of the extension workers, farmers and peasants as well as any other group in need of agricultural information (ibid). In view of the above, SNAL is expected to be an active player in meeting the information needs of its broad clientele in the best way possible. Furthermore, one of the outputs in the SUA Corporate Strategic Plan for 2005 and beyond refers to effective information services for farmers and other stakeholders, giving SNAL a clear role beyond the university boundaries.

In its efforts to reach out to a wider clientele, SNAL has implemented an automation programme with good results so far. Using WEBLIS interface of Micro CDS/ISIS software, SNAL has automated the catalogue and its circulation services. The catalogue

can now be accessed from virtually anywhere in the world where there is an Internet connection via the library website at http://snalwww.suanet.ac.tz or through the library link on the SUA website at http://www.suanet.ac.tz. The library also participates actively during agricultural exhibitions where the library staff explain and demonstrate to farmers and the community at large the information resources available at and through SNAL. (See Photo 3).

2.7 The issue of poverty

2.7.1 Poverty as a challenge to development

The definition and interpretation of poverty, as explained by Hazell and Haddad (2001) and URT (1998), is adopted here. Broadly poverty is "a state of deprivation prohibitive of decent human life" (ibid). It consists of two interacting deprivations –physiological and social. Physiological deprivation refers to an inability to meet or achieve basic material and physiological needs and can be measured either as a lack of income, which limits access to food and education, health, housing, water and sanitation services, or by a failure to achieve desired outcomes. Social deprivation, which is assessed at individual or community level, refers to an absence of elements that are empowering-autonomy, information, dignity and self-esteem. Lack of empowerment is reflected in exclusion from important decision-making processes, even when the outcomes are of considerable importance to the poor.

The issue of poverty has remained one of the major challenges of development in Tanzania since independence, although various plans and programmes have been formulated to fight it. Some implementational shortcomings have eroded most of the early gains accrued through the poverty eradication programmes. Among others are the economic difficulties experienced by the country in the 1970s and 1980s, due to issues related to the collapse of commodity prices, the war against Iddi Amin of Uganda and extended periods of drought (ibid) just to mention a few. Recently, Tanzania once again has demonstrated its commitment and seriousness in tackling the challenge of poverty by conducting various researches on poverty alleviation, formulating the National Poverty Eradication Strategy (ibid), and launching the Poverty Reduction Strategy Paper (PRSP) (URT, 2000_a, op. cit.).

The third-phase President of the United Republic of Tanzania continuously emphasized this commitment in his various speeches. In one of his speeches at the inauguration of the Tanzania Development Forum, he pointed out the importance of all sectors in playing a part in the struggle to reduce poverty by quoting a saying that "...very few burdens are heavy if everyone lifts" (Mkapa, 2003).

Photo 3: **SNAL pavilion: Staff explaining about printed and electronic information services, 2006**

Source: Photograph taken by the researcher on 8th August 2006

2.7.2 Some of the country's recent initiatives in combating poverty

In 2005, the cabinet approved the National Strategy for Growth and Reduction of Poverty known by its acronym MKUKUTA (Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania), a successor to the Poverty Reduction Strategy Paper. The MKUKUTA is based on the vision 2025 and committed to the achievement of the Millennium Development Goals. The MKUKUTA is strongly outcome-focused and aims to foster greater collaboration among all stakeholders.

The strategy identifies three clusters of broad outcomes to include growth and reduction of income poverty, improvement of quality of life and social well-being, and good

governance. The first broad outcome has a greater relationship and dependency on improved agriculture. The agricultural sector has been acknowledged to hold the potential to significantly advance national objectives of growth and poverty reduction. This is because there is a focus on scaling up investments towards modernizing small, medium and large-scale agricultural enterprises. The growth in agriculture, a leading sector of the economy, will lead to higher incomes, thus reducing income poverty. Higher incomes enable households to improve human capabilities through better education, health, nutrition and shelter. Human capability in turn is critical for long-term growth. In summary, the target for agricultural growth is to increase economic growth from 5% in 2002/03 to 10% by 2010, and increase food crop production from 9 million tons in 2003/04 to 12 million tons in 2010 (URT, 2005_a op. cit.).

Under the umbrella of the strategy (MKUKUTA), the government has a number of ongoing initiatives for empowerment of the people. The initiatives include the Property and Business Formalisation Programme for Tanzania (MKURABITA), which aims at empowering the majority of poor Tanzanians, by increasing their access to property and business opportunities in order to access a strong and expanded market economy, together with the Programme for Empowering Tanzanian Entrepreneurs through the Provision of Soft Loans, which had set aside a total of 21 billion shillings during the financial year 2006/07 for provision of soft loans to Tanzanian entrepreneurs for agricultural and commercial production areas, employment creation and eradication of poverty. Others are the Tanzania Mini-Tiger Plan 2020, a strategy to build special

economic zones including export processing zones needed to fast-track implementation of NSGRP and realization of Vision 2025 goals, Business Environment Strengthening for Tanzania (or MKUMBITA in Kiswahili), the Tanzania Social Action Fund, a programme which helps the communities to contribute to their own development by choosing investments that will guard or improve their-well-being, the Programme for Development of Primary Education (Mpango wa Maendeleo ya Elimu ya Msingi), and the Programme for Development of Secondary Education (Mpango wa Maendeleo ya Elimu ya Sekondari), to mention a few.

Some of the initiatives by the financial sector, particularly those belonging to NGOs, include the Micro-finance institutions such as Foundation for International Community Assistance and the Promotion of Rural Initiatives and Development Enterprises.

The government through the Cooperative Act of 1991 restructured the cooperatives movement and established the Savings and Credit Cooperatives (SACCOS) categorized into urban SACCOS and rural SACCOS. The government is advocating and encouraging the formation of SACCOS as one way of promoting access to formal financial services. The rural SACCOS have a common bond in residence and associations, so that members of these schemes usually reside in the same village, and rely on the same primary cooperative society for crop sales. The SACCOS have helped to overcome the bias that often prevails against individual borrowers who are located in rural areas and are sometimes not easy to reach. One of the advantages of SACCOS is

their willingness to offer even small-sized loans to members, unlike the formal financial institutions. According to Wangwe and Lwakatare (2004), SACCOS have helped overcome the poor's access to financial services in the rural areas.

2.8 Morogoro region as a study area

2.8.1 The potential of the region

Morogoro region has coastal climatic features as well as coastal culture to a large extent, although it is 100 km from the Indian Ocean. The region is also mountainous and hilly, due to a stretch of the Eastern Arc Mountains. The Nguru, Ukaguru, Uluguru and Udzungwa Mountains are part of this Arc found in Morogoro region, the other part being the Taveta hills in the Republic of Kenya and the Usambara in the United Republic of Tanzania. The Arc has unique species of flora and fauna as a result of oceanic influence.

The region is the second largest in Tanzania, and borders with eight other regions. This situation has attracted many immigrants, especially from bordering regions, and more so for livestock immigration. The region attracts farm labour mainly because of being Tanzania's largest producer of sugar as well as exporter of teak hardwood logs (URT, 2002: viii).

Morogoro region is well supplied with water due to having numerous rivers carrying large quantities of water, and has therefore the greatest potential for irrigation agriculture. For example, 50% of the Rufiji river Basin (the largest river in the country) is in this region, and also a number of other rivers, including the Kilombero, Wami, Luwengu, Great Ruaha, Ruvu, Ngerengere, Mkondoa and Mkindo. It has fertile soils and excellent agricultural potential whereby all of Tanzania's economic crops can be grown. Unfortunately however, the region has no major cash crops for the smallholder farmers (ibid.: ix), and the region's potential for agricultural development is virtually untapped. The region, for example, is known to have the potential capacity to supply Tanzania with all its requirements for paddy (ibid: viii).

The region has a high concentration of agricultural institutions, which are among major generators of information on agricultural innovations in the country. These include SUA, which is the only Agricultural University in the country. In addition, it has six other agricultural-related research institutions namely, Ilonga, Dakawa, Katrin, Msimba seed research, Livestock Training Institute and Tanzania Forest Research Institute. Furthermore, the region hosts a national library for agriculture (SNAL) whose mandate includes the provision of agricultural information services to farmers and peasants. Apart from SUA, it has two more universities, namely, the Mzumbe University and Muslim University of Morogoro. Up to 2002 the region had a distinction of having one of the best distributions of primary schools among the rural population in the country (ibid.: x).

2.8.2 Geographical location

Morogoro is situated towards the east-southern border of Tanzania Mainland. It lies between latitude 5° 58" and 10° 0" south of the equator and between the longitude 35° 30" and 38° 30 east of Greenwich. It is bordered by eight neighbouring regions. To the north are Tanga, Arusha and Manyara regions, to the east there is the Coast region, on the western border are Dodoma and Iringa while Ruvuma is to the South and Lindi region on the southeastern border.

2.8.3 Land area

The region is the second largest in Tanzania Mainland occupying a total area of 73,039 sq km, out of which 2,240 sq km (3%) is water. Morogoro's total area is 7.7% of the total area of Tanzania Mainland or 8% of Tanzania Mainland's land area.

2.8.4 Administration

The region is divided into six administrative districts, namely Kilombero, Ulanga, Kilosa, Mvomero (only from 2005), Morogoro rural and Morogoro Urban, sometimes referred to as the Morogoro Municipality (Map 2). Like the administrative structure of other regions, while the Municipality district is divided into wards and subdivided into administrative streets (popularly called "mitaa" in Kiswahili), the rural-oriented districts are each divided into divisions and further subdivided into wards. Below the wards there are village units and smaller units referred to as "vitongoji" or neighbourhoods. The region has a total of six districts, and 66 wards (URT, 2005$_c$).

2.8.5 The people

Morogoro's indigenous people are of Bantu origin. Four major tribes, the Waluguru, Wanguru, Wakaguru and Wapogolo, tend to live in mountainous areas while other smaller tribes live in the lowlands. However, the region has attracted other tribes who have gradually migrated into the region from neighbouring areas. These include the Maasai, Bena, Hehe and Gogo, to mention a few. Also, several other tribes are found in the region, particularly the urban district, as a result of employment in the government and other institutions in the region. In the 2002 countrywide human population census, Morogoro region had a population of 1,753,362 people, of which 873,245 were males and 880,117 were females (URT, 2003_b op. cit.: 59).

2.8.6 Climate

Normally the region has a bimodial rainfall pattern between November and May, with a spell of dry weather in January and February. Generally, the annual rainfall varies between 600mm and 1800mm. The windward side of the Eastern Uluguru Mountains receives very high rainfall of up to 2,850mm annually. The leeward side of these mountains is usually dry, some of them receiving less than 600mm per annum. The average annual temperatures vary between 18° C to 30° C.

2.8.7 Farming activities

The region cultivates only 8% (500,000 ha out of a total of 5,885,887 ha) of the total arable land. Despite the region's enormous potential for irrigated agriculture, only 5% of

the cultivated land is under irrigation. The principal food crops include maize, paddy, cassava, sorghum, bananas and beans. These food crops are also to some extent grown for cash. Cotton, coffee, sunflower and simsim are the cash crops grown at household level, while sugarcane and sisal are grown on a commercial scale by estates. However, smallholder farmers around the estates also grow sugarcane for commercial purposes.

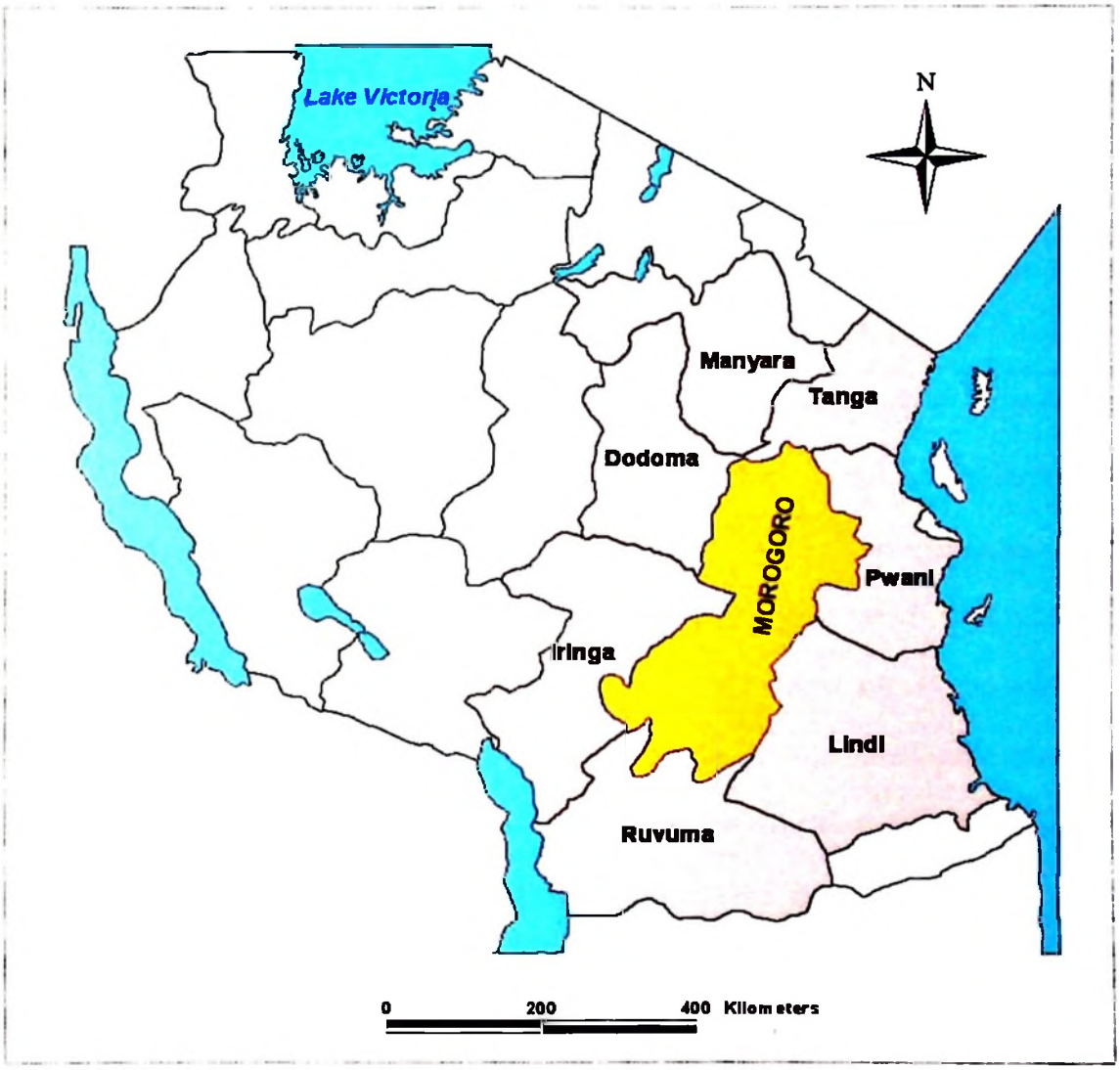
Livestock keeping has mostly been done traditionally and concentrated on cattle, goats, sheep, and pigs. Local chickens are also traditionally kept for home use and, until recently, had not been making an important contribution to household income. Improved diary cattle and beef cattle keeping in the region are relatively knew practices among smallholder farmers (URT, 2002 op. cit.: 66).

2.8.8 Natural resources

The region's natural resources include forestry, beekeeping, fisheries and wildlife. As highlighted earlier, the region ranks high among the regions of Tanzania mainland for endowment with water resources. It has perennial streams, springs and rivers on which the Kidatu and Kihansi hydroelectricity plants of the National Grid are situated. Morogoro has three major wildlife areas; the Selous Game Reserve, the Mikumi National Park and Udzungwa Mountains National Park. The mining activities, though on smallscale, are taking place for rubies in Ulanga district and Matombo in Morogoro district. There are industrial minerals of limestone, mica, and graphite, whose potential

is untapped. The region is also rich in construction minerals such as sand, gravel and stones.

Map 1: **Tanzania showing Morogoro and bordering regions.**



Source: The Geographical Information System (GIS) at SUA, 2006.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter reviews literature which is related to the broad objective of the study. To begin with it looks into the literature arguing in favour of information as an important factor for empowerment and economic development. The review also highlights the difficulties in demonstrating the tangible positive impact of information on development. The literature cites these difficulties as probable reasons why the information sector is accorded a low priority in the development programmes in a number of developing countries. The review is then organised, based on the specific objectives of the study, in chronological order as presented in chapter one. The concept of information needs is reviewed, citing some critiques from a number of authors who view it as too abstract. However, it also cites some authors who advocate a need for regular studies for updating information needs of the farmers. It also cites successes and failures of rural libraries as a means of meeting the information needs of farmers. On the format, channel and information access interface, the chapter highlights formal information channels, indicating the role of recorded and printed information resources. The review throws light on the community information centre concept as an alternative approach to acquisition of information by farmers. The chapter also looked into literature that emphasizes the need for collaboration of the agricultural information stakeholders in

building proactive practices of acquisition of information by farmers. Bearing in mind how rapidly ICTs are being adopted as tools of information access and use in the present day, the chapter has highlighted the role of ICT in rural development, indicating its current applications, potential, and present limitations.

3.1 The relationship between information and economic development

3.2.1 The role of information in economic development

The importance of information lies in empowering people to make choices to attain better livelihoods. Both developed and developing countries' scholars have unequivocally documented the role of information in the development process, pointing out that the development gap between urban and rural areas is attributed to, among other things, lack of access to information (Sturges and Neill, 1998; Ozowa, 1997; Mazie and Ghelfi, 1995; Aina, 1991_a). The USA for instance, having realized that information has become a critical part of successful economic development at all levels, has placed an emphasis on rural libraries and information services to overcome lack of access to information, a factor that was identified to have contributed to the development gap between urban and rural USA (Mazie and Ghelfi, op. cit.). The USA managed to bridge the information gap, enabling rural areas to catch up with the economic development. A similar emphasis is observed in China, where it is documented that improvement in information services was one of the strategies used to achieve agricultural transformation (Xu, op. cit.; Delman, op. cit).

Information has become important such that the current era has been called the 'information age'. The importance of information is more obvious in industrialised countries where studies have demonstrated the tangible nature of information in the economy. In the US, for example, it was reported that more than 46% the gross national product and 53% of labour income was related to knowledge, communication and information work. The sector was expected to grow to 60% of the European Community's GDP by 2000 (Willem, 1994). In these countries, information is increasingly viewed as a commodity with a price-tag (Rivera, 2000).

Although information plays an important role in almost every human activity, and phrases such as "information is power", "information economy" "information is an instrument of production" have been used to illustrate the importance of information in modern societies, its value in the development process is a topic of extensive debate (Meyer, 2005). Menou (1993) is of the opinion that information management does not seem to feature clearly as a development strategy, probably because of its indirect relationship to development. A similar observation has been made by Mchombu (1995), arguing that the impact of information on agricultural development for instance, unlike on health issues, is a complex matter to substantiate and is limited by the need for non-informational inputs such as fertilizers, seeds, tools and so on. Nonetheless, information can have a huge multiplier effect on the efficiency and effectiveness with which these other non-information resources are utilised

Information has been recognised as an equally important production factor as land, labour and capital, and academics and researchers are aware of the value of information in development, but there has been some concern that information is still not perceived as being an important factor like other resources, probably because, while other resources are tangible in nature, the tangibility of information is not straightforward (Meyer op. cit.). In an effort to explain why information is not viewed in the same light as other development resources, Meyer (ibid.) argues that the nature and attributes of information have to be challenged, and in so doing determine the use of information among different communities.

In Tanzania, efforts geared towards bridging the informationgap include the rural/village and mobile libraries in the 1970s (Kaungamno, 1978), adult education literacy programmes, Universal Primary Education of 1977, Zonal Newspapers, and more recently the Primary Education Development Programme (PEDP)

In discussing the phenomenon of "information poverty", The UN Centre for Science and Technology declared that:

> "The distinction between information 'haves' and 'have-not' is the basis for the dichotomies between developed and developing, rich and poor.... It is within this context that the concept of development might be understood in information terms" Willem, (op. cit.).

Low agricultural productivity is attributed to among other things farmers' lack of access to and use of agricultural information at critical times during the year (CIAT, 2004).

This is still the case, despite the long-standing recognition that developing countries should invest in knowledge for farmers in order to achieve economic development. In underscoring the importance of such an investment, one economist pointed out that:

> "Expenditure on bringing new knowledge to the peasant farmers is probably the most productive investment which can be made in any of the poorer developing countries" (Lewis, 1955:187).

In underscoring the need to focus on the rural communities for the country's development, in one of his speeches, the first president of the United Republic of Tanzania emphasized the need to give priority to developing rural areas in all sectors by saying:

> "While other countries aim to reach the moon, we must aim, for the time being, at any rate, to reach the village" (Nyerere, op. cit.:323).

3.2.2 Agricultural innovations for improved productivity

Invaluable information has been generated through research and innovative activities, which, if used by the target group would result in a major breakthrough in human development. Informed and knowledgeable farmers make the best choices, learn better farming practices, use better seeds and fertilizers and consequently produce plentiful global food supplies. They are also aware of methods for disease control, better industrial techniques and a wide variety of technologies. Timely access to information on innovation related to better farming and livestock practices, high value crops, processing and storage methods, markets and weather forecast is crucial for improved productivity and for combating poverty.

Though the role of information in economic development is well documented, various researchers observe that agricultural information services are accorded low importance by most African governments (Ozowa, op. cit.; Aina, 1991_b). Ozowa, further argues that "low importance attached to information by these countries is one of the contributing factors to the failure of a significant change in the agricultural development despite the efforts made by their governments and development partners."

3.2.3 Farmer Empowerment through information

Farmer empowerment is a concept that has become an important part of the development agenda in recent years. It emerged out of the assumption that people have generally been voiceless and powerless and therefore are unable to influence or negotiate for better terms for themselves with traders, financiers, governments, and civil society representatives (Mwaseba et al, 2006 op. cit.).

The importance of this concept stems from the recognition that, in order for the poor and marginalised farmers to benefit from poverty reduction efforts, the position of farmers in relation to public and private institutions has to change (Neuchatél, 2004 op. cit.). The change being referred to here is for farmers themselves to move from being passive recipients of information and other services and regulations to a situation where they take full responsibility for their own development and use public and private institutions as resource providers (ibid.). Neuchatél (ibid) also argues that farmer empowerment is a precondition for the development of demand-driven services and it must result in

changes both in the capability of the individual farmer and in the overall development system. In underscoring the connection between knowledge, power and development, Foucault in his theory of knowledge/power stated that "knowledge is always a form of power and that all knowledge, once applied in the real world, has effect" (Mason, 2008).

The term empowerment has different meanings in different social-cultural and political contexts. It has both intrinsic and instrumental value and the concept is relevant to the way relations within households, between local communities and the outside world are characterised, and so there are many different definitions. Narayan, as quoted by Mwaseba et al (op. cit), defines empowerment as "the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives". Batliwala (1993), on the other hand, describes empowerment as a range of activities from individual self-assertion to collective resistance, protest and mobilization that challenge basic power relations, and is therefore aimed at changing the nature and direction of systemic forces that marginalize women and other disadvantaged sectors in a given context. Most definitions however focus on issues of gaining power and control over decisions and resources that determines one's life, while taking into account structural inequalities that affect different social groups.

A group of agricultural scientists, working on Farmer Empowerment and Organisation in Tanzania (URT, 2003_a, op. cit.), describes attainment of farmer empowerment as a

state when farmers acquire the ability to determine their own destiny and assume the authority, resources and capabilities to hold accountable and influence the content of public and private agricultural services, such as extension, research, training, information, investment and marketing. The Neuchatél initiative on the other hand sees it as a process that increases the capability of smallholder farmers and farmers' groups to make choices and to influence collective decisions towards desired actions and outcomes on the basis of those choices (Neuchatél, 2004 op. cit.). Both of these definitions identify four key elements which are: access to information; inclusion and participation; accountability; and local organizational capacity. According to Narayan, as cited by Mwaseba et al (Mwaseba et al op. cit.), efforts at empowerment should focus on the four elements, and in this context on designing mechanisms to support peoples' access to information.

Empowerment however is limited by a number of factors. Sometimes it may be misinterpreted as causing problems in certain circumstances. This is because empowerment often leads to consciousness-raising which leads to more critical thinking, which in a political context, for example, may be interpreted as a political threat, while in contemporary society it could be equated to undermining traditional power structures of a society, or in women's empowerment it could be interpreted as a threat to patriarchal dominance (Mwaseba et al, op. cit.). Empowerment is also limited by the digital divide, which limits the optimal utilization of information technologies.

An important aspect of farmer empowerment is the ability of farmers to identify the causes of the problems facing them in agricultural production and the ways to solve them. Farmers are required to look for diverse sources of information and communication and evaluate what they receive (URT, 2003_a op. cit.). It has been noted that the majority of farmers in Tanzania feel inferior, either due to their low level of education or due to top-down manipulative approaches used by development agencies, including the government.

Recent applications of participatory approaches to learning seem to be preparing farmers for their new role as clients who formulate and express demands, rather than simple recipients of information, and who increasingly adopt improved knowledge-demanding technologies and appreciate the new approaches. These attributes would only be attained by empowered farmers (ibid)

3.3 Farmers' information needs

3.3.1 Difficulties in assessing the information needs

Assessment of the information needs of any group of users is an important undertaking in order to develop useful search and access services. However, as pointed out by Leeuwis (2004 op. cit. : 243-244), assessment of information needs is a complex undertaking. It is more than simply asking someone what his or her information needs are, because in some cases people are often not aware of the needs that have already been fulfilled, and will express no 'need' for information which they do not know exists. Leeuwis (ibid.: 244) also argues that an information need only emerges when it is about to be fulfilled, when particular information is within reach, and only if one has access to particular information does it become possible to evaluate whether or not there was a real need for it. Furthermore, the difficulties in assessing the information needs are compounded by the fact that the information needs tend to be a 'moving target' (ibid) in that farmers continuously learn, solve problems and identify new ones in an ever-changing environment, meaning that information requirements can change rapidly. As such, there is the chance that an identified information need may have altered or been resolved even before a leaflet or website targeting a particular need is ready. Similarly, Mchombu (1993) argues that the concept of information need seems too abstract for the majority of people, especially in rural areas, to comprehend. He further argues that most of the time, people are either not aware that they need information or that the information which can be used to solve a certain problem is available. In this case needs have to be linked to specific problems that people encounter in their daily activities.

3.3.2 Approaches in assessing the information needs of farmers

Due to the complexity of finding out the information needs, scholars have suggested different approaches and strategies that could be employed to identify them. Leeuwis (op. cit.) suggests an analysis of the way in which the existing facilities for information provision (such as leaflets, articles, websites) are used, observing and analyzing current information-seeking behaviour, discovering the needs during interactions with clients when developing the search and access facilities and deducing information needs from what others such as scientists, subject matter specialists, and agri-business people think the needs should be.

Other approaches that have been employed in identifying the information needs of farmers are those by Mchombu (1993, op. cit.) and Kaniki (1995), who used the critical incident approach which translates problems experienced by users in their daily activities into information needs, based on the assumption that new information, knowledge or skills would be useful in solving problems identified by users. A similar approach was used in a study in rural areas of Tanga region in Tanzania (Kiondo, 1998). These methodologies have been successful in establishing the needs of various users. In another approach, Aboyade (1984) used the action-oriented, participant–observation methodology to analyse the information needs and information-seeking pattern of users. Rural resource centres based on community participation have also proved useful in identifying farmers' agricultural information needs in other countries such as Kenya and South Africa (Opala, 2004; Karlsson, 1994,).

In other studies, the approach for identifying the information needs was by categorizing the needs in terms of subjects or field of knowledge. For example, a study by Sturges and Chimseu (1996: 1481) found that rural Malawi people needed information on agriculture, health, hygiene, water supply, education and literacy, and credit and loans, while Ojiambo (1989), Kaniki (1989) and Aina (1985), in their studies in Kenya, Zambia and Nigeria respectively, found that peasant farmers needed information on methods for improving agricultural productivity.

Information specialists insist that information needs of rural areas have to be identified for information to have an impact on the rural livelihoods. According to Mchombu (1993 op. cit.), these needs basically fall under two categories; needs that are common to all such as weather forecast, marketing, fertilizers and so on, and those that are location specific. The nature of the information need is another crucial consideration in setting up relevant information services. Research conducted by Kivikuru et al (1994) in nine villages in Tanzania concluded that most needs belong to the domain of basic needs. Similar findings have been reported in other researches carried out in other developing countries (Kaniki, 1995 op. cit.; Matengu, 1992 and Fairer-Wessels, 1987). Some of these and other information experts (Kaniki, 1995: ibid.; Mchombu, 1993 op. cit. and Du Plooy, 1988) have used Maslow's social class theory of needs to explain the nature and levels of information needs, whereby the lowest level of needs must be satisfied before the demands of the next level could be met. Research findings, such as those by Fairer-Wessels (op. cit.), have shown that the majority of people in rural communities and

urban disadvantaged groups need information at the first level in the hierarchy of needs. This group has been generally characterized as information-poor in the sense that they have limited access to information and are apparently less aware of the value of information (Du Plooy op. cit.: 5). Also, Rosenberg (1986) related information needs to the characteristics of the user or their community, arguing that their needs reflect the user's socio-economic, cultural and political environment.

Both Aina (1991_b op. cit.) and Kaniki (1991) emphasize the need for regular studies to update farmers' information needs because farmers change and so do their needs. To this end, there seems to be only a few studies on agricultural information needs in Tanzania and they are very scarce both in terms of number and coverage (Kiondo, op. cit.; Dulle, 1997).

3.3.3. Libraries in meeting farmers' information needs

The use of libraries, particularly the public library services for meeting the information needs of rural communities and to bring about agricultural development, has frequently been recommended by various scholars in developing countries, including Ikhizama and Oduwole, (2003); Okiy, (2003); Manda, (op. cit.); Sheba, (1997); Aina, (1991_b, 1989, and 1986 op. cits.); Van Niekerk, (1991); Oladele and Alekude, (1987) and Namponya, (1986). Kaniki's study in Zambia demonstrated the good position of the libraries to develop appropriate services to meet the information needs of the farmers (Kaniki, 1991, op. cit.).

The need to bring knowledge to rural people through libraries in Tanzania was long recognized by the TLS that planned for a rural library scheme and mobile library to serve farmers and peasants who form the majority of the rural population (Mwasha, 1985, Kaungamno and Ilomo, 1989). This move was in response to the government's constant urge to direct resources to rural development and to wipe out illiteracy. The mobile library service and the rural library scheme, however, did not last long enough to have their impact felt in the Tanzanian rural areas. Failure of these libraries was attributed to the use of untrained personnel, the largely illiterate environment, lack of permanent structures, dependence on donor funding and the absence of relevant materials (Kilindo, 1989). A number of other researchers have pointed out the ineffectiveness of the rural libraries when they were set up as extensions or replicas urban public libraries rather than being established based on actual needs and end-user participation (Katundu and Nyerembe, 2002; Karlsson, op. cit.; and Durrani, 1985).

Although rural libraries in Tanzania seem to have demonstrated poor results in that they have not been a priority in development programmes, some governments in developing countries such as China (Xu, op. cit.) and Nigeria (Aboluwarin, 1998) have had a successful deliberate focus on rural libraries in their efforts to improve agricultural productivity. Also, rural libraries are known to function by meeting the information needs of rural people in many other parts of the world such as Thailand, Malaysia, Singapore, the Philippines, India and Russia where, as pointed out by Okiy (2003), their success has been attributed to innovative library services. In Malawi, a study by Sturges

and Chimseu (op. cit.) stresses the role that the national library system has in meeting the information needs of the rural agricultural community. In order for the libraries to play a bigger role in providing information to the rural population, Asamoah-Hassan (1997) challenged librarians to have new approaches and a change in attitude so that they demonstrate interest and innovativeness when serving rural communities. Similar challenges have been put forward by Okiy (op. cit.) who urges libraries to discard its traditionally docile role as a repository of knowledge and ideas so that they become more active as disseminators of knowledge for rural development. Communities must also be involved in the decision-making process right from the planning stage, such as in determining the materials that will be useful and the formats which will be acceptable to them, so as to achieve the desired results (Asamoah-Hassan op. cit.).

Generally, the current state of public libraries in Africa is seen as weak, with numerous problems that are mostly associated with inadequate funding from the parent bodies or institutions, unlike the flourishing situation that was seen in the 1970s (Rosenberg, 2006). However, the public library system is well established with a long experience in offering community services. This fact has made librarians propose innovative initiatives that will take into consideration the socio-economic and cultural conditions of the country and encourage community participation, thus bringing about community empowerment (Ibid.; Katundu and Nyerembe, op. cit.). The current trend of revisiting, strengthening and expanding public libraries in Africa may be another opportunity and a

challenge to extend the services further into the rural areas by adopting new and innovative ways in providing of information to the rural areas (Powell, 2002).

Although library services may be gradually expanding (Mollel, op. cit.), and literacy levels have improved, no recent studies in Tanzania have investigated the current role of the library facility in meeting the farmers' information needs.

3.4 Recorded sources of information for use by farmers

3.4.1 The printed information

Recorded sources of information, whether in print or electronic formats, have a great advantage because of being more constant in the dimensions of time, place and space. Further, they give the user a chance to set their own pace according to their own style and ability to assimilate information. A study conducted in Uganda and Ghana demonstrated that farmers had a greater preference for printed information because, if they forgot things, they could always go back to the print and check them up (Carter, op. cit). It was further demonstrated in the same research that farmers demanded printed information to satisfy their information needs (ibid).

Likewise, in the transformation and modernization of rural China for instance, it is documented that the print media, though not the best for peasants with a low education,

were used to supplement the village meetings that were successfully used to disseminate agricultural information (Delman op. cit.).

Print Agricultural Information Materials (PAIMs) such as leaflets, booklets and fact sheets, for example, are used extensively as vital supportive tools in extension, even for low-literate communities (Morris and Stilwell, 2003). The authors caution however that the production of such materials has to take into consideration the target audience's information needs, communication and language style and level of reading and education (ibid). The advantage of print media in the developing rural areas has been underscored that:

> "The printed word has an outstanding quality of performance. It will still be there when the half hour or 15 minutes of radio broadcast has passed. And on posters, the printed word has the added advantage of being highly visible" (Majed, 1990).

The printed materials in physical format such as leaflets, booklets, posters, and brochures are more constant in time and space.

3.4.2 Availability of printed information

The use of print media that are rural-focused is one of the advocated information transfer strategies in a study on health information provision to the rural areas of Kenya (Kibet and Otike, 2003). Although printed materials have unique advantages, care is required in

properly articulating the target audience's information needs and abilities when producing printed materials (Ozowa op. cit.; Kibet and Otike op. cit.).

In considering the use of printed materials for farmers' education in Tanzania, a study by Kauzeni (1979:286) indicated poor performance of farm magazines and other printed materials in conveying farm information to rural peasants due to low literacy rate. This study however was carried out more than twenty years ago, and the scenario of literacy in Tanzania has generally changed for the better. In 1975 for instance, while it stood at 66 and 56 percent for men and women respectively (UNESCO, 2000) according to the Tanzania Bureau of Statistics (URT, 1997_b op. cit), the literacy rate in 1990 was 87 and 81 percent for men and women respectively. Furthermore, campaigns for wiping out illiteracy in the country, such as those undertaken between 1972 and 1975, resulted in a tremendous reduction of illiteracy levels (URT, 1989:7 op. cit.; URT, 2004_b op. cit.). Although it is not clearly known whether the literacy level implies functional literacy, we may, for the purpose of this study, safely assume that at least the situation has improved and let it be proved otherwise by the research results. In the light of this improvement in literacy levels, there have been no studies to find out whether or not recorded information such as printed materials could now be effective sources of information for farmers in Tanzania.

Printed materials are constantly being produced despite the lack of empirical evidence for the effectiveness of the printed word in transferring information to farmers in

Tanzania. The MAFC for instance, through its various institutions, generate the materials for agricultural extension services. Furthermore, in recent developments, several non-governmental organizations (NGOs) and farmer-led initiatives are producing extension materials for supplementing the extension services delivered by the government sectors (Rutatora and Mattee, op. cit.).

3.5 Farmers' ability and willingness to access and use printed information

3.5.1 Functional literacy for successful use of printed information

Farmer's literacy level is known to be a hindrance in using printed materials (Makombe and Sampath, 2003.; Aina,1990; Mohamedali, 1977). For this reason, focus has been on oral channels of information for farmers in Africa. However, following rigorous literacy interventions, there has been considerable improvement in literacy levels in Tanzania as indicated earlier. The factor of functional or useful literacy, rather than years of formal education, has to be considered before using printed information for farmers. With this understanding, Aboluwarin (op. cit.) considered "functional education" of farmers when recommending rural libraries for agricultural information dissemination in Nigeria.

3.5.2 Farmers' attitude to accessing and using information

Attitudes, beliefs, perceptions and preferences are among factors that limit information access and use (Kularatne, op. cit.; Riesenberg, 1989). Further, a study by Uhegbu (2001) found skepticism to be among the impediments to rural information services. In

some areas farmers believe they know everything that is required for farming since they have been doing it all their life (Isinika and Mdoe, op. cit.: 29-30) and so do not need agricultural information.

3.5.3 Information-seeking behaviour

Information-seeking behaviour is an aspect of human information behaviour which means the purposeful activity of looking for information to meet a need, solve a problem, or increase understanding (Kajberg and Lørring, op. cit.: 88). In most cases farmers have been treated as passive receivers of information through conventional extension systems that are mainly unidirectional, conveying information and knowledge from research to the farmer that may not be of priority importance for the farmer, a situation that has been documented and criticised (Leeuwis with Ban, op. cit.: 11; Maru and Alluri, op. cit.). The main argument is that farmers, particularly in Africa and Asia, may remain barely reached with new learning opportunities if they are not given opportunities and facilitation to enable them to look for and find answers to their problems.

Researchers such as Momodu (2002); Sturges and Chimseu (op. cit.); Kaniki (1991 and 1989 op cits); Aina 1985 op. cit.), have thrown light on information-seeking behaviour of rural people, particularly in Africa. It is argued that, because there are a good number of people in rural areas who prefer informal information sources, there is a need to further develop such sources so that they make an impact on the lives of rural people.

However, an action research in Nigeria (Aboyade, 1983 op. cit.) found that farmers could actually go out and look for documented formal information rather than wait for someone to offer it to them. This observation lends support to the idea of mainstreaming habits of information acquisition (seeking, accessing and using) into the lifestyles of farmers.

3.6 Need to enhance farmers' access to and use of agricultural information

3.6.1 Sources and Channels of information

Farmers' formal sources of agricultural information in most developing countries depend to a large extent on the agricultural extension services offered "freely" by the government through the extension officers. However, worldwide and particularly in developed countries such as the USA and Europe agricultural information is becoming a price-tag commodity and provision of agricultural knowledge is increasingly fee-based, with the private sector increasingly taking a greater part in information transfer (Rivera, op. cit.).

The purpose of using extension officers is to reach out to farmers through extension services, such staff visits to individual farmers, demonstration/on-farm trials, agricultural exhibitions, radio and TV programmes, and printed materials carrying agricultural messages.

Studies show that farmers view extension workers as important sources of information (Isinika and Mdoe, op. cit.; Sheba, op. cit.). In Tanzania for example, during the process of formulating the country's Poverty Reduction Strategy Paper (PRSP), the "grassroots" stakeholders recommended, among other things, an increase in extension agents of at least one per village in order to improve research and extension activities (URT, 2000_a op. cit.: 14).

Extension approaches, however, have their own shortcomings in the sense that they tend to be package oriented in solving farmers' problems. These approaches tend to assume that farmers are homogeneous in terms of their needs, priorities, abilities and attitudes towards farming activities. The extension approach therefore does not seem to cultivate habits of active information searching and using among farmers.

Extension agents' visits, though identified by farmers as their main source of agricultural information (Mgeni, 1978: 38), contributed to a delay in innovation diffusion (ibid: 52) because most African farmers do not come into contact with extension officers for years. This is because extension officers are few and cannot make visits to individual farmers when required to do so. The shortage of extension agents has been reported persistently as one of the limitations in extension work (Sheba, op. cit.; Isinika and Mdoe, op. cit.: 29). Other studies, such as those by Aina, (1985 op. cit.) and Mchombu, (1993 op. cit.) have reported limitations in extension systems when used as the main formal avenues for effective information transfer to rural areas

Studies on information provision to farmers in rural areas, particularly in Africa, tend to emphasise traditional methods such as the use of oral sources (Meyer, op. cit; Sturges and Chimseu, op. cit.). It is also known that indigenous communities use a variety of occasions and places to exchange information (Karlsson op. cit.), such as water collection points, bars and beer-drinking places, tribal authority meetings or communal decision-making meetings. Others are churches and mosques, political meetings and schools (Okiy, op. cit.). Food kiosks were also mentioned as channels of information in Kenyan rural areas (Durrani, op. cit.).

3.6.2 Multi-channel approach for enhancing access to information

While it is true that oral channels of information have a long history in rural communities, these communities are influenced by external environments to use modern channels of communication. These include newspapers, radio, films, rural resource centres and village reading rooms or rural libraries where available. Furthermore, it has been pointed out that farmers' dependency on oral sources of information is not entirely their choice but rather is mainly due to factors including lack of awareness of the existence of alternative sources of information, lack of access to available sources and inability to utilise some sources of information due to low literacy (Kaniki, 1989 op. cit.:161). In addition to these factors, Aina (1985 op. cit.: 41) identified the unavailability of institutional sources such as libraries in the rural areas as among the reasons for dependency on word-of-mouth.

In recognition of the socio-economic and technical changes that are taking place in rural areas, Karlsson (1994, op cit.: 14) advocated the use of both an indigenous and exogenous information system, referring to it as a "synergistic information system". In view of the above, Mchombu (1993 op. cit.) recommended the use of all three systems to ensure effective information transfer and exchange activities by linking the three knowledge systems. The multi-channel approach alternative, meaning both modern (exogenous) and traditional (indigenous), was again recommended in a more recent study that was carried out in a number of African countries (Mchombu, 2003 op. cit.). In line with this recommendation, Durrani (op. cit.) asserted that "no modern information system will succeed in the rural areas unless it comes to terms with the existing oral systems".

However, informal sources of information such as relatives, friends and neighbours play a useful role, and farmers sometimes find them more important sources of information than extension agents (Isinika and Mdoe, op. cit.). Nevertheless, they may not always be reliable because they sometimes are not well informed, have inadequate information or may distort the information in the process of passing it on to others (Roling, op. cit.: 113). In view of all these observations, there is a need to understand the diversity of information acquisition problems from the farmers' perspective, to use a combination of approaches attempting to mainstream information-seeking practices into the regular lifestyles in order to solve information and knowledge-related problems.

3.6.3 Gender and access to and use of agricultural information

Gender should be considered in order to promote access to and use of information because gender-related attitudes and practices constitute barriers in accessing information (Materu-Behtsa, 2004: 216). It is widely recognized that there is a need to integrate women into agricultural development efforts, particularly in developing countries, where women constitute the majority in farming communities. However, they have more difficulty in accessing resources due to historical and traditional factors and because men have greater decision-making powers in agricultural issues (State of the World, 2003: 48-49; Kiondo, op. cit). Furthermore, in some communities, men and women do different agricultural activities at different times of the year. For example, vegetable growing is perceived to be a woman's activity, while production of cash crops such as tomatoes in Iringa district is a male activity (Mwaipopo, 2004: 206). Depending on the type of community, men and women therefore may have different information needs and different access and use habits. In communities where cultural and religious taboos prevail, there may be a barrier preventing information acquisition and thus in most cases women remain behind as a disadvantaged group (Ozowa, op. cit.). Gender differences are also pronounced in the use of modern technologies such as mobile phones. In Uganda for instance, it was revealed that in 2001 about 70% of phone owners in that country were men (Mundy and Sultan, 2001: 117). Although this situation might have changed over time, it nevertheless serves to show possible gender disparities that may need deliberate efforts to overcome them.

Despite the gender differences cited above there is scarce information on how gender and gender relations affect access to and use of agricultural information in this country so that they could be adequately addressed when designing interventions for information access and use by farmers.

3.7 Promotion of the practice of proactive information acquisition

3.7.1 The concept of Community Information Centres (CICs)

It has been observed that, although rural communities in Africa need information just like their counterparts in urban and developed countries, the strategies to serve people in the former category has to be different from the latter in order to have a positive impact. As observed earlier, the approach for establishing the information facilities in rural areas has to be different from that used to establish them in urban areas. It is with this understanding in mind that scholars put forward the concept of rural resource centres as a more appropriate approach for rural areas. Such centres have been named differently from one place to another, but generally they are established under similar principles using closely related approaches.

In countries such as South Africa, the problem of rural libraries is being addressed by establishing participatory community rural resource centres in accessible places and with resources in all formats, provided that they are marketed to ensure their use (Karlsson, op cit.). In a research by Mchombu (1995 op. cit.), the Rural Development Information

Centre Model was adopted to set up experimental Community Information Centres (CIC). The CIC are comparable to the Rural Information Centre and Community Information Resource Centre concepts that were put forward by the Ministry of Agriculture (Kaaya, 1999) and Katundu and Nyerembe (op. cit.). Katundu and Nyerembe (ibid) critically argue in favour of Community Information Resource Centres as a feasible alternative to the public library model, for instance, asserting that while the former are mainly a replica of the western model, with a top-down approach, the latter are based on the local information environment, community information needs and participation, thus more realistic and sustainable (Rosenberg, 2006 op. cit.). In recognition of the difference of the social cultural values between Africa and other places, Rosenberg (ibid) puts forward the concept of 'African librarianship'.

Further to that, the Kenya National Library Service (KNLS) is practising an alternative approach in reaching out to villages by setting up the "Community-based Libraries". This approach is an effort to fill the information gap after the KNLS Board had failed to establish more branch libraries as anticipated earlier. With this strategy, the communities are requested to put in place the necessary infrastructure while the board provides the initial reading material, the staff, and meets recurrent expenditure. The approach is said to have received overwhelming support from the communities in Kenya (KNLS, 1999).

In a relatively more recent initiative, farmers in Hai District in Northern Tanzania established their own Village Information Centre (VIC) in 2001. This centre which at

first was meant to cater for integrated pest management information needs is said to be the first of its kind in Tanzania (CIAT, 2004). However, detailed information on how the centre has performed over time is not yet available. Not only that but also as Rosenberg (1993) argues, there is little experience and scanty empirical evidence on what CICs or Rural Information Centres or Rural Information Resource Centres should be and how exactly they should be run.

In addition, probably what is more important in the CIC approach is the emphasis on farmers themselves to proactively seek, access and use information that is most relevant to their needs. This approach is opposed to that where farmers are being passive recipients of information delivered in discrete units. The approach of giving them information without an environment in which to participate and choose what is most relevant to them may not lead to a sustainable knowledge-building base. Inculcating the practice of proactive information acquisition by farmers could contribute to a continuous building of the knowledge base. The proactiveness in information acquisition could be related to old sayings that encourage sustainability such as 'learning how to fish as opposed to being given fish'.

3.7.2 Collaboration between agricultural information stakeholders

The need for collaboration between the three agricultural stakeholders, i.e. farmers, extension and information sectors, have been advocated before. In Nigeria for instance, Oladele (op. cit) recommended a much closer and complementary cooperation between

extension workers and agricultural librarians, while Aboyade (op. cit.) advocates for collaboration, arguing that, while extension professionals are more skilful in handling farmers and dealing with their farming needs, information workers are stronger in mechanisms of information transfer and information management. Furthermore, Maru and Alluri (op. cit.) recommended collaboration as a strategy for life-long learning arrangements for smallholder farmers in Asia and Africa.

Libraries in Africa were advised to create effective links between the information they contain and the information needs of farmers and extension workers in order to solve information problems in agriculture (Sheba, op. cit.). To that effect Sheba (ibid) recommended setting up Agricultural Advisory Boards that should include both librarians and extension officers. Linking agricultural information libraries and centres with agricultural research, as well as the agricultural extension system and farmers, was also identified as an effective strategy for improving agriculture and agricultural techniques in Kenya (Ojiambo, 1995). A collaborative approach is also recommended by the Agricultural Sector Development Strategy (ASDS) for effective information support services (URT, 2001_a op. cit: ix, 39). However, apart from a few studies such as that by Mchombu (1995 op. cit), which employed a collaborative approach between librarians, agricultural professionals, educationists and health workers, it appears that only a few researches have looked into possible mechanisms for implementing such a collaborative approach and there is limited information about the implementation of such strategies and approaches in African countries. In some Asian countries, such as Indonesia,

Taiwan and Japan, information for remote farmers has successfully been disseminated by having a link with national information centres (Bay-Petersen, 1996).

3.7.3 ICTs in promoting farmers' access to agricultural information

The Information and Communication Technologies (ICTs) are revolutionizing the way information is being generated and managed in the current era. For the majority of people in Africa however, new ICTs, particularly computers and the Internet, were until recently far from reach. For instance, by 2001, while one out of every 9,000 Africans outside South Africa had access to the Internet, the ratio was one in 38 in the rest of the world (Mundy and Sultan, op. cit: 103). This picture is however changing rapidly. For example, in 1996 only 19 countries had full Internet services, but by 1999 the service had covered almost all countries (53) except Congo, Eritrea and Somalia (ibid.).

The potential for making use of ICTs for development in rural places that have better literacy levels and relevant technological infrastructure has been documented fairly widely (Maru and Alluri, op. cit.; Adam and Wood, 1999; Sagna, 1996 and Andre, 1991). With liberal trade policies, Tanzania, for instance, is increasingly seeing rapid technological developments in its rural areas. The private telecommunication systems, for example, have revolutionized rural life where acquisition of cellular phones by farmers is increasing very rapidly. The phenomenon of the boom in cellular phones observed in Uganda (Mundy and Sultan, op. cit.: 117) is probably similar to what has been reported as the leap-frogging situation taking Tanzania by storm (Hancock, 2005). Despite the fact that the use of mobile telephones is a recent phenomenon in most

countries in Africa, it was surprisingly observed that in Uganda, for example, mobile phones were used as much as ten times more than in developed countries (Mundy and Sultan, op. cit: 115). The situation observed in Uganda is not so different from what is being observed in the rest of the East African countries, particularly Kenya and Tanzania. It would be interesting to find out to what use these cellular phones are being put. Do farmers use them to obtain agricultural information?

The development and use of telecentres in developing economies such as Buwama, Nabweru and Nakaseke in Uganda, (NARO/IDRC/CRDI/CAB, 2002_a) and Sengerema in Tanzania (ITU, 2002), provide indicators of how delivery and access to information in developing countries may be done in future. These telecentres are operating as libraries having book collections, Internet cafes as well as meeting places.

Some International Organizations such as the FAO (FAO, 2002_a) and the World Summit on the Information Society are making efforts to spearhead the way in using ICT in disseminating agricultural information. The FAO, for example, established the World Agricultural Information Centre (WAICENT) for agricultural information management and dissemination. Most WAICENT resources make use of modern IT. Furthermore, FAO urges the adoption of new ICTs, arguing that the technologies should not be seen as "luxuries" but as "essential tools for sustainable development" (FAO, 2002_b).

Initiatives in Africa south of the Sahara that have reported success stories in using ICT for agricultural information in rural areas include some programmes in Kenya. For

example Nairobi University in collaboration with International Development Research Centre are experimenting rural "information kiosks" for tracking down market prices (Opala, op. cit.). Furthermore Kenya Agricultural Commodity Exchange and Nairobi University Agriculture Student Association are using ICTs including mobile phones for smallholder farmers' information (KACE, 2004, NUASA, op. cit.). Tanzania also appears to have experienced rapid development in the use of technology in some rural areas and particularly in urban and peri-urban areas. Examples include the telecentres that are said to have increased from one in 2001 to six in 2003, the ICT-enhanced marketing projects such as the Crop Marketing Bureau in Magu District (Menda, 2005), and the boom of mobile phones (Hancock, op. cit.). The adoption and use of mobile phones has been expressed as having taken the country by storm in that, despite the poorly developed rural electrification, it was revealed that some 97% of Tanzanians said that they could access a mobile phone (ibid.).

On the other hand, Marru and Alluri (op. cit.) have pointed out limitations such as financial and social sustainability as well as type or category of users for the telecentres, for example, that have been established in a number of developing countries. Likewise, Bakyawa (2005_a) pointed out that increasing evidence shows that the technology remains beyond the reach of many farmers.

Among major barriers to effective access to new ICTs in sub-Saharan Africa, for example, is the high cost associated with the technologies. The issue of sustainability has

also been on the agenda in ICT services projects. On the issue of high costs and sustainability, Adam and Woods (op. cit.) pointed out the resultant cycle of dependency where institutions appeared to be moving from one donor to another. Until recently several aid agencies have been instrumental in establishing Internet services in Africa, but it was soon realised that donor money was not the way to sustain these services. Currently, private businesses such as Internet Service Providers (ISPs) are seeing commercial opportunities to make profit. An example of such an ISP is Africa Online, a Nairobi-based firm operating in Kenya as well as Côte d' Ivoire, Ghana, Swaziland, Tanzania, Uganda and Zimbabwe (Mundy and Sultan, op. cit.: 113).

Another major issue that may constrain the meaningful use of ICT by smallholder farmers for the time being is limited relevant and useful digital content (Marru and Alluri, op. cit). Also, Bakyawa (2005_b) pointed out problems in finding relevant information in usable formats on the Internet as among the major limitations in the use of ICT by smallholder farmers. For some time and probably up to the present time it has been observed that ICT in most rural areas is also limited by problems related to infrastructure, lack of awareness, knowledge and skills (NARO/IDRC/CRDI/CAB, 2002_b). On the issue of infrastructural constraints, Maru and Alluri (op. cit.) argue that for ICT to have a significant impact on the livelihoods of farmers deliberate changes are needed in policies for the development of rural telecommunications and electricity infrastructure.

The potential as well as an inevitable trend of adopting ICT for improving livelihoods in rural communities may not be ignored. This probably calls for the need to get information on existing opportunities that could make it possible for more farmers to benefit from ICT resources for their information needs.

3.8 The research Gap

The literature reviewed above has shed more light on the role of information as one of the development factors, pointing out the need to update farmers' information needs. It appears that there is scarce information on the needs of smallholder farmers in the study area, a situation that may contribute to lack of information acquisition practices among farmers. Provision of agricultural information to farmers is a task mainly performed by the agricultural extension sector. However, some researchers now recommend active involvement of information specialists in this task, but a framework is lacking for empowering farmers to proactively seek information that is most relevant to their needs as opposed to being passive recipients of information delivered in discrete units, without giving them a chance to choose what is most relevant to them. A gap of this kind cannot be filled by the extension service alone; rather information professionals such as librarians, who are more greatly endowed with information management skills, could play a complementary role in this task. There is not enough information explaining how such an approach could be realised nor is there empirical evidence of the institutional framework for implementing such an initiative in Tanzania. Despite the increasing

acknowledgement of the role of information in agricultural transformation and socio-economic development, no study has attempted to mainstream information-seeking practices into farmers' normal activities so as to assist them to seek, access and exploit information from a wide variety of recorded sources in order to positively contribute to their decision-making abilities.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter explains in detail how the study was conducted. It is divided into three main sections; the pre-intervention survey, the intervention and impact assessment. Both qualitative and quantitative research methods were used to achieve the research objectives. In this stage a questionnaire survey was conducted to contribute to achieving the research objectives one, three and five. This was followed by a longitudinal intervention study in which the trial models of Village Information Centres (VICs) were established, put to use, monitored and evaluated through a participatory approach. During the intervention study, collection improvement, and monitoring and evaluation visits were carried out. During these visits, informal and formal discussions were conducted, followed by reflection which formed the basis for subsequent improvement in the collection and management of the intervention model according to the participants' experiences in the respective villages. The VIC intervention model study also contributed to providing answers to research questions one, three, four and five. Towards the official end of the research an impact assessment was conducted, which comprised a questionnaire, focus group discussion (FGD) and information acquisition test to have an empirical basis for recommending the VIC as models for the stimulation and promotion of the practice of proactive information seeking.

4.2 The research design

Research design has to do with identifying the approach, and determining the general procedures or strategies of inquiry, and of data collection, analysis and presentation (Creswell, 2003: 3). This study used a combined research method framework where both qualitative and quantitative data were collected concurrently. The rationale for using the combined method approach, also referred to as multi-method, convergence, integrated, or mixed (Creswell, ibid: 16), is based on its major advantage of neutralizing or cancelling the biases of a single method (Creswell, ibid.: 15.; Glazier and Powel 1992).

4.2.1 The pre-intervention survey

A cross-sectional survey approach was used for a situation analysis. Such a design, according to de Vans (1993: 379), allows data to be collected at one point in time. The data can also be used for simple descriptive interpretations as well as for determining the relationships between variables at a particular point in time. In this research the survey was carried out to benchmark the study parameters as far as access to availability and use of information by smallholder farmers are concerned. The questionnaire was used to come up with the demographic data, identify agricultural activities, and find out the prevailing information–related situation as well as identifying preliminary agricultural information needs of farmers in the study area.

4.2.2 Participatory Action Research (PAR)

The research intervention stage was participatory action-oriented in nature. The intervention was carried out based on modification of participatory action-oriented research models as explained by Reason and Bradbury (2001), O'Brien (op. cit.), and Mutimba, (1997). The participation of farmers used the collaborative mode and at the functional level or functional typology. Four modes have been identified, each characterized by the intensity of farmer involvement. These are: contract, consultative, collaborative, and collegial (Biggs, 1989). Out of the four modes, the collaborative mode is said to represent the ideal in that it involves continuous interaction between researchers and farmers in the research process and allows for flexibility rather than following strict stages of research (Mutimba, op. cit.: 23).

Pretty et al, (1995) have used the level of participation of farmers as a useful factor to interpret the term 'participation', and avoid possible contradiction, and seven levels of participation have been identified by them. These are: passive participation; participation in information giving; participation by consultation; participation for material incentives; functional participation; interactive participation; and self-mobilization. At the functional level, farmers participate in predetermined objectives of externally initiated ideas, depend on external initiators and facilitators for the research process and may become self-dependent as the research progresses (ibid). A study by Mutimba (op. cit.: 24) found that the first four levels of participation listed above result in superficial and fragmented achievements with no lasting impact on people's lives. Therefore functional

participation is strongly recommended when the ultimate goal of intervention and support is to achieve sustainable development (ibid.).

This research adopted the functional level of farmer participation, whereby farmers participated in systematization and internalization of predetermined objectives that were based on previous interactions with farmers through agricultural exhibitions, farmer opinion as captured from the survey data and through literature. Active participation of farmers gave rise to ideas and operationalisation of the VIC model as will be explained later in this chapter.

The PAR has an advantage over other conventional research models because of the active participation of farmers and their willingness to give information during the research process (Defoer et al, 1998). In addition, Brewton and Millward (2001: 13) recommends an action research where there is the intention of making a practical difference to the participants. The approach is also recommended by Okali et al (op. cit.: 20) where community empowerment is required, because by its nature the participatory approach is an empowering process. The methodology is highly recommended where there is the intention to make a research both a process and a goal (Greenwood et al 1993).

The validity and reliability of participatory methodologies for rural development has also been substantiated by Temu and Due (2000), who found that participatory methodologies, among other things, gave quality information and involved stakeholders.

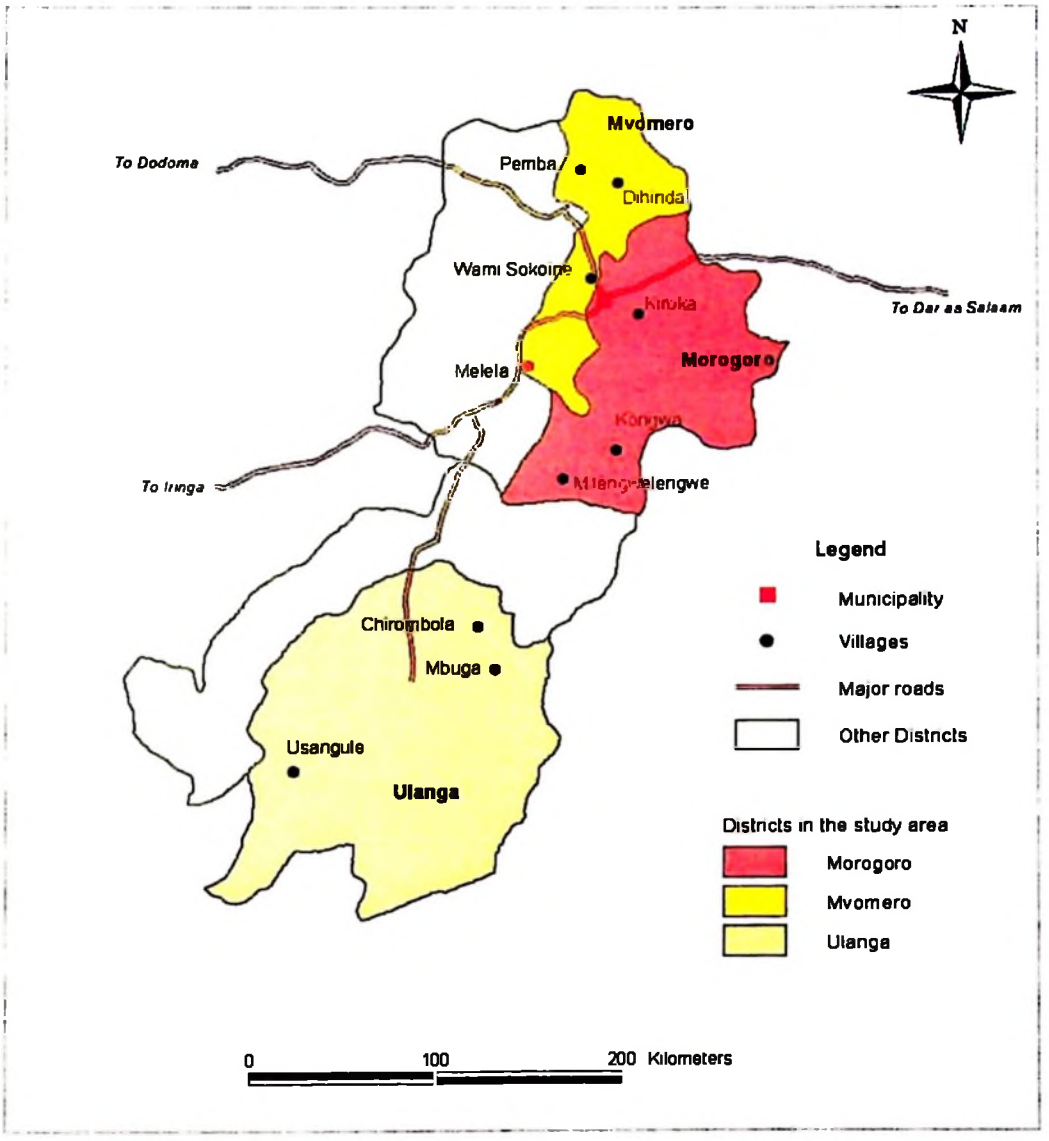
4.2.3 Assessment of impact, awareness and acceptability of the VIC

The third stage aimed at assessing the farmers' awareness and acceptability of the VIC. It was also used to determine whether or not the intervention had made an impact on individual participants and the community at large. At this stage, a questionnaire was used, together with the triangulation method of FGD, informal interviews, on-the-spot observations and testing farmer's knowledge about basic agricultural information that was contained in the printed materials available at the VIC models. The assessment also included a control village as will be explained later in the chapter.

4.3 Area of study

The study was conducted in three districts of Morogoro region (Map 2). The selection of Morogoro as the seat of the study was purposefully done on the basis that the region is well endowed with a diversity of agricultural features, including diversity in ethnicity, farming systems and agricultural information generators as explained in chapter 2. Thus the region has opportunities for a wide range of agricultural activities that could make use of a variety of agricultural information. Based on the above, this region was found to offer the optimum environment for this study.

Map 2: Morogoro region showing the research villages



Source: The GIS at SUA in collaboration with the researcher

4.4 Population of study

The population of the study comprised smallholder men and women farmers in Morogoro region in Tanzania. The study focused on smallholder farmers because they constitute the majority (about 80%) of the population who earn their living in rural areas, with agriculture as their main economic activity. It has also been documented that though this is the largest group in the agricultural production sector, it is nevertheless relatively disadvantaged with respect to access to and use of information resources. Consequently, this group was seen as a relevant target in relation to improving productivity for better livelihoods through cultivation and optimization of the practice of proactive information-seeking, and the access and use of information about agriculture.

4.5 Sampling method

4.5.1 Sampling for the pre-intervention stage

(a) Sampling of districts and wards

A multi-stage purposive-stratified simple random sampling technique was used to draw a sample of district and wards that were involved in the survey. This sampling technique is based on a model by Bulmer (1993: 91) who recommends such a technique in conducting surveys in rural and developing areas, where lists of wards and villages are available from documents such as national census reports. The first sampling stage employed the random sampling technique to select three (50%) out of the six districts in the region, namely Morogoro rural, Mvomero and Ulanga. A list indicating the names of

all the wards in each division was obtained from the national census document (URT, 2005_c op. cit.) and verified at the planning offices of the District Executive Directors.

The second stage was a sample of 10 wards randomly selected from a total of 66 wards in the three districts under study. The number of wards selected from each district was three, four and three from Morogoro rural, Mvomero and Ulanga respectively. This number is equivalent to 15 % of all wards in the three districts.

(b) Sampling of the villages

A list of villages in each ward was obtained from the office indicated above. With the assistance of the Ward Executive Officers in the selected wards, one village was selected from each ward according to the criteria below:

- Representation of communities. Communities that are predominantly crop farmers as well as those having both crop farmers and livestock keepers mainly of Maasai tribe. This criterion was thought important because each community had its own peculiar situation and needs that were found useful to consider in the course of the study.
- Proximity to urban centres. Villages situated near the town and municipal centres as well as those in remote areas were picked to take care of possible variations due to urban influences.

Therefore, a total of 10 villages were purposively selected as indicated in Table 1 and location Map 2.

Table 1 **Names of Districts and corresponding divisions, wards and villages under study**

District	*Division*	*Ward*	*Village*	*Km from Regional HQS*	*Km from District HQS*
Mvomero	Turiani	Kanga	Dihinda	93	93
	Mlali	Melela	Melela	35	35
	Mvomero	Kibati	Pemba	110	110
	Mvomero	Mvomero	Wami Sokoine	20	20
Morogoro rural	Mkuyuni	Kiroka	Kiroka	25	25
	Mvuha	Mvuha	Kongwa	94	94
	Bwakira	Mngazi	Milengwelengwe	103	103
Ulanga	Mwaya	Chirombola	Chirombola	331	32
	Mwaya	Mbuga	Mbuga	342	43
	Mtimbira	Usangule	Usangule	324	81

Source: Compiled by the researcher

(c) Sampling of the respondents

The sampling process required the development of a sampling frame, which in this study was a current list of all farmers in the selected villages as obtained from the household list in the village government office in collaboration with the VEO_1 in each village.

Stratified simple random sampling was used, whereby farmers were stratified into men and women to ensure representation of both genders. Random selection of respondents was done in order to increase validity and reduce bias. Based on a model by Feurstein (1986: 70), a sample size of 60 farmers per village, which is about 5% of the current active population in the respective villages, was adequate to meet the minimum sample size required as a representative sample for valid and reliable results in rural surveys. The population in the sampled villages was about 1000 adults in all villages. This number was almost the same in all the villages sampled. Finally, 60 farmers were drawn from each village making a sample of 600 farmers. It is worth noting that the well-defined and functional administrative structure of the local government in Tanzania facilitated the sampling procedure, particularly because lists of villages, wards, and divisions are available from local government offices at different levels of the structure.

4.5.2 Sampling for the intervention and impact assessment stages

(a) Selection of districts and villages

The number of districts and villages selected for the intervention stage was reduced from three to two and from ten to four for the districts and villages respectively. The two districts were Morogoro rural and Mvomero, while the four villages were Dihinda, Kiroka, Kongwa, Melela. Two more villages, Milengwelengwe and Wami Sokoine, were selected as control villages where no research action took place. Reduction of the number of districts and the number of villages as well as purposive sampling was found necessary because the longitudinal study and action research in particular by its nature requires a smaller sample to allow theactive participation of the research participants in

collaboration with the researcher in making a close follow-up for a long time (O'Brien, op. cit.).

Another consideration was type of villages as far as farming activities and distance from urban centre were concerned. In order to capture any differences in villages, it was found necessary to include villages that had crop farmers and livestock keepers as well as villages that are relatively close to urban centres and those in more remote areas.

(b) Selection of the participants

In response to objectives number one and four of the study, the participants were selected at two different levels. Initially the research participants were comprised of all men and women farmers in each village who had attended the village meetings at which the objectives and research ideas were exchanged, scrutinized and improved by members of each village. The number of participants varied from one village to another as will be shown in the following chapter. Farmers who attended the initial village meetings continued to participate in subsequent meetings. All farmers who registered, visited and used the VIC were among those who continued to attend the village meetings.

The second level involved selection of participants to form the FGDs for the purpose of triangulation and to contribute to achieving objectives one, four and five. The most frequent users of the VIC were identified from the research logbooks or journals (VIC attendance registers and analysis books). In each of the four villages, two groups were

formed, each comprising 10-12 men and women as shown in Table 20 in the following chapter. The selection of this sample was based on a combination of models of Gibbs (op. cit.) and Stewart and Shamdasani (1990: 57). While Gibbs suggests that the recommended number of people per group varies from a minimum of four up to 15, Stewart and Shamdasani recommend 6-12 participants, arguing that fewer than six participants might end up in a dull discussion while more than 12 participants could be difficult for the moderator to manage and/or deny other participants an opportunity for active participation. The total number of participants in all eight groups was 87 farmers.

The sampling procedure for the respondents to an impact assessment questionnaire followed the same procedure as that for the situation analysis stage. A total of 240 respondents were sampled (60 from each village) to represent the four villages under intervention.

4.6 Data collection methods

4.6.1 Permission and recruitment of the research assistants

The situation analysis survey lasted from December 2004 to March 2005, and the intervention study commenced in April 2005 and lasted for one year and two months.

The research was conducted after the procedures for obtaining the relevant permission and introduction letters were observed. These included the introduction letter from the

University administration and a hierarchical communication procedure starting from regional to district level. After that communication was made with the Ward Executive Officers and finally the VEO_1 (the approval and introduction letters are attached as Appendices 5 - 10).

Three research assistants, one for each district, were recruited to assist in data collection during this stage. The assistants included two primary school teachers and one Village Extension Officer (VEO_2) residing in the research areas. School teachers were selected because they were familiar with the area and could conduct the interviews during school vacation. The VEO_2 was not only a resident in one of the research villages but also according to the officer at the District Agricultural and Livestock Development Office was one of the active VEO_2 for agricultural information for farmers. In addition, two library staff from SNAL were recruited to assist in administering the test and recording the FGD proceedings as will be explained later.

A training seminar was conducted in order to familiarize the assistants with the overall objective and approach of the research, the research instruments and what was required in conducting a face-to-face interview. Keat (2000: 76) recommends the use of trained assistants, arguing that in ensuring consistency for reliability, trained assistants improve reliability.

4.6.2 Data collection for pre-intervention survey

(a) Secondary data

Documents and publications such as the Agricultural Development policy, ASDS, Poverty Reduction Strategy, and TLSB reports were consulted. In addition, continuous literature review assisted in getting more in-depth information about agricultural information issues as well as different research approaches.

(b) Primary data

The survey questionnaire was administered by the principal researcher and the research assistants through face-to-face interviews to ensure a high response rate as well as to have a chance to clarify the questions where necessary.

4.6.3 Data for the Research intervention and impact assessment

The intervention involved participation in establishing, monitoring, modifying and evaluating the VIC or Kituo cha Habari cha Kijiji (KHK) in Kiswahili. Towards the end of the research, FGDs were held in each village for triangulation and validity checking. An impact assessment questionnaire survey was also conducted at the end of the study period.

(a) Secondary data

An assortment of printed documents with relevant information on agricultural innovations and other agricultural information in Tanzania that could be used by farmers were identified and collected by the researcher following physical visits to five places as follows. In Dar es Salaam two departments under the Ministry of Agriculture and Food

Security (MAFS) (now Ministry of Agriculture, Food Security and Cooperatives-MAFSC) were visited namely the Directorate of Research and Development and FEPU. Other places included Inades-Formation (Tanzania) situated in Dodoma municipality, an NGO dealing mainly with farmer education activities. Documents from Inades and some from the MAFSC were obtained at a small cost. Other places visited were in Morogoro and included the Rodent control centre belonging to MAFSC, four units at SUA namely the Directorate of Research and Postgraduate Studies, the Institute of Continuing Education, the rodent control project and SNAL. Also the researcher collected some documents from the agricultural exhibition pavilions in Morogoro. The exhibition is an annual event that takes place during the first ten days of the month of August (see Photograph 4 and 5 for 2006 exhibitions).

Photo 4: **Entrance to the Agricultural exhibition in Morogoro**

Source: Photograph taken by the researcher on 8th August 2006.

At the rodent control centre, all printed materials available for distribution to farmers were collected, while at SUA, a selection of relevant publications was made from the documents that were stored for future distribution.

The materials collected were in the form of booklets, pamphlets, leaflets and posters. These were organized into broad subjects such as crop husbandry, seed varieties, animal health and production, irrigation agriculture, pest management, fruit and vegetable growing and processing, use of animal power, human nutrition and health, and farmers' groups to mention a few. (See the attached list of titles as Appendix 13)

Photo 5: **One of the pavilions having printed information for visitors to pick up**

Source: Photograph taken by the researcher on 8th August 2006

Selection of printed materials for use in the intervention stage was based on both the information needs and preferred formats as identified in the survey, as well as what was physically available for direct use by farmers. Another criteria for selection of the documents was inclusion of critical current issues in the community that would be of interest to them such as health and nutrition, specifically nutrition in relation to HIV/AIDS, and farmer groups and networks.

(b) Primary data

(i) Meetings with the village government leaders

In each village the researcher held one meeting with the village government leaders in order to get familiar with the village set-up and profile, establish a relationship which is conducive, discuss the research objective, nature and goal, and request their cooperation. Furthermore, appropriate dates for meetings with the rest of the community were agreed upon. The village government called for special village meetings through notice boards posted outside their offices and shops and by word-of-mouth. In two villages, i.e. Melela and Kiroka, the meetings had to be combined with normal general village meetings held once every three months. (See Photograph 6). Each village had a formal village government to oversee the daily activities of the village, which was a useful setting for this research.

Preparations for the interventions coincided with preparation for the country's general election that took place at the end of 2005. This delayed the initiation of the intervention in some villages such as Kiroka, where the researcher was advised to postpone the

meetings to avoid possible misinterpretations by the public who might have related the research meetings to political issues, mainly because one of the village leaders was aspiring for political office in the village government.

Photo 6: Group photograph with village government leaders: Dihinda

Source: Photograph taken during fieldwork on 23rd June 2005

(ii) Meetings with the public

The researcher held three preliminary meetings in each village before establishing the VIC. Only two meetings were held for the control village – which will be explained later in this chapter. The village leaders chaired the meetings while the researcher facilitated the meetings and clarified issues. The first meeting was mainly for building rapport with

community members and to brainstorm on the ground rules so that they could freely give their opinions during open discussions. The ground rules were clearly written down on the flip chart by the VEO_1 for all to see and comply with. Open discussions were designed to encourage more participation by respondents. The purpose of the research, its nature, goal and scope was explained and discussed right from the outset and throughout the research process. This was a deliberate effort to avoid false hopes created among the community during research of this nature (Okali et al op. cit: 78). The respondents were also made to understand that the decisions made as well as the outcomes of the meeting would be a collective responsibility. During this meeting, samples of printed materials that could probably be of interest to them were briefly displayed and collected back for future use.

At this stage the idea of the Information Centre, as captured in the survey stage also came out strongly from the meetings in two out of the four villages. Therefore it was refined and adopted. It was agreed that the centre be known in Kiswahili name as "Kituo cha Habari cha Kijiji" i.e. Village Information Centre (VIC).

The second meeting was for the purposes of administering a pre-intervention test for agricultural information awareness among farmers, so as to have the baseline data for making a comparison between the farmers' scores before and after the intervention. The test was part of the impact assessment stage that will be explained in the following section. Apart from administering the test, during this meeting further discussions were

held about the feasibility of having a VIC. Issues discussed included location of the centre, availability of bookshelves and printed information materials, management and sustainability of the centre. Local carpenters in the villages volunteered to make simple shelves at a small cost in three out of the four villages. The fourth village (Dihinda) had bookshelves in the village office that could be used to display the materials because they were not being used at the time of the research. In the three villages, it was agreed that the shelves would be ready by the next meeting.

(iii) Establishing the VIC

During the third meeting further discussions with village members and actual establishment of the VIC (KHK) took place. The decision on the most suitable place for the VIC was based on both the farmers' preferences as found out in the survey for the situation analysis and their opinions during village meetings. The community members were made aware of the voluntary nature of their participation.

The researchers and village members jointly cleared the place, arranged the shelves, wrote labels and mounted them onto the shelves before displaying the printed materials. (see Photographs 7 and 8). The awareness and publicity posters were also posted on the entrance door.

To begin with the publications belonged to eight broad subject areas where each subject had one to two titles of documents in the form of booklets, leaflets, pamphlets, and

posters. However, in the course of the research process of monitoring, feedback from participants and reflection, the number of titles as well as subject coverage was increased in response to user requests and according to availability. Each subject was allocated a unique code similar to a class mark system to ensure consistency in record keeping.

The meeting elected male and female coordinators or supervisors of the VIC, and in two villages that had both crop farmers as well as livestock keepers, a third farmer was elected from among livestock keepers to represent their community. During the meeting the tasks for these coordinators were spelt out to include:

- To oversee the usage of the centre by filling in the logbooks
- To sensitize fellow village members and create awareness of the existence of the centre in the village
- To oversee the safety of the materials
- To put down any comments by the users or any other person visiting the centre that is not captured in the logbooks
- To encourage other people in the village to use the centre

Photo 7: Participants clearing the place and mounting the shelves: Kongwa

Source: Photograph taken by the researcher on 3rd August 2005

The researcher held a separate discussion with the coordinators, mainly to discuss and agree on the management of the journals, particularly on issues such as proper and consistent record keeping, and identifying and recording relevant information. Each village agreed on some general rules for the safety of the materials and agreed on its own opening days and times of the week.

Photo 8: Participants labelling and displaying the materials: Kongwa

Source: Photograph taken by the researcher on 3rd August 2005

(iv) Visits for monitoring of the VIC

Visits to the VIC were done once a month to monitor and evaluate how the VIC were being used in different villages and who were using them. Discussions with the users covered issues such as participants' attitudes towards the VIC, comments about appropriateness of the materials that were available at the centre and other materials that they missed at the centre, preferred formats of the materials, whether in the form of books, booklets, leaflets, pamphlets, posters and so on, how else would they prefer using the materials available in the centre as well as their attitude towards the VIC model and any other suggestions. In addition, the researcher observed how the actual usage of the materials took place, e.g. individual reading or group reading, discussion among

farmers, enthusiasm of participants regarding accessing the materials at the centre and so on.

(v) Focus Group Discussions

The FGDs were conducted in the research villages for three main purposes. First as a triangulation method in order to further probe and verify what participants indicated in the research journals. Second, to verify the information obtained in the survey in relation to agricultural information issues such as farmers' information needs and other issues, and third to capture preliminary indications of the research intervention impact from the active users of the centre.

Two FGDs were conducted for each VIC. The discussions were guided by focused topics listed in the discussion guide. The discussions targeted the most frequent users of the VIC as identified from the research attendance register. While the principal researcher moderated the discussion, the proceedings of the discussions were recorded by the research assistant, a member of staff at SNAL.

The discussions took place in the open space outside the village government offices in three villages while at Kongwa the discussions were held in a village meeting hall which used to be the cotton storage house in the past. (see Photograph 9 and 10). On average, each discussion lasted for about one hour.

Photo 9 & 10: The FGD in session

Photo 9: Kongwa village Photo 10 Dihinda village

Source: Photograph taken during the FGD sessions on22/02/2006 and 02/03.2006.

(vi) Pre and Post-intervention agricultural information tests

The test was administered to the four villages under intervention and to two control villages at two different times during the study period (Photo 11 and 12). The pre-intervention test was administered to each of the four villages during the second public meeting, while the post-intervention test was administered before the official end of the research in each village. In the control villages, the tests were administered at the beginning of the intervention study and after all other villages had had the post-intervention test.

The intention of the test was to compare the extent of agricultural information that the farmers had regarding innovations and other information in relation to agriculture and

livestock activities prior to and after the establishment and use of the VICs. It was expected that the scores of the test would give an indication on whether or not there was any difference after they had had the opportunity to access information materials at the centre. The overall purpose was to find out whether or not farmers in the study area could or could not use printed information usefully for their information needs so as to have empirical evidence on the role of printed information and the information use model in stimulating the practice of seeking, accessing and using information by smallholder farmers in the study area.

The researcher explained the scope of the test and confidentiality of the scores of each participant. However, at this stage the participants were not informed of the post-intervention test planned towards the end of the study in order to allow for natural assimilation of information without necessarily looking for specific answers to the test questions.

Photo 11 and 12: Farmers attempting the agricultural information Test

Photo 11: Melela village

Photo 12: Kiroka village

Source: Photographs taken by the researcher on 29/06 and 23/08 2005 respectively

All farmers who attended the meeting and were willing to participate, irrespective of their reading and or writing skills, were encouraged to participate. Each farmer who could read and write was given a pre-written test paper and a pen. The participants were required to answer the questions independently, and were given ample time to attempt all questions and leave out those that they could not answer. Two research assistants assisted farmers who could not read and/or write. The assistants had clear instructions to only write down answers given by the farmers themselves. On average, the tests lasted for one and a half hours.

(vii) Survey for impact, awareness and acceptability of the VIC

The questionnaire was administered to 240 randomly selected men and women farmers in the four villages under intervention to determine their level of awareness, attitude acceptability and limitations, and any other opinion regarding the VIC. The data obtained also contributed some indications on the possible early impact of the VICs.

(viii) The control villages

The control villages did not have any intervention measure except for the knowledge test that was conducted twice in each village following the same procedure as in the intervention villages. The purpose of having the control villages was to find out whether there would or would not be any difference in the information that the farmers had between the villages under intervention and the control villages at the end of the research. With some assumptions, as explained in chapter one, it was expected that, in using this approach, we would be able to make a researched conclusion as to whether farmers could or could not search for information and get informed by accessing recorded information sources, and printed sources in particular, so that we have a basis for recommending or not recommending the VIC approach. The basic question was would there be any difference in the level of knowledge of farmers before and after intervention?

4.7 Instrumentation

The data was collected using eight instruments that fulfilled the research objectives. The multiplicity of instruments used for data collection in this study is based on models, including that of Creswell, (op. cit.), who argues that a combination of methods using more than one instrument neutralizes biases of a single instrument. Furthermore, O'Brien (op. cit.), among other things asserts that participatory methods are more of a holistic approach to problem-solving, thus allowing for several different tools to be used during the research process. The instruments that were used for data collection included the following:

4.7.1 The Questionnaires

There were two types of questionnaire, one for the situation analysis survey and the other for assessment of the impact, awareness and acceptability of the VIC. In the basic design the questionnaires contained both closed and open-ended questions distributed into various sections (Appendix 1 and 2). The questionnaires were translated into Kiswahili so that they could be used directly during the interview process. Two English - Swahili dictionaries (Kirkeby, 2000; TUKI, 2000) were consulted where specific key words were required in the questionnaire.

The survey questionnaire was used to obtain information to contribute to achieving the research objectives one and three. Specifically, the questionnaire was used to generate demographic data, identify agricultural activities taking place in the area, find out the

abilities, attitudes, preferences and limitations in relation to access and use of printed information, sources of information materials and the availability of such materials in the households of the respondents, identify the agricultural information needs of farmers in the study area, as well as capturing respondents' awareness regarding ICT tools in facilitating information access and any relevant opinions or suggestion about stimulating active seeking and using of agricultural information.

The impact assessment questionnaire was used towards the end of the research to find out the level of awareness of the VIC which had been established in the research villages, farmers' general attitudes and opinions concerning the VIC as well as any change in information-seeking practices following the establishment and/or use of the VIC.

4.7.2 Village meetings

The research process required a series of separate meetings with village leaders on the one hand and with the general public on the other. The meetings contributed to arriving at the consensus that formed the basis for the consequent intervention.

4.7.3 Research logbooks

Two kinds of research logbooks were designed for each village. These were the register book used to register the attendance and the analysis logbook used to track the information usage by individual participants (Appendix 6). The daily attendance was

recorded as well as the information concerning the documents that were accessed and read or discussed among users. The information included comments concerning the usefulness of the publication, user preferences in terms of document format and content presentation, reasons for their opinion and any other suggestions from the participants. The logbooks were also used to identify information needs as well as to monitor the trend in seeking, accessing and using information. In addition, they were used in identifying the most frequent users of the centre for the purpose of selecting members for the FGDs. The logbooks had the same layout for all the villages and required similar inputs from users. The data captured in this instrument contributed to addressing the research objectives one and four.

4.7.4 Agricultural information knowledge Test

This instrument was used to obtain data that contributed to addressing the research objectives three and five. The test was about factual and practical information concerning agricultural activities taking place in the study area as found out in the situation analysis stage. All responses sought in the test were contained in the information materials that were intended for display and later displayed at the VIC. The format of the test required short answers. The researcher designed a marking scheme that was used to mark the test and allocate scores to each script. The total score was out of 100 marks. (The test is attached as Appendix 3)

4.7.5 Focus Group Discussion (FGD) Guide

The typical instrument for a focus group study is a discussion guide (Morgan, 1988). As a complement to the other tools above, it was used for triangulation and validity checking. It captured information that responded to objectives one, three, four and five. The guide had a list of parameters relating to the VIC as an intervention to stimulate the practice of seeking, accessing and acquiring information by farmers (the FGD guide is attached as Appendix 4).

4.7.6 Notes from the monitoring visits

During monitoring visits, informal discussions were carried out with users of the VIC (research participants) in reference to predetermined issues, such as other information materials that the farmers needed at the centre, preferences for available materials and suggestions on preferences for methods for accessing the materials. However, participants also pointed out issues and/or approaches related to the VIC that required some modifications and improvement as the research process continued.

4.7.7 Observation guide

The observation guide (Appendix 5) was used as a checklist to make note of, among others, farmers' enthusiasm as reflected by their participation during open discussion, and the actual method used by farmers when accessing the materials, e.g. individual reading, group reading, and/or discussions during reading. The guide in combination with other instruments addressed research objective four.

4.7.8 Documents

Secondary data were obtained from a number of documents that were either consulted in the course of literature search, or were physically collected for inclusion in the VICs in responding to research objective two. The documents consulted included those from Internet sites.

4.7.9 Pre-testing of the instruments

The questionnaire and agricultural information tests were pre-tested for validity, and clarity of content using farmers in two villages; Maseyu village in Mikese ward, Morogoro rural district and Kipera village, Mlali ward in Mvomero district. The FGD guide was pre-tested for appropriateness in stimulating discussions. Pre-testing of the FGD guide was done using farmers in Kongwa and Dihinda villages who appeared in the research logbooks but were not selected for the FGDs. Modifications were made whereby the instruments were shortened and modified while some of the questions were further simplified to become more straightforward and better conveying the intended message. The modification improved the structure, clarity as well as the validity of the final instruments.

4.8 Data analysis and presentation

4.8.1 Analysis of the survey data

The information gathered through the situation analysis survey questionnaire produced both quantitative as well as qualitative data. The data was grouped into seven groups including i) general information, ii) personal particulars including demographic information, iii) main activities of the respondents, iv) education, reading and writing abilities, v) agricultural information availability and information needs, vi) availability and use of printed information, vii) awareness regarding ICTs and viii) any other opinions or suggestions regarding access and use of agricultural information. The dependent and independent variables were identified. By going through the questionnaire, the information was edited, summarized and coded into non-ambiguous responses for each variable to ease analysis. The templates for coded data were designed and data was put into the computer where the SPSS computer package version 11.5 was used for data processing and analysis.

Descriptive statistics were computed whereby the means, percentages and frequency distribution of different variables were calculated. The chi-square test values were computed to assess the significance of the relationship between variables. Influences between variables were determined to find out factors influencing access and use of information, and factors influencing preference for a certain type of information source and resource over the other.

Some of the open-ended questions that could not be analysed by the computer software were subjected to a systematic content analysis technique whereby sorting of the content into meaningful categories and themes of major issues in relation to the research objectives was done. Opinions and suggestions by respondents were drawn from the questionnaires and summarized to ease presentation.

4.8.2 Analysis of the intervention and impact data

The analysis involved the data from the VIC assessment questionnaire survey, agricultural information test, data from the logbooks used in the VIC and the FGD data.

The information from the questionnaire survey was put into three groups namely i) personal particulars including demographic information, ii) information related to the VIC and iii) any other opinions or general suggestions. Some of the data collected for assessment of the VIC was analysed using the same version of the SPSS computer package as used in the baseline survey data.

A regression analysis was conducted for selected sets of independent against dependent variables, in order to measure how different socio-economic factors could have influenced the behaviour exhibited by different respondents during utilization of the VIC. To this effect a General Linear Model (GLM) was used to measure the stated influence.

The basic agricultural information test was corrected and scores were allocated to each script. The test scores were in two groups; the pre-intervention scores and post intervention scores. The average score for each group was determined. The scores were further segregated by gender, levels of education and age categories. Also a comparison in percentage of scores was made between villages under research and the control village.

Relevant information was manually and carefully extracted from the research logbooks and used to determine the central tendencies. The proportion and trend of farmers who sought, accessed and used information at the VIC over time were also determined. Furthermore, the publications that were accessed most and the possible reasons for this were found out. Farmers' information needs, preferences, opinions and suggestions were also summarized from the logbooks. The discussion notes from the monitoring visits as well as the FGD guides were subjected to content analysis procedures and systematically analysed according to themes as listed in the guides. Comparison of the content between villages was made.

Illustrations such as frequency tables and charts were used to simplify presentation of the results. The profile of selected printed information resources on agricultural innovations and other useful information was organized into subject categories, origin of the document and some relevant bibliographic information (see a list of selected printed materials, Appendix 12).

4.8.3 Integration of the data from the three stages

The quantitative and qualitative data from the three stages were integrated in order to provide a more complete picture of some of the variables that were overlapping when the two methods were employed. Integration was also a useful approach to provide answers to the research questions more systematically and simultaneously.

4.8.4 Data presentation

The data was summarized and presented in two major sections; data gathered from the survey and that from the intervention study. Illustrations such as frequency tables, graphs and charts were used for result presentation where appropriate. Bibliographic information of printed materials that were collected for use at the VICs was organized into different subjects (Appendix 14).

4.9 Data quality control

Data quality control was ensured by using methods that improve the validity and reliability of data. Validity and reliability are crucial methodological concepts in designing and implementing rigorous and high quality qualitative and quantitative research. The term validity is defined as the degree to which one measures what is supposed to be measured. Reliability is concern with the extent to which the research instrument yields the same results on repeated trials. Triangulation was employed in order to improve the validity of the findings. Using multiple methods of data collection,

as explained earlier in this chapter, safeguarded against the danger of distortion while at the same time providing a means of crosschecking the accuracy, controlling bias and validating interpretations. Repeated visits by the researcher to the VIC for monitoring their use as well as informal discussions with users of the VIC was useful in crosschecking participants' responses and enhancing validity.

Reliability was improved by using structured questionnaires, logbooks bearing similar formats for all VICs and interview guides for guiding the FGDs. Pre-testing of the instruments was done as a means of ascertaining their suitability in obtaining the required information. The research assistants were carefully trained to make sure that they were well acquainted first with the purpose of the research and the research instruments.

4.10 Ethical issues

There were ethical issues that required consideration. These included:

- Responding to the questionnaires as well as participation in the intervention stage were done on voluntary basis after obtaining the informed consent of participants, following a clear explanation of the whole research process.
- Disclosure of demographic data, especially the participant's age and level of education, was also voluntary in that they had a choice of mentioning their exact

age or a broad category of their age as well as a category of the highest level of education.

- Respondents were assured of anonymity and confidentiality as regards their responses to research questions and individual scores of the agricultural information test.

4.11 Limitations of the study

This research covered Morogoro region only due to limited resources, particularly time and to some extent financial constraints. It is known that in most cases PAR in particular is expensive in terms of time commitment of both the researcher and the participants (Okali et al 1994 op. cit.: 92). In this case it was necessary to have a consensus during public meetings so that all could own the decisions, which to some extent made the meetings last beyond the planned time. However, weaknesses of the approach such as being time consuming did not have negative effects on the research results as they were minimized by having specific time limits set for the visits and discussions with farmers. It is also known that the approach may raise participants' expectations, leading to false information by farmers. To overcome false expectations the researcher clearly explained the scope and purpose of the research before and during the research process as a deliberate effort to avoid misinterpretation and false hopes. Lack of a concise translation in Kiswahili for the concept of "information" as used in this study was a limitation to some extent but it was overcome by using various examples, phrases and sentences to be

able to get across the exact meaning of the concept. Although various other channels and media for information transfer are recognized and have been pointed out, the study was confined to recorded and printed information resources for the reasons pointed out earlier in the literature review.

CHAPTER FIVE

PRESENTATION AND DISCUSSION OF FINDINGS

5.1 Introduction

This chapter has two main sections. The first section presents and discusses the results of the pre-intervention survey which was carried out in order to understand the situation of farmers and their environment in relation to access to and use of printed information resources. Section two is about the intervention stage of the study in which the Village Information Centres (VICs) were established using a participatory approach, monitored and evaluated in order to determine their role in stimulating proactive practices of information acquisition by farmers using printed materials.

5.1 The survey

The survey part of the study addressed issues reflecting on the profile of the villages, profile of respondents, information needs of farmers, etc, in order to take stock and map out the status prior to interventions carried out by this research as recorded in the methodology section.

5.1.1 Profile of the villages that were surveyed

Profiles of the villages were an aspect of the survey covered by section one of the questionnaire. This section aimed at getting information about the villages under study as well as information about individual respondents in respect to demographic characteristics, literacy levels and rates, major activities, and practices and preferences as far as information access and use is concerned. In this aspect, a total of ten villages were surveyed. Only two villages, Melela and Wami Sokoine, were accessible by a tarmac road along the highway towards Iringa and Dodoma regions respectively. None of the villages had electricity at the time of this research. The villages were located at distances ranging from 20 to 342 kilometres from the Morogoro region headquarters referred to as the urban centre in Table 2. Within their respective wards, the villages were located at distances ranging from 0-4 km from the centre of the Ward where the Ward's Offices are located. The distances of the villages from the urban centre, as well as major crops and livestock are summarized in Table 2.

The 10 villages involved in this study practised different farming systems in respect to diversity and extent of agricultural and/or pastoral activities. Three out of the 10 villages, i.e. Wami Sokoine, Melela and Kongwa, had an agropastoral system of agriculture, where both crop cultivation and livestock keeping were being undertaken as the major agricultural activity.

The prevalence with which different villages were engaged in either crop and/or livestock-based activities varied between villages. In order to provide an indicator of the extent of engagement with the crop and/or livestock keeping activities in the research villages, a scale of one to ten was used where each unit represented a measure of 10% in extent of involvement as presented in Table 2. According to the scale referred to, the extent to which crops were being grown or livestock were being kept in a given village is indicated using a scale numbered 1-10, where the unit 1 (one) was used to indicate that between 1-10 percent of all respondents grew the crops or kept animals cited in the table. Similarly, unit 2 indicates that 11-20 percent of all respondents grew crops or kept animals as the case would apply, etc., up to 10, which indicates that 91-100 percent of all respondents grew the crops or kept animals as the case applied. The dash sign (-) has been used to indicate that in the reference village there was either only a negligible number of the respondents (less than one percent) who grew the crops/kept the animals in question, or the crops/animals were not kept at all in that village.

Table 2: Names of villages, their location, and major activities

District		Mvomero				Morogoro rural			Ulanga		
Name of the Village		Pemba	Wami Sokoine	Dihinda	Melela	Kiroka	Kongwa	Milengwelengwe	Chirombola	Mbuga	Usangule
Km from urban centre		110	35	93	35	25	94	103	331	342	324
Km from district centre		110	35	93	35	25	94	103	32	43	81
Km from division centre		20	18	13	5	12	14	4	8	7	2
Major activity (crops and livestock)		crop	both	crop	both	crop	both	crop	crop	crop	crop
Major crops	Maize	10	9	9	9	10	10	10	10	10	8
	Paddy	-	4	9	6	9	9	8	10	9	10
	Sorghum	1	3	1	6	2	2	1	-	1	1
	Simsim	-	-	1	1	4	6	8	6	5	2
	Cassava	6	2	2	1	3	1	-	1	1	1
	Beans	9	-	1	1	3	-	1	6	1	-
	Other legumes	2	2	2	1	3	5	2	4	2	2
	Vegetables	1	1	2	1	7	1	1	1	1	1
	Coconut	-	-	1	1	5	1	3	-	-	1
	Bananas	1	-	1	-	4	1	1	1	-	1
	Other fruit	-	-	2	1	6	1	-	-	-	-
	Sugarcane	2	-	3	-	1	1	1	1	-	-
	Sunflower	-	-	-	8	-	-	-	-	-	-
	Cotton	1	-	2	-	-	1	-	3	6	1
	Coffee	2	-	-	-	-	-	-	-	-	-
	Forest trees	1	1	1	-	-	-	-	-	-	-
Major livestock	Chicken	10	6	10	8	8	7	10	9	8	7
	Cattle	2	5	3	4	1	5	1	1	-	1
	Goats		6		3	-	7	2	-	-	-
	Pigs	1	-	2	-	1	-	-	-	-	-
	Sheep		1	-	1	-	1	-	-	-	-

Source: Field Data

Maize and paddy were the dominating crops in almost all villages under study. Although several other crops are being grown or could be grown in the area as shown in the table, the two crops have a long tradition as the preferred food crops in the area. This may be the reason for their prominence, especially because they have been shown to have a ready market for any surplus production.

However, there are indications that other non-traditional crops could probably pick up rapidly with awareness and information about their potential and production techniques. Likewise, although local chickens were kept by the majority of the respondents, they were not considered important livestock when compared to cattle, goats, sheep or pigs. As to why they did not consider them as important, the reasons advanced included susceptibility to epidemic diseases and predators and being kept only for local consumption. Nonetheless, there was an indication that village or local chickens were gaining increasing prominence given the rapidly increasing demand for the same from urban areas. This may further be enhanced as farmers come to learn that technologies to cope with and address the problems posed by diseases existed and were accessible.

5.1.2 Profile of the respondents

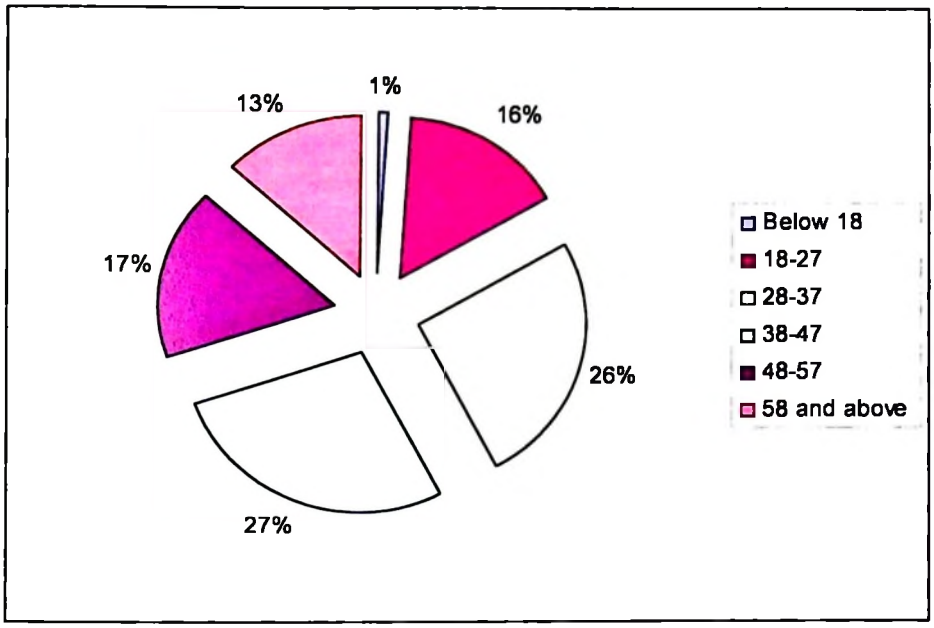
5.1.2.1 Age and gender distribution

The questionnaire required respondents to indicate their age categories. This is because, during the pilot survey, some farmers were reluctant to tell their actual age or were not sure of their year of birth, but were more at ease to state their age category. A total of

600 smallholder farmers were interviewed. Out of these 349 (58%) were men and 251 (42%) were women.

As shown in Figure 2, a majority of the respondents 318 (53%) were in the 28 - 47 age category. The finding was particularly interesting given the fact that this age bracket is normally the most economically active, and therefore would probably be willing to participate in the subsequent stage of the research. In addition, it was assumed that it would probably be easier to encourage this group to practise reading simple or short instructions as a way of acquiring information and knowledge, than elderly farmers, who might not be ready to change their practices, or very young farmers who might not have settled down into agricultural activities.

Figure 2 Distribution of age of the respondents



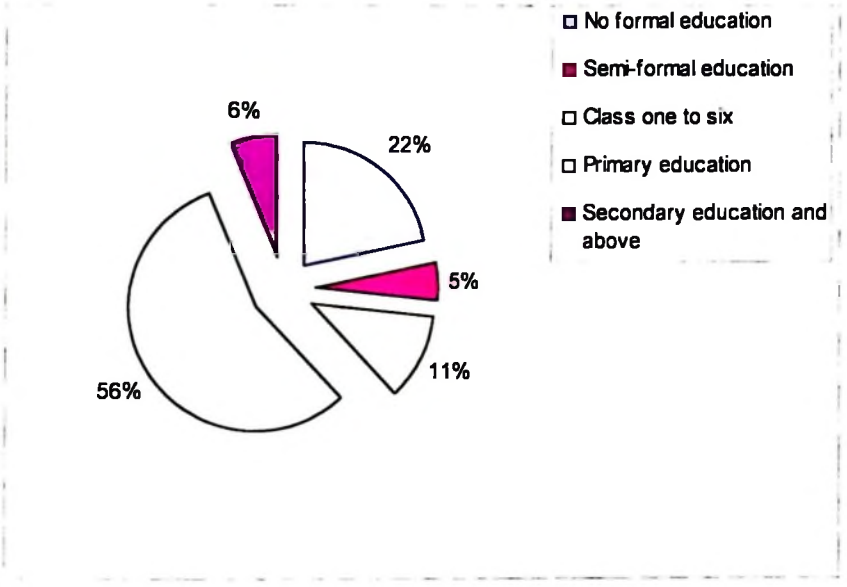
Source: Field Data

5.1.2.2 Education and functional literacy

A majority of respondents, i.e. 76% (454 out of 600) had attended some form of school and reported to be literate. However, a follow-up question revealed that the actual number of respondents who had attended formal school classes, i.e. class one up to secondary school or above, was 440 (73%). Although primary school education (completed all classes I-VII/VIII) was attained by 56 percent of all respondents (n= 600), (Figure 3), it was found out that respondents who completed the primary school level of education formed the majority 337 (76%) of those who had been to formal school classes, (Figure 4). This implies that 76 percent of all farmers had functional

literacy, i.e. could read by themselves and understand short instructions, an attribute which was crucial for this research.

Figure 3: Distribution of respondents by types of education



Source: Field Data

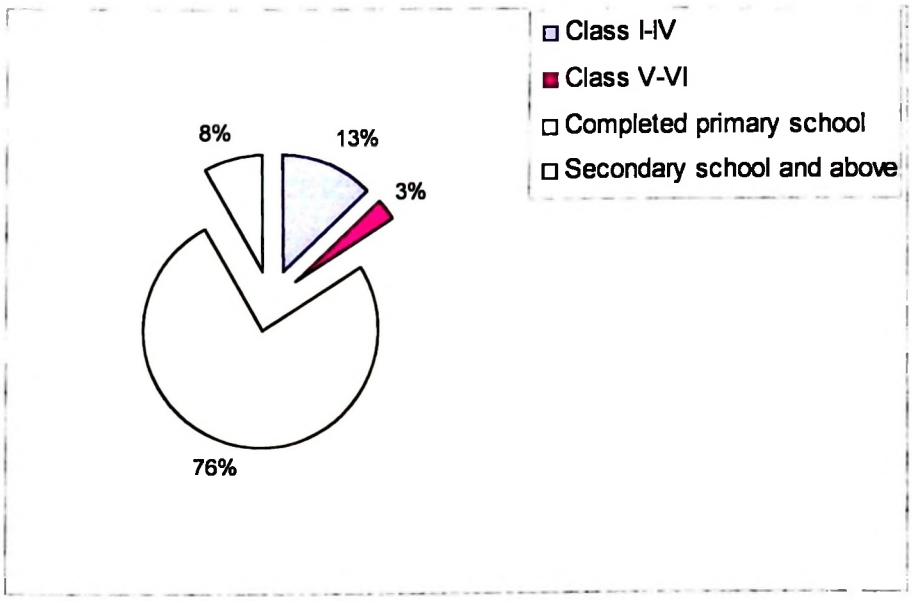
The semi-formal education category included all who had attended adult education classes and those who had acquired some skills in reading and writing through self and/or peer instruction. Fourteen respondents who had basic functional literacy had never attended formal classes but had acquired reading skills on their own.

Respondents who were functionally literate or had basic reading skills (could read and understand simple or short instructions) constituted 76 percent of all farmers (456 out of

600 respondents). This finding was crucial because of the basic assumption that the success of the subsequent stage would depend on the availability of a good proportion of participants that had functional literacy in the research area.

The fact that farmers in the economically active age category were also relatively better educated and could actually read basic instructions is crucial and would indicate that developing and availing them of reading material on agricultural innovations for individual consumption by such farmers would meet with effective capacity to utilize them.

Figure 4: Distribution of respondents by types of formal education



Source: Field Data

On comparing the levels of education between gender, it was revealed that 79 percent (or 275) of all men (n = 349) and 66 percent (or 165) of all women (n = 251) had attended formal classes. The dominance of male farmers in the relatively better educated category is not a surprising finding because of cultural and historical gender imbalances in the education system in the country (Mbilinyi et al 1991: 5-6). However, recent developments indicate that there is a positive change towards gender balance in education, and this has probably resulted in increased educational opportunities for women. The small difference in percentages between men and women who had completed primary education, where the percentage was 58 for men and 53 for women, (Figure 5) may further serve to illustrate the results of efforts that have gone into reducing gender differences in access to and participation in the education system. In general, the largest number of respondents who had completed primary education was in the age category of between 28 and 47 years.

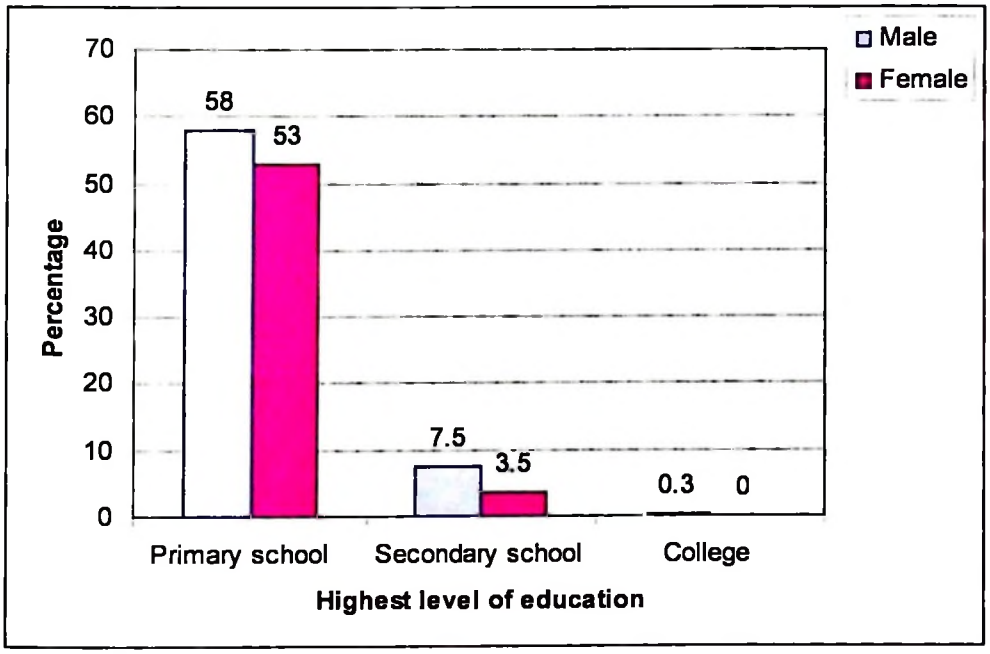
5.1.2.3 Livelihood activities of the respondents

Section three of the questionnaire was looking for the main sources of livelihood for the respondents. Specifically, it required them to indicate their main agricultural and non-agricultural activities, major crops or animals kept as well as mentioning the non-agricultural activities in which they were involved.

Findings revealed that the majority of farmers, i.e. 431 (72%), dealt with agricultural activities only, while the remaining 28 percent combined agriculture with other activities

including brewing local beer, shop keeping, fuel wood/charcoal making, carpentry and tailoring. Again the majority 559 farmers (93%) regarded crop farming as their main source of livelihood and only 34 (6%) farmers kept livestock as their main occupation. Only one percent gave equal weight to crop farming and livestock keeping as their sources of livelihood.

Figure 5: Comparison of highest attained levels of education between men and women in the research villages



Source: Field Data

5.1.3 Assessing the information needs of farmers

Establishing farmers' current information needs was a necessary undertaking in preparation for the intervention stage of the research. Due to the complexity of

determining the information needs, as explained in the literature review, the information needs were determined during both the pre-intervention and intervention stages of the study for the purpose of capturing as much information as possible. Two approaches were used to establish farmers' information needs: (1) The critical incident approach (Mchombu, 1993, op. cit. and Kaniki, 1995, op. cit.) and (2) the needs in relation to innovations, ideas or technologies they wished to know more about.

5.1.3.1 Information needs determined using the Critical Incident Approach

In the critical incident approach, as captured by section five of the questionnaire, the information needs were established as reflected by revelations of problems experienced by farmers during three preceding farming seasons as summarized in Table 3. The assumption in this case was that some of these problems could probably have been overcome by having access to and use of appropriate information and knowledge. Almost all farmers (97.5%) reported facing problems that they wished they had information and knowledge on how such problems could be addressed.

Measures taken by farmers in tackling their problems

Out of 581 farmers who responded to the question on how they dealt with farming problems, 360 (62%) reported to have tried looking for various ways of solving their farming problems. As illustrated in Table 4, while 395 farmers (67.9%) sought guidance from the VEO_2, as many as 222 farmers (38.2%) did nothing about the problems.

Table 3: Problems identified as most disturbing during the three preceding farming seasons

Most disturbing problem	Respondents who indicated a particular problem as most disturbing		
	N	Frequency	Percentage
Rodent infestation	540	266	49.3
Crop diseases	502	310	61.8
Bad weather	497	178	35.8
Frequent deaths of local chickens	467	191	40.9
Lack of money to buy implements	461	14	3.0
Lack of market for the produce	459	55	12.0
Diseases of other livestock	453	76	16.8
All others (e.g. pests, lack of transport, etc.)	533	208	39.0

Source: Field Data

Other solution avenues that were mentioned by 24 percent of the respondents included seeking advice from neighbours and friends, reporting the problems to the village leaders, and reading agricultural printed materials, mostly leaflets and booklets. In this respect, it was of interest to note that printed materials were acknowledged by some farmers in search of solutions to agricultural problems. Although the extent of use of printed information was not determined, this finding was crucial and positive in preparing to embark on the intervention stage of the study.

Table 4: Methods for tackling the problems as mentioned by farmers

Measures taken	Number of respondents in relation to measures taken (n = 581)	
	Frequency	Percentage
Consult VEO$_2$ for advice	395	67.9
Buy implements from shops	278	47.8
Traditional methods & herbs	209	35.9
Others	139	23.9
Ignored the problem	222	38.2

Source: Field Data

5.1.3.2 Information needs assessed by way of farmers' wishes

The second approach required the respondents to indicate any agricultural innovation, idea, or technology that they probably had heard of and would have wished to know more about. Some of the needs were found to be specific to a particular village, probably because of slight variations in agricultural activities. A total of 510 farmers (85%) responded to the question. Their information needs were grouped into ten subjects as illustrated in Table 5. As is apparent from their responses, among other needs, there was an indication by most of the respondents of the need for "Modern or Modernizing Agriculture" which in Kiswahili was taken to mean "Kilimo cha Kisasa". Although the need for "modern agriculture", which as mentioned above is frequently referred to in Kiswahili as "kilimo cha kisasa", was mentioned by the majority of farmers in all villages, it tends to have very broad meaning, it is non-specific and in most cases it

overlapped with other subject areas. For example, information on methods for controlling crop diseases or information about "better seeds" and so on is all about "modern agriculture". The apparent overlapping of information was among the issues that were straightened out by face-to-face discussions at the intervention stage.

Further, as kind of a paradox, new information needs emerged as farmers began to be exposed to information resources in the VIC. This observation is further explained in sections 5.2.4.4 and 5.2.5.4 of this chapter.

Table 5 Summary of farmers' unmet information needs

Subject area	**Frequency and percentages of subjects as mentioned by farmers**	
	Frequency	Percentage
Modern agriculture	440	73
Control of crop diseases	256	43
Better seeds	243	40.5
Control of livestock diseases	240	40
Food processing & preservation	120	20
Vegetable growing	100	17
Use of fertilizers	87	14.5
Weed control	73	12
Irrigation agriculture	67	11
Beekeeping	15	2.5

Source: Field Data

5.1.4 Availability of information resources

The types, diversity, appropriateness, relevance and sustainability of information resources available in the villages was captured through section five of the questionnaire, which also sought information on the availability of agricultural information that could be used by farmers.

5.1.4.1 Available information resources that could be used by farmers

It has been well reported that repackaged, recorded and printed information on agricultural innovations and ideas meant for use by extension agents as well as by farmers is readily available in various agricultural related institutions, offices and libraries. To that effect, an assortment of relevant printed materials was sought and gathered mainly from four agricultural or agricultural related institutions that were visited, namely SUA, MAFS, INADES an NGOs dealing with farmer information and MVIWATA, which is a network of smallholder farmers in Tanzania. The materials in the form of booklets, pamphlets, leaflets, magazines, newsletters and posters were collected and organized into different agricultural subjects. A sample of printed materials is shown in Photo 13. The materials have been categorized into broad subject areas such as:

- Crop husbandry,
- Seed varieties,
- Animal health & production,
- Irrigation agriculture,

- Pest management,
- Draught animal power and animal-drawn implements,
- Human nutrition & health, and
- Farmers' groups, to mention a few.

Photo 13 A sample of selected printed information materials

Source: Materials assembled and photograph taken by the researcher on 30/10/2006

5.1.4.2 Availability of information materials in respondents' homes

An attempt was made to determine whether respondents owned and/or held any form of reading materials as a source of some form of information. More than half of all respondents (384 out of 600) responded to the question. It was further revealed that 89.6 percent of those who responded to this question (344 out of 384) had some printed information materials at home, and only 10.4 percent did not have any type of printed

information in their homes. It was also found out that 35 percent (120 out of 344 farmers) of those who owned the materials were women.

The materials were categorized into six groups as indicated in Table 6. The recreational publications in this study referred mostly to short stories and jokes, booklets or pamphlets, and to a lesser extent leisure magazines. Religious publications included the Bible and various Christian scriptures. A few respondents mentioned the Quran.

Table 6: Types of information materials available in respondents' homes

Type of information material available	**Possession of information materials in respondents' homes**		
	N	Frequency	Percentage
Newspapers	361	211	58.4
Religious publications	359	182	50.7
Health publications	359	162	45.1
Recreational publications	358	164	40.8
Agricultural publications	359	135	37.6
Government and political	359	121	33.7

Source: Field Data

The majority of the respondents reported having newspapers at home although they did not acquire them regularly (Table 7). Ranked according to frequency of availability, agricultural materials were last but one with respect to types of reading materials which respondents kept in their homes. In this respect, it may be considered that the presence of certain types of information in respondents'homes could be an indication of the

perceived need for the materials, and also be a reflection of the relative differences in the proactiveness and aggression in disseminating the encountered materials by the advocacy agencies of both governmental and non-governmental organisations. This appears to be particularly the case with respect to health and religious materials during health campaigns and religious meetings, where printed materials are normally distributed en masse. Further, ownership and availability of the information materials in respondents' homes could be an indication of a certain degree of reading practices and desire for reading materials already existing among farmers, to be readily optimized with appropriate initiatives to that effect.

5.1.4.3 Sources of the information materials

In this respect, an attempt was made to determine the sources and means by which farmers obtained the printed information that they held in their possession. To that effect follow-up questions concerning ownership and source of the information materials were included to find out how the farmers obtained them. The findings of this undertaking are summarized and ranked accordingly in Table 7. Although the highest number of respondents mentioned having bought information materials, follow-up questions revealed that 'buying' referred to newspapers only, which were purchased during respondents' occasional visits to town.

Table 7: Means by which respondents acquired information materials in their possession

Means of acquiring information materials	Extent to which the means was used by respondents						
	n	Frequently		Once in a while		Never	
		Frequency	%	Frequency	%	Frequency	%
Buying	368	115	31.5	128	34.7	125	33.9
Borrowing	367	84	22.9	207	56.4	76	20.7
Development Agents	367	84	22.9	91	24.8	192	52.3
Researchers	366	4	1.1	45	12.3	317	86.6
Religious meetings	363	34	9.4	133	36.6	196	54
Nearby schools	363	13	3.6	73	20.1	277	76.3

Source: Field Data

The majority of respondents (86.6%) said they received no information materials from researchers. It would appear that researchers who made fairly frequent visits to villages do not necessarily bring reading materials for farmers with them. Probably this is one avenue that is significantly underutilized in as far as delivery of reading materials to farmers is concerned. However, much as farmers would have appreciated obtaining some information materials for future use from visiting researchers[5], it remains to be seen whether the villages concerned would reflect different frequencies in this aspect if the number of research activities in their locations were to be increased. Nevertheless, it would appear that researchers' field visits could appropriately be one of the effective means of enhancing dissemination of information materials to smallholder farmers in

[5] Some of the SUA researchers' experience as communicated to SNAL librarian 2004.

rural areas. Further, although "development agents" as a source of information materials in respondents' homes ranked second, together with "borrowing", it has to be understood that "development agents" is a fairly broad term that puts together agents from different occupational domains, including health, social welfare and agricultural extension workers from the government and NGOs.

5.1.5 Farmers' attitudes regarding printed information

In this aspect, an attempt was made to gain an insight into the farmers' attitudes regarding the role of recorded and printed matter a source of information to address their information needs.

The majority of the respondents (91.3%), i.e. 532 out of 583, irrespective of their reading abilities, regarded printed materials as a useful source of information on agricultural knowledge and skills. This included even farmers without basic reading skills who thought printed materials would be useful to them as they could get the information indirectly through those who could read.

This finding seems to underscore the importance of printed sources of information for keeping farmers informed and encouraging then in the habit of acquiring information. Recorded sources of information, whether print or electronic, have a great advantage because they are permanent records and allow consultation, reference, revisiting and follow-up at the farmers' own pace, which again may have the added advantage of

allowing follow-up of reading materials according to individual farmer preferences, as well as their rate and ability to assimilate such information.

As reported earlier (Matovelo et al., 2006), preferences of farmers in this research were similar to those of farmers in Uganda and Ghana, where farmers had a great preference for printed information, arguing that they could be used for reference once extension staff had gone or a radio programme was over (Carter, op. cit.).

The finding of this study that basic literacy among farmers in the study villages was at 76%, which is a fairly high rate (Matovelo et al, op. cit.), is in perfect agreement with reports by the government and UNESCO, which state that levels of literacy in Tanzania have generally improved over time since the 1970s (UNESCO, op. cit.; URT, 1997_b op. cit.: 9). This fact implies that favourable conditions exist for recorded information materials and specifically printed information to be increasingly used as tools for promoting the practice of proactive information acquisition by farmers. By implication, therefore, enhanced access to printed information appears to be a viable and effective tool for the empowerment of farmers for knowledge acquisition and economic development.

Although for a number of years the presupposed paucity of reading habits in the society has been used as one of the reasons for encouraging oral channels of information transfer in Africa at the expense of printed materials, studies such as this one serve to

provide evidence that the practice has inevitably got to change, particularly because of the apparent increase in literacy rates and the readiness by farmers to consume printed materials. Further evidence of a need in this direction is shown by the apparent dynamism even among rural communities as a result of globalization. There is increasing adoption of a diversity of information exchange media including ICTs such as, TV, Radio and now the mobile phone, which is rapidly attracting the interest of many rural dwellers. Furthermore, with improvements in infrastructure, computer-based services, particularly the internet, is gradually penetrating rural areas.

5.1.6 Farmers' information-seeking practices

Amongst other objectives, this study set out to explore alternative approaches to and prospects of cultivating the attitude of proactive information acquisition by farmers for sustained knowledge-building practices among smallholder farmers. To this effect an attempt was made to determine the extent to which a favourable attitude existed among farmers and to determine how best it could be exploited to increase the diversity and resourcefulness of the reading materials that farmers could access.

It was revealed here that, while the literacy rate is reported to be fairly high, the percentage of farmers getting information through printed materials is as low as 24 percent (130 out of 534 farmers). This finding could mean that, while the ability to benefit from printed materials is potentially high, access to printed information may be limited. In such a scenario, there is the portrayal of a role to be played by information

specialists to complement the current role being played by extension staff and NGOs alone in providing information to farmers.

Talking to friends, relatives and extension staff and listening to radio programmes were among the prominent means of information acquisition by farmers (Table 8). The challenge in respect to the area of interest in this research was how to assess the resourcefulness of the printed materials that farmers were able to access. Furthermore, it would be of interest to determine the effect that an increase in the diversity, quantity and ease of availability of such materials would have on the development of the practice of proactive information seeking and the level of improvement in knowledge on matters of interest to farmers.

Table 8: Various sources used by farmers to obtain information

Source of information	Disposition of respondents with respect to their sources of information		
	N	Frequency	Percentage
Friends, neighbours or relatives	545	438	80.4
Extension staff	540	390	72.2
Radio programmes	535	334	62.4
Printed materials	534	130	24.3
Agricultural implement shops	532	120	22.5
Agricultural exhibitions	533	67	12.6
Video programmes	534	48	9
Farmer training centres	534	42	7.9

Source: Field Data

This is further underscored by the observation that the preferred source of information was related to the level of education. For example, while the majority of respondents with primary education preferred friends or relatives as sources of information, the relatively more educated group only 'slightly preferred' this same source. However, all groups, irrespective of education level, age and gender, expressed great preference for consultation with extension staff. The expressed preference could be due to a number of factors including lack of printed materials, farmers' awareness of the existence of extension services that has been created over time when other sources of information are limited, or it could be a function of the subject matter of the mission of extension staff to villages.

It was also noted that agricultural exhibitions were mentioned as a source of information by only a few respondents. Although the exhibitions are a yearly event taking place throughout the country, they probably have little effect on smallholder farmers as far as information acquisition is concerned.

As shown in Table 9, all relatively well-educated respondents had a 100 percent preference for extension personnel, probably because farmers in this category were more aware of the technical knowledge that the extension staff would have. The level of education was a significant factor ($P < 0.05$) influencing preference for talking to relatives, listening to radio programmes and reading printed materials as a means of obtaining information. Other factors including age and gender were not significant.

Although there was preference for extension staff, it has to be remembered that, apart from what has been explained above, this source of information is faced by a number of constraints including the ratio of extension workers to farmers being low, low incentive and lack of motivation to work in rural areas.

Table: 9 Farmers' preferences for sources of agricultural information

Means for obtaining information	Level of education	Levels of preference						χ^2
		Most Preferred		Slightly preferred		Not preferred		
		n	%	n	%	n	%	
Talking to friends and relatives	Semi-formal	16	64.0	8	32.0	1	4.0	P<0.05
	Primary	205	51.5	140	35.2	53	13.3	
	Post primary	8	23.5	21	61.8	5	14.7	
Listening to radio programmes	Semi-formal	16	61.5	9	34.6	1	3.8	P<0.05
	Primary	200	50.3	150	37.7	48	12.1	
	Post primary	11	32.4	21	61.8	2	5.9	
Consulting extension workers	Semi-formal	25	96.2	1	3.8	0	0.0	p>0.05
	Primary	388	97.5	8	2.0	2	0.5	
	Post primary	34	100	0	0.0	0	0.0	
Reading short publications	Semi-formal	11	42.3	9	34.6	6	23.1	P<0.05
	Primary	248	62.3	116	29.1	34	8.5	
	Post primary	25	73.5	7	20.6	2	5.9	
Watching video/tv programmes	Semi-formal	3	11.5	16	61.5	7	26.9	p>0.05
	Primary	87	21.9	196	49.4	114	28.7	
	Post primary	8	23.5	12	35.3	14	41.2	

The percentages above have been calculated from among the respondents' level of education

Source: Field Data

5.1.7 Awareness of agricultural innovations and ideas

It has been reported that lack of information on agricultural innovations is among the reasons that some innovations, such as new crop varieties, as well as innovative techniques and technologies for crop and animal husbandry meant for solving some agricultural problems, are not adopted by farmers.

A total of 383 out of 592 farmers (65%) in the study area had heard of at least one new innovation that had been around for the past 10 years in various fields of agriculture, which they themselves had not yet been able to adopt and put into practice. However, when no time limit was set for the same question, the percentage of those who had heard of any innovation in agriculture was as high as 88%. One example was observed with respect to vaccination against the common killer disease of local chickens known as Newcastle disease. While a standard vaccine had been around for many years and also in recent years a heat-resistant variant had been introduced, less than 10% had vaccinated their chickens against the disease, even though about 72 percent of the 592 respondents had heard of the existence of the vaccine. The main reason given was lack of adequate knowledge about the vaccine, including its accessibility and how to use it.

Almost all farmers (97.6% of all respondents) wished to have information and learn more about various old and new agricultural innovations. Only 2.4% were either not sure or did not like to learn more about various old and new agricultural innovations. Some of the explanations by respondents who did not like to gain exposure to other

innovations in agriculture included the perception that they had enough experience and thought they knew enough of agricultural activities.

Others believed that such innovations would not help solve agricultural problems, and would be harmful to human health and the soils. Still others were not ready to change the methods they were used to, and there were those who felt the innovations were too expensive. This finding may be taken to imply that some farmers tend to be resigned to old agricultural practices, either because they fear change or because of lack of adequate information and knowledge as to the actual value of innovation and emerging technologies to their farming practices.

Either way, it would seem that strengthening the delivery of information materials adds value to the welfare of such farmers. It may be argued that diversifying and strengthening the availability of information materials has the potential of stimulating exposure well beyond farmers' immediate needs and so, by reading widen their horizons.

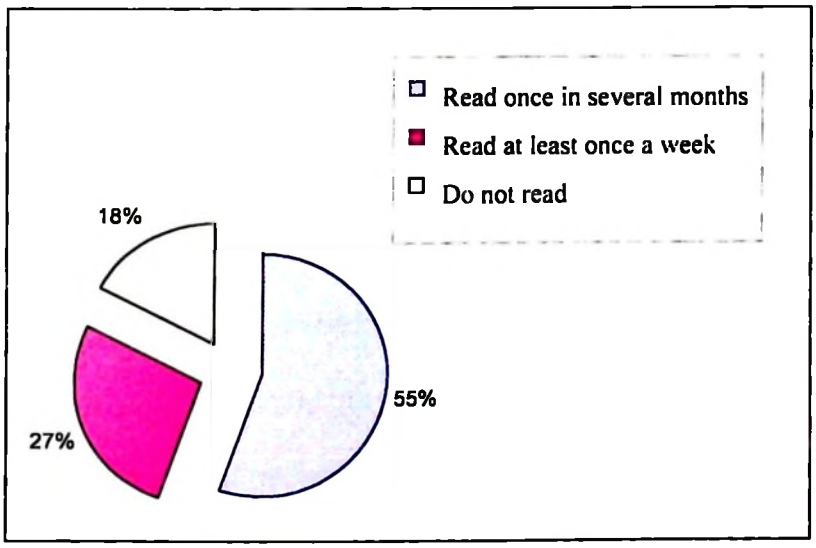
5.1.8 Farmers' reading habits

Realising that the value of information resources made available to farmers depended on how well they were read, it was considered pertinent to examine the reading habits of farmers. The intention was to identify established habits that were good enough to be

further exploited, as well as identify the gaps, if any, to be addressed in the course of the study.

The study attempted to establish whether farmers who had functional literacy skills read anything at all at any moment during their daily activities. It was found that slightly more than half of the respondents, i.e. 255 (55%), read once in a while (once in several months), 126 (27%) read something at least once a week, whereas 84, i.e.18 percent of all literate farmers, never read anything (Figure 6).

Figure 6: Reading habits of the respondents



Source: Field Data

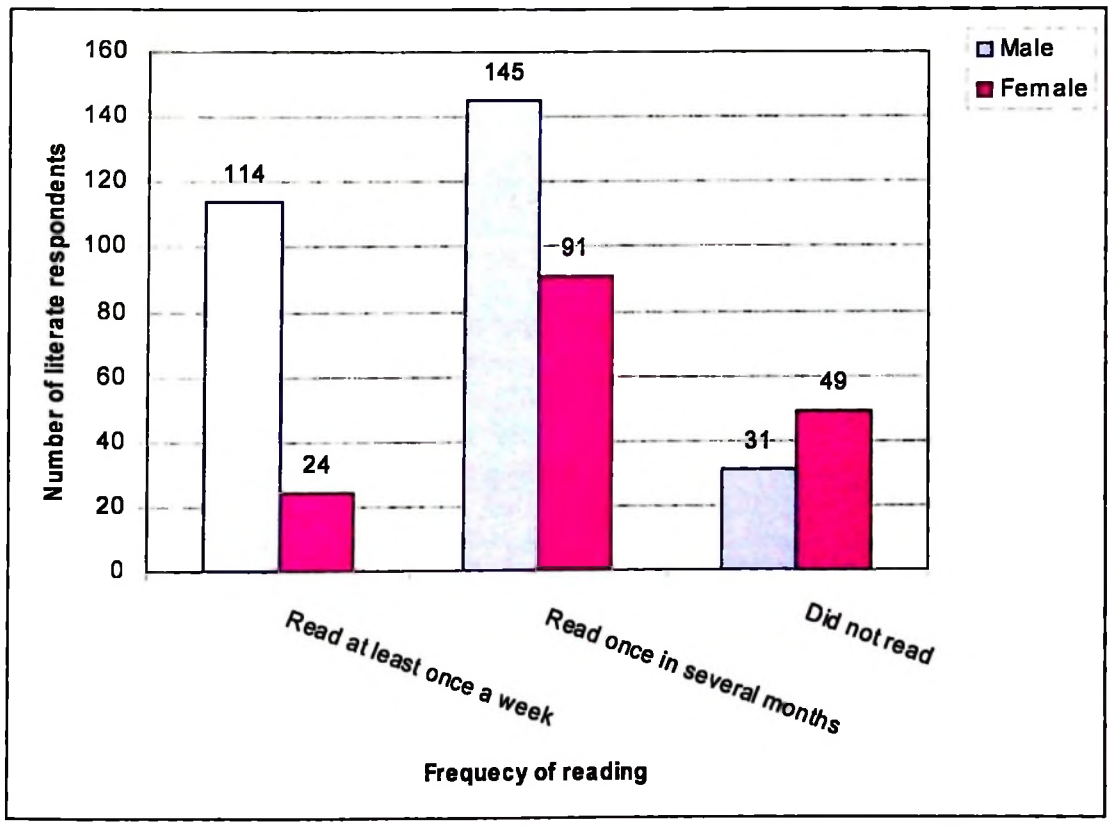
In attempting to find out the reasons why some people with functional literacy skills did not use their skills to read, it was found out that 43 (51.8%) out of 84 respondents cited

lack of reading materials as the main reason for not reading anything. Other reasons cited included lack of time for reading 27 (31.7%), difficulties in reading meaningfully or low reading ability 13 (15.3%), sight problems 11 (13.1%) and lack of interest 10 (12%). Only one respondent (1.2%) felt that reading may not benefit him. Although the proportion of respondents who did not read at all is small, it opens up new frontiers of analysis, and the feeling of lack of perceivable benefit in reading could be taken to imply just that, or it could also mean that some of the people who can read may not indulge in reading for lack of materials that could bring them the desired benefit. Furthermore, lack of perceivable benefit could also be a reason for lack of interest in reading. This is a matter that warrants thorough consideration when selecting reading materials for farmers. It is also possible that the low frequency of reading, even among those who read at least once a month, could be in a way attributed to the perceived benefit that is realized out of indulging in reading.

The extent to which respondents practised the habit of reading was slightly different between male and female farmers (Figure 7). While a total of 114 (40.4%) of all literate male farmers read at least once a week (n=282), only 24 (13.9%) of literate female farmers had the same frequency of reading (n=172). Out of 80 literate respondents who were not in the habit of reading anything at all, 31 (38.7%) were men while 49 (61.3%) were women. This gender difference in frequency and reading habits is a matter that may also require deliberate focus when considering modalities and locations for availing reading materials. In most rural households women are captive to domestic chores to an

extent that may probably account for the difference in the time available for reading for male and female respondents. This may not explain the whole phenomenon but serves to raise awareness that there may be differences in access to and use of information materials between genders to the extent that they may warrant factoring in when planning dissemination of information resources among farmers.

Figure 7: Gender differences in frequency of reading among respondents



Source: Field Data

5.1.9 Type of materials that were being accessed and used by farmers

Concerned by the possibility that the frequency and extent of indulgence in reading among respondents could be influenced by the type of materials that were being accessed for reading, an attempt was made to determine the types of such materials and make inferences on how they may have affected reading frequency among farmers.

The majority of respondents, 268 out of 378 (70.9%), mentioned newspapers as the information resource they read most. In crosschecking and finding out more about newspaper readership, respondents were required to mention the titles of newspapers that they read. A total of 232 out of 360 (64.4%) respondents who read newspapers could remember the names of newspapers published in Kiswahili. The titles of six papers with the number of respondents who mentioned them included Majira (64), Nipashe (53), Mwananchi (40), Kiu (28), Uhuru (21), and Mtanzania (19). Reasons for preference of newspapers included getting sports news and other entertainment news, and other current information. Other printed information that farmers came across and read (not necessarily kept them) are presented in Table 10. From this finding, it was apparent that newspaper readership was high among literate farmers, which further confirms the presence of functional literacy among the majority of farmers. Newspapers were not only being read incidentally, but featured high among printed materials that farmers possessed as illustrated earlier in Table 6. One wonders whether newspapers could be a useful channel through which selected information could reach farmers.

Table: 10 Type of information materials that farmers read

Type of information material read	Respondents who read a particular information material		
	n	Frequency	Percentage
Newspapers	378	268	70.9
Recreational materials	370	156	42.2
Specific subjects (e. g. health, agriculture)	370	127	34.3
Religious materials	373	79	21.2
Others, (e.g. government, politics)	368	31	8.4

Source: Field Data

5.1.10 Preferred format and language of printed materials

Considering the possibility that the format in which reading materials were presented could influence the readers' preference to read, an attempt was made to determine the same and its influence if any that it could have on readership.

It was found out that most farmers preferred short text publications in the form of leaflets, posters and booklets rather than books with detailed information. The majority of respondents, 538 out of 595 (90.4%), preferred materials printed in Kiswahili. Only 57 (9.6%) respondents preferred materials in tribal/local or other languages. This finding is not surprising since Kiswahili, being the national language, is enforced as the medium of instruction in all public primary schools and is widely spoken throughout the country.

5.1.11 Preferred places and methods for accessing printed materials

Considering that the site where reading materials are located must be the preferred place for everybody involved, four different locations were proposed. These locations included village government office, schools, social clubs and places of worship.

Respondents were asked to select the place they would most prefer for the location of reading materials from amongst the four proposed places. It was found out that the majority, 521 out of 585 respondents (89.1%) chose the village government office. The single major reason for choosing such offices was because most of them were more centrally located than other places. The centrality of the village government offices was also helpful with respect to the location of other facilities such as shops and markets that are normally available within the same location, making it convenient for the users of the facilities. In addition, it was also probably because the village offices were more open to the entire public unlike the other alternative places, such as places of worship, schools, and social clubs.

About 72% of the respondents preferred getting assistance from extension or other development agents in using printed materials. This was followed closely (70.4%) by private reading of the printed materials, i.e. reading them individually. Reading in a group and using a family member such as a school-going child were least preferred. Although extension workers have come out prominently as one of the farmers' main means used as well as preferred means for obtaining information, this finding could be

because the extension services have existed in the country since 1970s and are therefore well known by farmers, despite the criticism of having poor achievements in the past (Kauzeni, op. cit.). Furthermore, despite the long-standing existence of the services, farmers appear to have little knowledge about a number of innovations and ideas that have existed for more than ten years. It appears that most smallholder farmers have not been exposed or encouraged to use other complementary methods for the acquisition of information so that they may have become dependent on extension staff, thus tending to wait for information from them. The presence of a high number of farmers having a positive attitude concerning individual reading is however a useful finding when considering alternative methods for the acquisition of information on agricultural innovations.

5.1.12 Basic knowledge and awareness of ICT

Following rapid changes in technological development worldwide, there are a number of initiatives geared towards adoption of ICT at various levels to speed up agricultural and rural development.

In view of this observation, the same questionnaire was used in an attempt to find out how informed the farmers in the study area were regarding ICT. This information was sought in order to explore how useful ICTs could be to farmers in rural areas at this present time as a means of accessing agricultural information. The literature survey regarding ICT applications in rural areas of developing countries showed that computers

and telephones - specifically the cellular phones - were the most commonly used tools for various purposes; therefore the questions relating to this section were confined to these two ICT tools as will be explained in sections 5.1.12.1-3.

5.1.12.1 Farmer's basic knowledge about computers and cellular phones

It was revealed that the majority of the respondents (81%) were aware of the cellular phones, while for computer awareness, the number was just slightly more than 50 percent of all respondents as shown in Table 11. Respondents were also required to briefly explain what they knew about the use of the two tools. ICT knowledge was categorized into three groups: those who did not know and so could not explain the use of the two tools, those who appeared to have some idea, and those who had reasonable knowledge. For computer knowledge, the reasonable knowledge category included all whose answers mentioned uses related to information storage and retrieval. While for cellular phones, the reasonable knowledge category included all whose answers were related to facilitating verbal communication and/or sending messages (SMS). Again, cellular phones appeared to be reasonably well known by a good number of the farmers as shown in the summary in Table 11.

As indicated in Table 11, only a few farmers reported to have seen and/or accessed a computer before. Sources of awareness of computers included farmer seminars and training (60 percent), friends and relatives (27 percent), and mass media (radio and newspapers) (13 percent). Out of the six respondents who had some exposure to

computer use, five were exposed during demonstrations at the farmer seminars and training and the remaining one used his own initiative on a visit to a relative. For the mobile phones, close to 10 percent had accessed or used them at the time of the survey. However, the number rapidly shot up by the end of the research, most probably due to the installation of communication facilities in some rural areas, which encouraged some farmers to purchase their own mobile phones. This phenomenon is a clear indication of the eagerness of farmers to change for a better livelihood. Sometimes farmers appear slow to change, probably due to lack of awareness, exposure and/or required facilitation such as basic infrastructure.

5.1.12.2 Influence of farmers' age and education on ICT awareness

Age and level of education of farmers appeared to have some relationship with the levels of knowledge about the use of computers (i.e. what computers were used for). While half of respondents under 18 years had a reasonable knowledge, close to 60 percent of all respondents within the oldest age category (above 58 years) seemed to know nothing about the use of the tool. Again, while it was only 8 percent of the second youngest age category (18-27) reported knowing nothing about the use of the tool, about 50 percent had a vague idea and as high as 42 percent of this age category had a reasonable knowledge of the use of computers. This clearly implied that the lower the age of the farmer the more likely it is that they will have reasonable knowledge about the use of ICT.

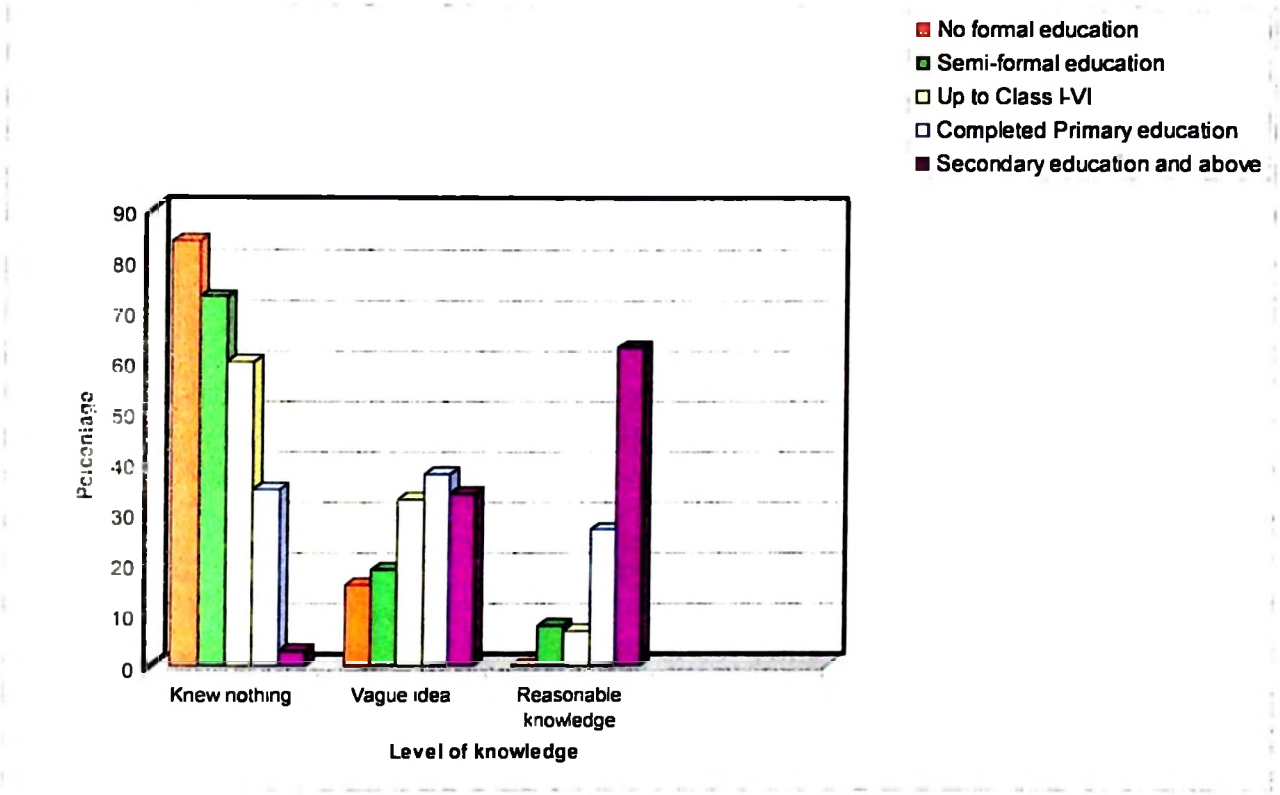
Table 11: Summary of farmers' status and comments regarding ICT n = 598

Respondents' status/comments	*Computer*		*Cellular phone*	
Status	Frequency	%	Frequency	%
Aware of their existence	323	54	485	81
Had vague idea of their use	173	29	120	20
Reasonable knowledge of their use	131	22	413	69
Knew nothing about their use	293	49	66	11
Seen them	173	29	287	48
Accessed/used them	6	1	53	9
Owns one	N/A	N/A	2	0.3
A neighbour/relative/friend owns one	N/A	N/A	227	38
Comments				
Computers be available in villages too	161	27	N/A	N/A
Cell phone infrastructure to the villages	N/A	N/A	275	46
	Comments regarding ICT in general			
	Frequency			%
ICT tools will be useful in villages	41			7
ICT will not be useful in villages	14			2
Would like to be educated about ICT	54			9
Wished to have electricity in villages	281			47

Source: Field Data

As illustrated in Figure 8, the relatively better educated respondents were more knowledgeable about the use of computers than their counterparts. The majority of those who did not know anything about what computers were used for fell into the non-educated category. This finding is however not surprising because the use of computers requires a certain minimum degree of literacy and therefore non-literate farmers were least likely to be interested or even to know what computers were used for.

Figure 8 Level of farmers' basic knowledge about ICT



Source: Field Data

5.1.12.3 Farmers' general comments and opinions about ICT

Farmers were asked to give their comments or opinions about ICT. Table 11 also presents comments about a specific tool and general comments about ICT. It was found that close to half (281) of all respondents, equivalent to 47 percent, made comments relating to their wish to have electricity in their villages. This is probably one of the clearest indications of farmers' readiness to have a change for economic development. Furthermore, 275 respondents (46%) wished enthusiastically to see cellular phone communication infrastructure/facilities (towers) installed close enough to their villages,

so that they could have network coverage. In this respect, lack of electricity was not considered a limitation as they were prepared to walk some distance to have their mobile phones charged once in several days. Their eagerness proved to be true because, by the end of the second stage of the research, more farmers (though the number was not known as it was beyond the scope of this research) owned mobile phones following the installation of communication facilities in some remote areas close to some research villages such as Kongwa.

The use of ICTs for rural development has been advocated for their potential contribution in bringing a positive change to rural life by bridging the information gap between the urban and rural communities. However, successful adoption of ICT in rural areas needs to be preceded by careful analysis to determine the relevant ICTs and levels of adoption in different situations in the country in order to avoid failures and frustration. A case in point is that of the telecentres and particularly the computer projects initiative by the Commission for Science and Technology. In some places the projects faced serious setbacks, in that some of them had to close after only a short time in operation. Lack of sustainability mechanisms of the services and infrastructural limitations are likely to be among the main reasons for the failure of the services. A typical example is that of the village computer initiative in Dakawa, Mvomero district in Morogoro region. It was understood that the centre closed after only a few months of operation and was closed throughout the research period as captured by the researcher (Photo 14) during the field trips in Mvomero district.

Photo 14 The facility for Dakawa village computer project

Source: Photograph taken by the researcher on 18/08/2005

However, rural ICT initiatives by NGOs such as the Family Alliance for Development and Cooperation, (Fadeco, 2006) seems to have success stories, probably because of what has been referred to as the "poor man's approach" which was adopted in establishing and sustaining it[6].

[6] Discussion with Mr. J. Sekiku, the FADECO Manager, during CTA workshop at SNAL on 09/06/07

5.2 The Intervention study

5.2.1 Pre-intervention knowledge testing

As detailed in the methodology chapter, research participants were subjected to a simple test to find out their level of knowledge about basic information concerning selected agricultural activities before and at the end of the intervention. Altogether six out of the ten research villages participated in the test. The exercise involved four intervention villages, namely Dihinda and Melela in Mvomero District and Kongwa and Kiroka in Morogoro rural District. The two control villages were Milengwelengwe (control 1) in Morogoro rural District and Wami Sokoine (control 2) in Mvomero District.

A total of 338 and 367 farmers participated in the pre-and post-intervention test respectively. The average number of participants was 56 and 61 farmers per village for the pre-and post-intervention test respectively. These figures include participants in the two control villages. Kiroka village had the lowest number of participants in both tests (41 and 51), while Milengwelengwe (control village 1) had the highest number of participants in both tests (70 and 72 for pre-and post-tests respectively). The total number of farmers who attended the meeting and the actual number who participated in the test, as well as the distribution of their scores for each village, are indicated in Table 12. The last row in the table shows the percentage of participants who scored above 50 percent of the total marks.

Out of the four villages, Dihinda had the highest number of participants followed by Kongwa. These two villages had an average of more than 60 participants each while Kiroka and Melela had about 50 participants each.

The performance of participants showed a clear difference between the intervention and the control villages, particularly with respect to the highest scores, average scores and percentage of participants who scored more than 50 percent for the pre-and-post intervention tests (Table 12). The post-intervention scores in almost all the villages under intervention were more than 30 percent higher than the pre-intervention scores, while both of the control villages showed a negligible difference between the pre-and post-intervention scores. The observed difference was most likely a result of access to relevant information available at the VIC. In this respect, the only obvious difference between villages under intervention and the control villages was the VIC.

Table 12 Results of the Test: distribution of participants' scores

Village		Dihinda	Melela	Kongwa	Kiroka	Control 1	Control 2
Total No. of attendees	Pre	165	97	103	87	124	98
	Post	141	110	120	75	112	101
	Difference	-24	13	17	- 12	- 12	16
No. of participants	Pre	63	43	59	41	70	62
	Post	65	52	66	51	72	61
	Difference	2	9	7	10	2	-1
Lowest scores %	Pre	6	3	2	3	8	3
	Post	8	2	9	19	6	5
	Difference	2	- 1	7	16	- 2	2
Highest scores %	Pre	74	61	64	62	76	65
	Post	96	72	98	86	78	61
	Difference	22	11	34	24	2	-4
Average scores %	Pre	38.5	31.5	29.5	35	39	33
	Post	51.5	40.8	46.8	50.2	40.2	32.5
	Difference	13	9.3	17.3	15.2	1.2	-0.5
Percentage above 50 %	Pre	32	26	19	29	35	21
	Post	56	48	47	51	33	24
	Difference	24	22	28	22	- 2	3

Source: Field Data

Likewise, the average score rose by more than 25 percent in all intervention study villages, and for Kongwa village the increase was more than 40 percent. This is a clear improvement of performance in all villages under the intervention study, unlike the control villages where the average remained more or less the same between the two tests, that is at the beginning and end of the study period.

On the general performance, while it was only Dihinda village that had at least 30 percent of the participants scoring above 50 percent in the pre-intervention test, the

picture was clearly different for the post-intervention test. More than 50 percent of participants in two villages (Dihinda and Kongwa) scored above 50 percent of the marks. The post-intervention test scores in the remaining two villages were also close to 50 percent, that is 48 and 47 for Melela and Kongwa villages respectively (Table 12).

In some situations it may be argued that the improvement that was observed in the performance of the post-intervention test could also have probably been due to a number of other possible factors, including possible exposure to unplanned sources of information during the research period. However, it was known with certainty that farmers got exposed to printed materials containing relevant information directly related to the test questions, through the VIC in the villages under intervention. It can therefore safely be assumed that access to and use of information that was available at the VIC was an underlying reason behind the increase in post-intervention scores in the study villages. Although there was no mechanism for knowing with certainty that the same farmers participated in both tests, it can be concluded that at least there was percolation or passing on of information from farmers who had visited the centre and read the materials to those who had not visited the centre at the time of the second test. Further, the fact that no such phenomenon is observed in the control villages – and this is why they were included in the first place! - serves to further underscore the impact of the intervention study in inculcating an increase in information levels among participants, a phenomenon that signals that the intervention study had brought about an increase in the

frequency and number of participants accessing and using the information materials at the VICs.

5.2.2 The Village Information Centre (VIC) as a tool of the intervention.

5.2.2.1 Duration and opening times of the VICs

The VICs were established, used and monitored for a period of about twelve months. The centres were open for three days a week, from 12 noon to six in the evening. However, each centre agreed on its own opening hours as found appropriate by the users. Limitation in the opening times was in order to allow time for other farming activities, particularly for the coordinators of the centres who were obliged to always be there for coordinating activities as detailed in the previous chapter. Limited opening hours was identified by users as one of the issues to be looked into in future so that farmers could be free to choose a time which suits individual users.

5.2.2.2 Materials that were included in the VIC collection

A total of 229 titles of various reading materials in Kiswahili that could be used by farmers were mobilized as explained in the methodology chapter. A summary of the distribution of the materials according to their formats and source or publisher is presented in Table 13.

Table 13 Number of collected titles under each format from different sources

Source/ publisher	Format of the materials that were collected				Total
	Booklets	Leaflets/Brochures	Pamphlets	Mag/Newsletter	
INADES	12	13	2	-	27
MAFS	8	104	-	1	113
SUA	48	29	5	-	82
MVIWATA	-	-	-	7	7
Total	68	146	7	8	229

Source: Field Data

5.2.2.3 Presentation of the collection that was available for use at the VICs

Out of 229 collected titles, 102 (45%) were selected for display and use at the centre. Selection of the materials was done based on the user needs and demands or requirements as identified in the situation analysis and during monitoring visits respectively. Other considerations were presentation of the documents in terms of format, layout and simplicity of the content and anticipated relevancy to the targeted farmer. Another basis for selection was availability of at least four copies of a given title so that each centre could get at least one copy of each of the selected publications. Titles that had less than four copies were distributed randomly to the farmers on request during field visits. Sections of typical VICs are shown in Photos 15 and 16

Photo 15 & 16: A typical VICs at two villages

Photo 15: Kiroka village

Photo 16: Kongwa village

Source: Photographs taken by the researcher on 12/10/2005

The selected materials were divided into two groups; the first group, whose materials were displayed at the onset of the VIC, had a total of 48 titles on eight subject categories as shown in Table 14, while the second group (Table 15) comprised a total of 54 titles on all other subjects that were introduced gradually after a period of two to six months, either at the request of the users or for creating awareness of other agricultural opportunities and health issues. It was also found necessary to add new subjects or titles to improve the collections, and keep them relevant, interesting and exciting for the users. In addition, various popular newspapers were gradually added to the collections as they became available to the researcher. Newspapers were among the items that were added at the request of the users.

Photo 15 & 16: A typical VICs at two villages

Photo 15: Kiroka village

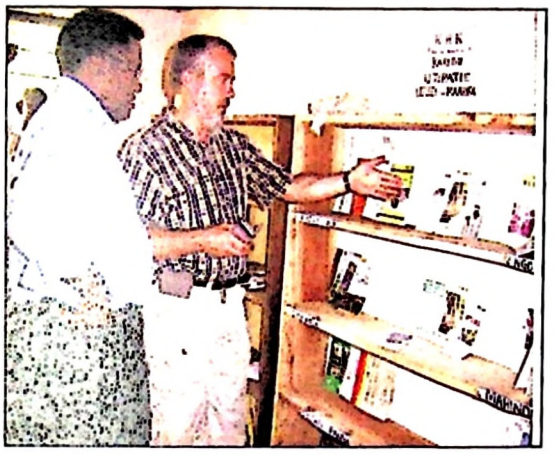


Photo 16: Kongwa village

Source: Photographs taken by the researcher on 12/10/2005

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While most of the materials in group one were in the form of booklets, and magazines/newsletters, which were firm enough to be displayed on the shelves, the materials for group two were in the form of booklets, magazines/newsletters, pamphlets and leaflets.

Therefore by the end of the research all centres had received 102 similar titles on the same subjects. All materials except the newspapers were published or produced between 1990 and 2005. As presented in tables 14 and 15, all the selected materials that were produced by different departments or institutions under the former MAFS were grouped under MAFS as one publisher/source. This was also the case for all materials obtained from various departments and units at SUA. A table with detailed information of the materials that were collected for use at the VICs is attached as Appendix 13.

Table 14 Profile of printed materials provided to the VICs at the onset

Subject	*Publisher/Source of the material*				*Total*
	INADES	MAFS	SUA	MVIWATA	
Local chicken product.	2	2	2	-	6
Cattle keeping	2	2	4	-	8
Paddy growing	1	-	3	-	4
Maize growing	1	1	-	-	2
Rodent control	1	2	6	-	9
Fruits &Vegetables	1	3	1	-	5
Food, Nutrition & Health	-	1	3	-	4
Farmer groups	1	-	2	7	10
Total	9	11	21	7	48

Source: Field Data

5.2.3 Profiles of users of the VIC

Identification of users of the VIC was covered in the day-to-day usage of the centre. Profiles of users were determined as they were registered in the user logbooks. Parameters such as total number of VIC members, their demographic characteristics, main occupation, and the number of visits were determined in order to have a general picture of participants' access to the VIC.

5.2.3.1 Users of the VICs

A total of 334 farmers were registered users of the four VICs at an average of 84 users per village. Out of this number only 86 (26%) were women. There was an apparent gender bias of the VIC usage, a finding which has been reported in other studies such as the one on the rural ICT usage (Nielinger, 2003).

Dihinda village had the highest number of registered users, both in terms of the total number as well as the number of women users. Generally, centres in more remote areas such as Dihinda and Kongwa had higher numbers of registered users of the VIC than centres close to urban areas.

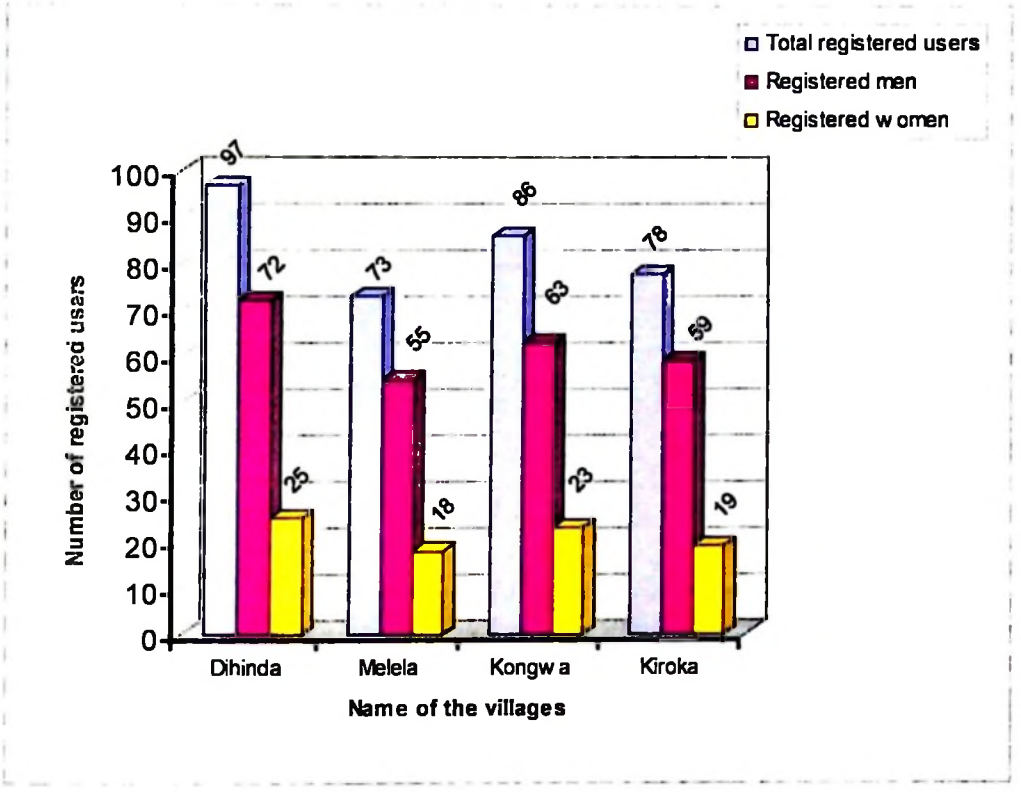
Table 15 Profile of printed materials that were gradually added to the VICs

Subject		*Publisher/Source of the material*				*Total*
		INADES	MAFS	SUA	MVIWATA	
Spices	Vanilla	-	1	2	-	3
	Simsim	-	1	-	-	1
Pest management		1	1	2	-	4
Rabies control		-	-	2	-	2
Irrigation agriculture		-	-	2	-	2
Animal disease control		1	1	2	-	4
Mushroom farming		-	1	1	-	2
Fish farming		-	-	2	-	2
Environmental protection		-	1	2	-	3
Keeping small animals		1	1	1	-	3
Dairy goats		-	-	1	-	1
Beans production		1	1	2	-	4
Traditional herbs for plant protection		1	-	-	-	1
Marketing		1	-	2	1	4
Food storage		1	-	1	-	2
Water harvesting		-	-	2	-	2
Food processing	Tomato	-	-	1	-	1
	Fruit	-	-	1	-	1
	Cassava	-	1	1	-	2
	Soya	-	1	1	-	2
	Meat	-	-	1	-	1
Flower growing		-	-	2	-	2
Policy issues		1	1	1	-	3
Farmer stories		1	-	-	1	2
Newspapers		N/A	N/A	N/A	N/A	N/A
Total		9	10	33	2	54

Source: Field Data

The total number of registered users in each village is shown in Figure 9, while the cumulative number of visits to the VICs in a period of one year for each village is shown in Table 16.

Figure 9 Number of registered users in the four VICs



Source: Field Data

It is clear from Table 16 that, as expected, the total number of visits per village was much higher than the number of registered users. This finding is not only because the same users were signing in the attendance book each time they visited the centre, but also because some farmers who used the centre did not register as members. It has to be noted that most of those who used the centre were signing the user logbook on each visit.

Table 16: Number of visits to the VIC in a period of one year

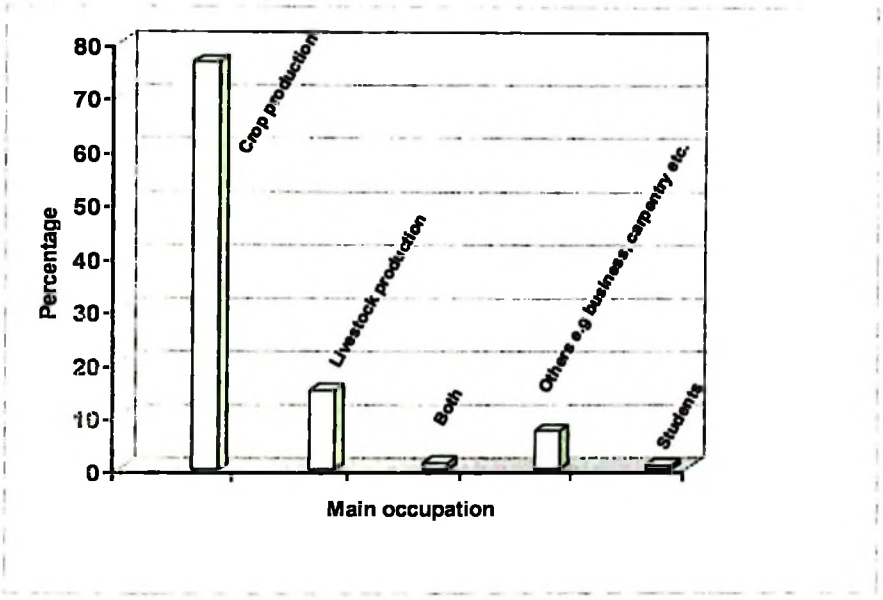
Name of the village	*Average visits per month*	*Total visits in one year*
Dihinda	25	327
Melela	72	939
Kongwa	89	983
Kiroka	29	320
Total visits for all villages	**54**	**2569**

Source: Field Data

5.2.3.2 Main occupation of the users of the VIC

The main occupation of the majority (76.2%) of all farmers who registered and used the VIC was crop farming, while livestock keeping was the main occupation of 15 percent of registered users. The remaining percentage of users had other occupations such as small business, carpentry and traditional handwork, which altogether accounted for 7 percent. One percent of all farmers were dealing with both crops and livestock on an equal basis, while less than one percent (0.6%) of all users were students or pupils in primary schools as shown in Figure 10.

Figure 10 Main occupation of the farmers who used the VIC

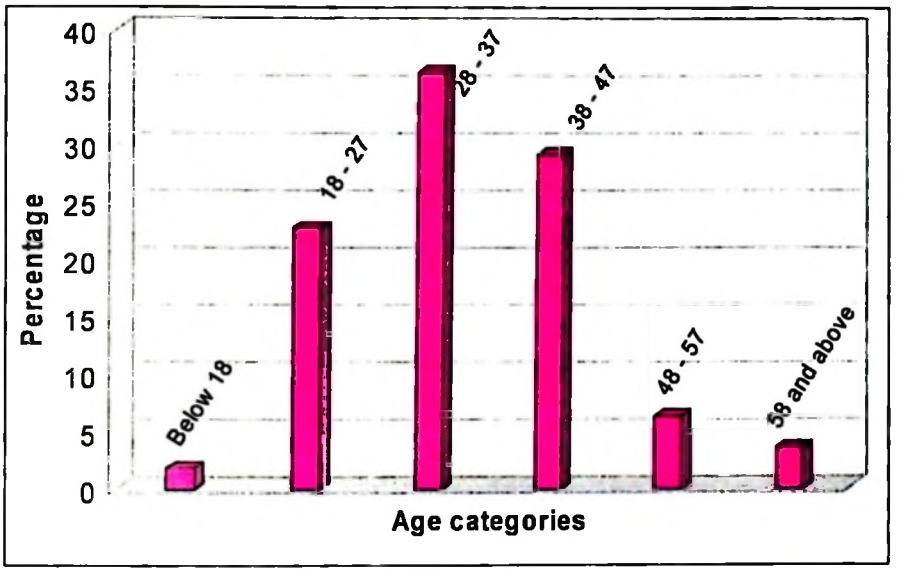


Source: Field Data

5.2.3.3 Age and educational background

The centres were well used by relatively young and middle aged farmers between 18 to 47 years old, with the dominant user age category of between 28 to 37 years (Figure 11). The majority of farmers (63%) had completed primary school education (Figure 12), a finding which was consistent in all villages. The percentage of farmers who had completed primary education was only 7 percent higher than the percentage that was found in the situation analysis survey (Matovelo et al, op. cit).

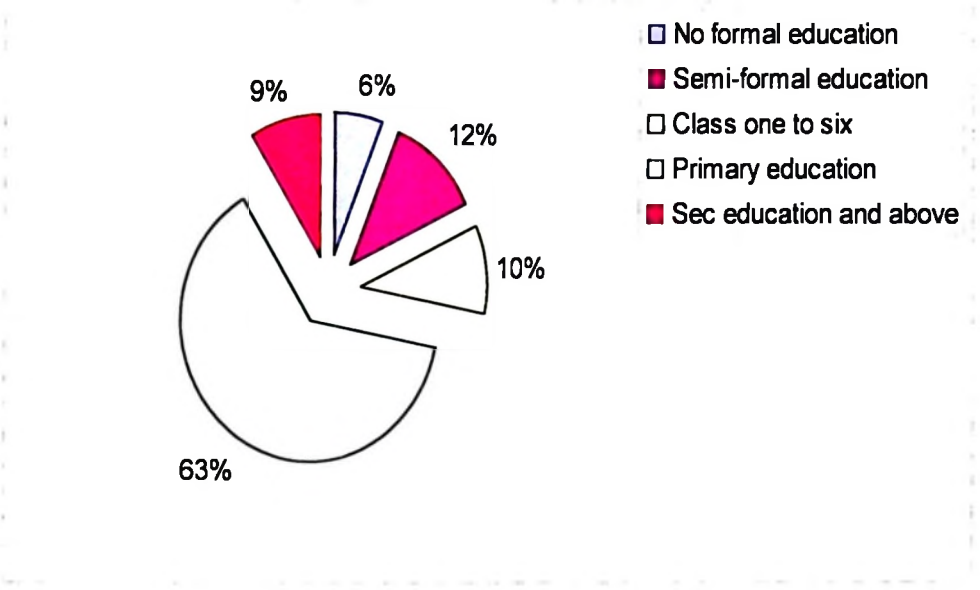
Figure 11 Distribution of age of farmers who used the VIC



Source: Field Data

While Dihinda had the highest number of users with primary education, the number of illiterate and semi-illiterate users was higher in Melela and Kongwa villages (Figure 13). Both of these villages had a mixture of crop farmers and pastoralists in their communities. Pastoralists in these villages however had relatively lower levels of formal education, a factor which could probably explain the finding of lower levels of formal education in these villages.

Figure 12 Distribution of education among registered users of VIC



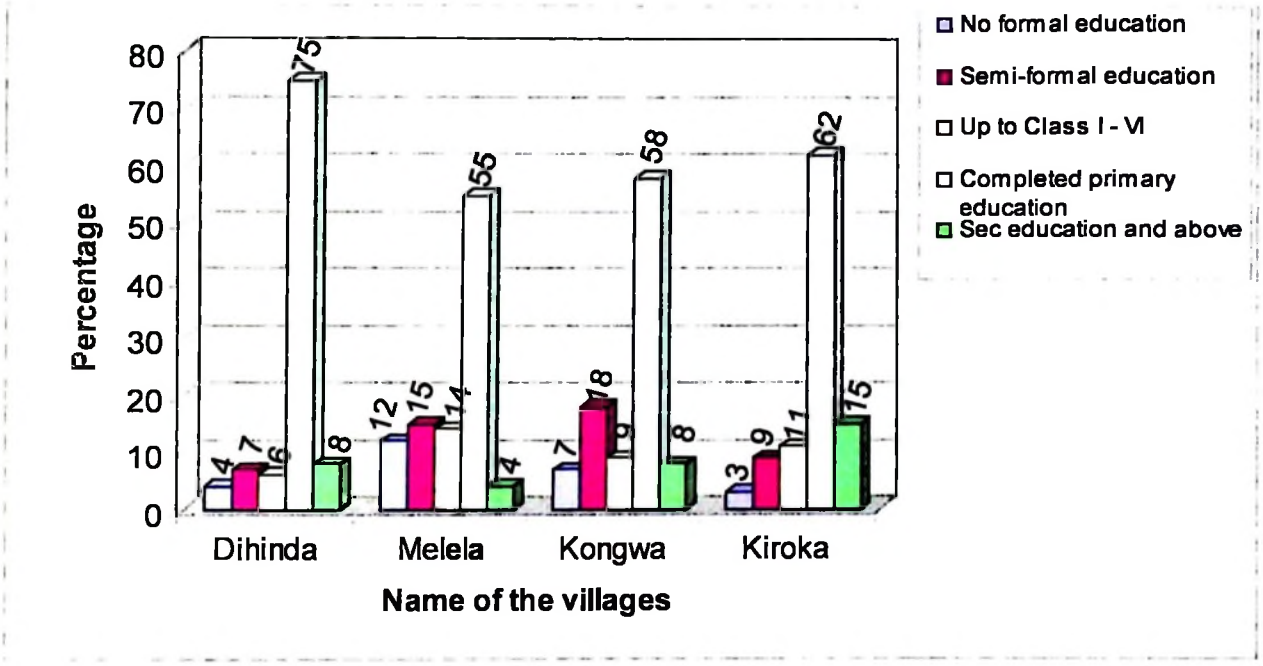
Source: Field Data

In each village there were "illiterate" users (with no formal education) of the VIC. Although these were small in number, they visited the centre regularly and depended on other fellow farmers who read and discussed the messages contained in different printed materials.

5.2.4 Utilization of the VIC captured in the logbooks

Using the information extracted from the logbooks, an in-depth assessment of the usage of the VIC in different villages was made in order to know the pattern of use of the collections, user preferences as well as various user comments and opinions.

Figure 13 Distribution of levels of education in each village



Source: Field Data

5.2.4.1 Usage patterns in different villages

All four VICs were used by registered and non-registered users throughout the period of study. The usage of the centres, as illustrated in Table 16 and Figure 14, showed a slightly different pattern of use from one village to another. However, there were some similarities between villages. For example, while Melela and Kongwa villages recorded the highest number of users, they showed high fluctuations of use in between months, particularly at the beginning of the intervention, the other two villages and particularly Dihinda showed a more stable and constant usage. The fluctuations appeared to coincide

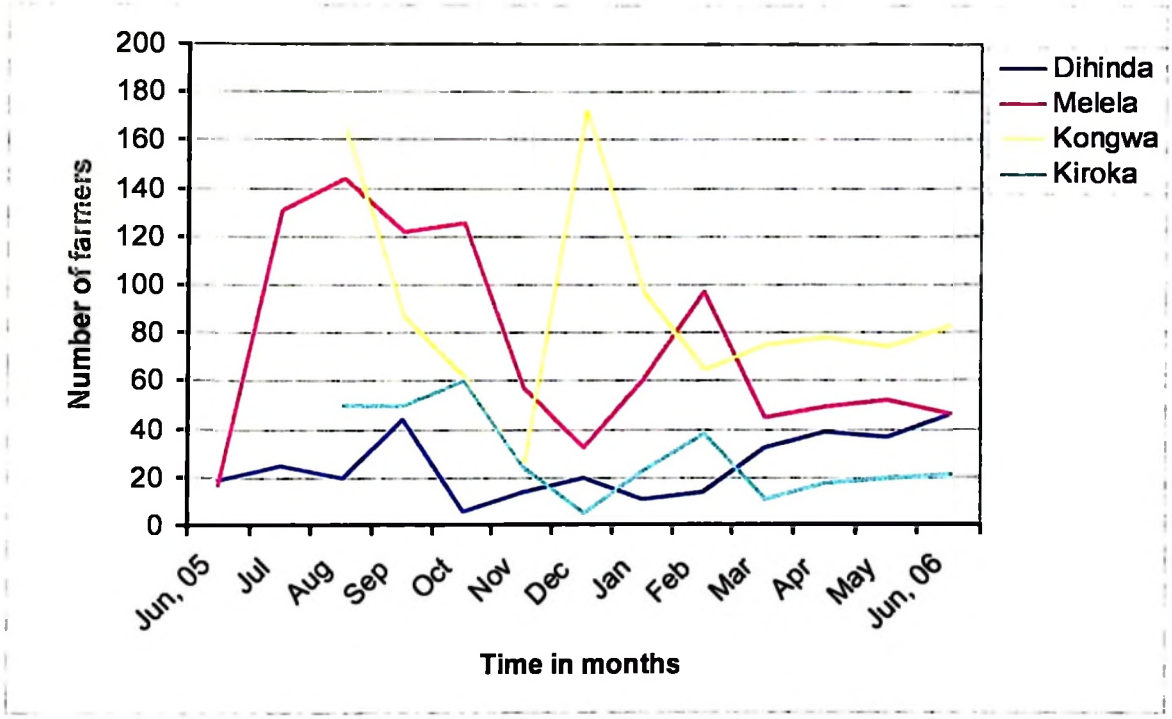
with the times when new materials were added to the collections as well as the researcher's visits to the centre. It is apparent that other factors contributed to motivating the users to come to the centre, including opportunities to interact with researchers and discuss other economic and development-related problems during open discussions.

Although Kongwa and Melela are located far from each other, they had some things in common, such as relatively higher levels of illiteracy (Figure 13), so that some users of the centre depended on fellow literate farmers for discussing of different subjects, a practice which was observed more in these two villages than the others. Another feature that the two villages had in common was the presence of two different communities in terms of socio-cultural issues, i.e. pastoralists and crop farmers which probably could have contributed to the recorded pattern of usage of the VIC.

Figure 14 shows that all villages except Kongwa started with relatively low numbers of users at the beginning but rose up sharply to a peak by the third month, then started to decline and obtained a stable or relatively constant state after about six months. Kongwa village on the other hand started with a very high number of users but declined sharply by the third month, and showed higher fluctuations in the number of users. The most stable state with respect to the number of users as well as the actual usage was that of Dihinda village, despite the fact that the village recorded the fewest number of users. Out of the four villages, Dihinda had the highest number of users who had completed primary education, which is the highest level of education of the majority of farmers in

the study area (Matovelo et al, op. cit.). Some of the users of the VIC were captured making use of the facility in Kongwa and Dihinda villages as shown in Photos 16 and 17 respectively.

Figure 14: Trend of the use of VIC in the four villages



Source: Field Data

It appears that generally the more remotely located VICs (Dihinda and Kongwa) registered more users than VICs located closer to town (Kiroka and Melela). This is probably because fewer opportunities existed to get information in more remote areas as compared with centres closer to town, meaning that the VICs in remote areas had a clear role to play in information acquisition opportunities. This finding serves to underscore

the effectiveness of the VIC model or such a facility in remote areas where there is a scarcity of information sources.

Photo 17: The VIC in use at Dihinda village

Source: Photograph taken by the researcher on 02/03/2006

5.2.4.2 Reading materials that were accessed by users.

One of the parameters in the logbook intended to capture information on which documents were accessed and used as well as the number of users who accessed a particular document.

It was found out that at least 81 percent (83 out of 102) of the titles that were available in all centres were accessed by at least one farmer during the time of the study. This number is for all the villages put together rather than individual villages. The number was probably higher than reported because there was under-recording of the accessed

materials as observed during monitoring visits. Keeping track of users' performance was probably giving some users a sense of achievement as observed in situations when they would crosscheck to ensure their entries were correct.

The number of titles read by an individual user ranged between one to 30 titles. The highest number of titles was read by a user at Kongwa village, although on average Dihinda village accessed more titles than any other village. The average number of titles per user with the name of the village in brackets was seven (Dihinda), five (Kongwa), three (Melela and Kiroka). There were a number of users in each village who read only one title, and as already stated other users did not record what they accessed. There could be a number of reasons for this observation, including the possibility that some of the users who indicated to have read only one publication resided in a different sub-village located relatively far from the VIC and so were not regular attendees but rather they probably made an incidental visit to the centre. Another reason could be ineffectiveness in recording the titles that a user read, particularly where recording depended on the availability of VIC representatives. These are some of the areas that may need to be addressed for improving the VIC model.

5.2.4.3 User preferences out of available materials

Again, using the information in the logbooks, an attempt was made to come up with user preferences out of the available titles in the VIC collection. This parameter was used as a triangulation method for determining more the information needs of farmers. The user preference was reflected in the materials that were accessed often in the centres as well as materials that were requested by users for their personal use (as gifts or for buying). Materials that were accessed by at least 10 percent of registered users in each centre were identified as frequently accessed.

Using this criterion, 20 out of 102 publications (19.6%) were accessed most as shown under brief titles in Table 17. Most of the materials were in the form of booklets, except for two pamphlets, one magazine and one leaflet. All except two were coloured and all except one had some drawings, pictures or photos in between the text for further illustrations. While a title on local chicken production was accessed more than any other by users in Dihinda, and Kongwa villages, rodent control/food storage and farmer groups were the most accessed titles in Melela village. At Kiroka village, control of rabies was the most frequently accessed publication.

Table 17 Materials that were accessed frequently

Brief title translation	*Publisher/ Source*	*Village and number of users*				*Total*
		Dihinda	**Melela**	**Kongwa**	**Kiroka**	
Local chicken keeping	MAFS	37	19	31	21	108
Chicken disease control in villages	SUA	33	20	25	17	95
Rabies control	SUA	25	20	23	24	92
Improve local chicken	INADES	32	19	23	17	91
Farmer stories	INADES	31	19	22	19	91
Maize growing	INADES	30	19	23	19	91
Farmer groups	MVIWATA	31	20	20	18	89
Farmer groups	SUA	30	22	17	19	88
Paddy growing	INADES	28	18	22	18	86
Vegetable growing	SUA	18	14	20	20	72
Local food preparation	SUA	24	19	21	17	81
Rodent control	SUA	23	11	25	18	77
Paddy disease	SUA	26	8	24	16	74
Keeping small animals	INADES	15	19	20	17	71
Rodent control/food storage	SUA	20	22	16	9	67
Traditional herbs	INADES	17	20	17	9	63
Diary cattle husbandry	INADES	12	16	11	8	47
Mushroom farming	SUA	11	4	10	7	32
Cereal storage	MAFS	8	7	8	7	30
Improved diary cattle	MAFS	10	8	5	6	29

Source: Field Data

The subjects that were accessed most appear to have no obvious relationship to the known farming activities in the areas under study. For instance, the five most frequently accessed publications included the control of rabies and farmer stories. Maize, paddy

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Rabies control	SUA	25	20	23	24	92
Improve local chicken	INADES	32	19	23	17	91
Farmer stories	INADES	31	19	22	19	91
Maize growing	INADES	30	19	23	19	91
Farmer groups	MVIWATA	31	20	20	18	89
Farmer groups	SUA	30	22	17	19	88
Paddy growing	INADES	28	18	22	18	86
Vegetable growing	SUA	18	14	20	20	72
Local food preparation	SUA	24	19	21	17	81
Rodent control	SUA	23	11	25	18	77
Paddy disease	SUA	26	8	24	16	74
Keeping small animals	INADES	15	19	20	17	71
Rodent control/food storage	SUA	20	22	16	9	67
Traditional herbs	INADES	17	20	17	9	63
Diary cattle husbandry	INADES	12	16	11	8	47
Mushroom farming	SUA	11	4	10	7	32
Cereal storage	MAFS	8	7	8	7	30
Improved diary cattle	MAFS	10	8	5	6	29

Source: Field Data

The subjects that were accessed most appear to have no obvious relationship to the known farming activities in the areas under study. For instance, the five most frequently accessed publications included the control of rabies and farmer stories. Maize, paddy

and vegetable growing came next in the priority list despite the fact that they were grown by the majority of farmers in the area. Again, although the publication on the control of rabies belonged to group two, whose publications were introduced to the collection much later, and was never among the information needs determined earlier, it nevertheless featured highly in the frequently accessed materials. This finding could probably mean that in some circumstances exposure to information is needed in order to stimulate the demand for it.

Although some of the frequently accessed materials did not necessarily reflect common agricultural activities, as Mostert (2001) argues and as found in this study, the information content of these documents was one of the factors that determined their demand as they probably matched the needs of the users.

Of the 20 most frequently accessed publications, nine were published by SUA, seven by INADES, three by MAFS and one by MVIWATA. Considering the percentage of contributions out of the publications by the four publishers, INADES had the highest contribution (38.9%) of its available materials (n=18), followed by SUA (16.7 %) (n=54), MAFS (14.2 %) (n=21) and MVIWATA (11.1%) (n=9).

There could be a number of reasons for this finding. One of the possible explanations is that all materials by INADES, for example, were repackaged materials produced specifically for farmers and smallholder farmers in particular. The content, layout and

format appears to have taken into consideration the main target user; farmers who were either semi-literate or with a low level of literacy. This could have been an advantage over other materials that were not necessarily targeting farmers in the same context as INADES.

The layout for all the publications by INADES and most of the publications by FEPU was in larger fonts (about font size 14) and appeared to have at least 1.5 line spacing. On top of these, each page had some illustrations and therefore contained less text. In contrast with INADES publications, some of the publications by Tanzania Agricultural Research Programme II-SUA had continuous text in smaller fonts and fewer illustrations.

The majority of INADES publications were booklets and a few pamphlets which seem to be preferred by farmers rather than to leaflets. It was observed that some users did not record leaflets in their list of accessed materials. It seems that users gave less weight to leaflets as compared with booklets and pamphlets and so they did not bother to record them. Although the overall collection had more titles from the MAFS than any other source (Table 13), more than 90 percent of these materials were in the form of leaflets and had fewer than four copies per title; as such most of them did not qualify for inclusion in the collections.

It was observed that a number of publications that were rarely accessed, such as some publications by SUA, did not exceed 30 pages, while some of the popular INADES publications had up to 50 pages. This observation implies that the length of the publication in terms of the total number of pages does not necessarily have much influence on the user's preference for a particular publication.

It was also noted that although 'Ukulima wa Kisasa' newsletter published by MAFS had been in circulation for many years with probably the longest history over all others, it was rarely accessed. It is most probable that the content and layout of that particular newsletter issue did not focus on the smallholder farmers as the main target. In general, this newsletter did not capture the interest of farmers. It would probably be more useful for farmers if this newsletter, with a long history in the country, could have a deliberate focus on farmers that would be reflected in its content and layout.

5.2.4.4 Users' requests for information materials

User requests were extracted from the logbooks with a view to identifying more information needs as well as a crosschecking mechanism in establishing user readership and demand for information. Following access to and use of the reading materials at the VIC, some users were eager to get even more and detailed information beyond what was being offered. Such information included information on vanilla, a new and high value crop which, though it has a relatively short history in the country and in Morogoro in particular, farmers wished to know more about so that they could consider cultivating it.

Others wanted information on cross-breeds of chicken for disease resistance, appropriate hatchery technology in villages and food processing (Table 18). Requests for such information from farmers could be one of the indicators of how diverse farmers are in their needs and how dynamic they could be in an appropriate environment.

It was observed that some of the information they accessed and later on requested more of that kind was requested out of curiosity, having been exposed to some of that information. For example, requests to have information on the preparation of local foods from other areas of the country followed exposure to titles on preparation of local foods available in Morogoro region. This phenomenon supports an argument by the information professionals such as Leeuwis, (op. cit: 244) and Mchombu, (1993 op. cit.) that demand for information may be created when users become aware of what is or could be available. With these findings, therefore, it can further be argued that in some cases information demand must be stimulated by exposure to that information. Furthermore, this finding could also mean that, given sensitization in an appropriate environment, the practice of proactive information seeking could extend to reading out of curiosity and even reading for leisure. Thus, the VIC facility could be a tool for self-sustaining growth of an individual as well as a community information and knowledge base. This finding may serve as a basis for considering the VIC model for inculcating proactive information-seeking attributes in farmers.

Table 18 Subjects that were requested for inclusion in the VIC collections

Subject		*Name of the village*			
		Dihinda	**Melela**	**Kongwa**	**Kiroka**
Spices	Vanilla	v	-	-	-
	Simsim	v	-	v	v
Irrigation agriculture		v	-	v	v
Environmental protection		v	-	v	v
Dairy goats		v	v	v	-
Beans production		v	-	v	v
Crop marketing*		v	-	v	v
Water harvesting		-	v	-	v
Food processing	Tomato	v	v	v	v
Story books*		v	-	v	v
Food prepare. from other areas*		v	v	v	v
Recent crop seeds*		v	-	-	v
Bee keeping*		-	-	v	v
Simple hatchery technology*		v	-	-	-
Cross-breeds of chicken*		v	v		
Newspapers		v	-	v	-

Source: Field Data

Key: * Requests that were not fulfilled at all

v Stands for villages where particular information was requested

5.2.4.5 Farmers' requests for personal copies

Assessment of farmers' requests for personal copies was another parameter which was considered in finding out more information needs as well as readership among farmers. As in number 5.2.4.4 above, it was also hoped that this parameter would contribute to the empirical evidence for the basis of the recommendations from this research. Users wished to acquire personal copies of a total of 19 titles in about 14 subject areas as indicated in Table19.

Table 19: Titles and number of users who requested personal copies

Translated title in brief	*Publisher/ Source*	*Format*	*Village and number of users*				*Total*
			Dihinda	Melela	Kongwa	Kiroka	
Local food prep.	SUA	Booklet	11	8	9	5	33
Chicken diseas in villages	SUA	Pamph.	15	6	5	5	31
Maize growing	INADES	Booklet	7	6	6	5	24
Local chicken	MAFS	Booklet	8	6	4	3	21
Traditional herbs	INADES	Pamph	6	3	6	4	19
Improve local chicken	INADES	Booklet	7	2	5	3	17
Farmer stories	INADES	Pamphlt	7	4	3	1	15
Rabies control	SUA	booklet	4	3	2	4	13
Paddy disease	SUA	Booklet	4	4	3	1	12
Ticks control	SUA	Booklet	3	2	4	1	10
Farmer groups	MVIWATA	Magazn	5	1	1	2	9
Farmer groups	SUA	Booklet	4	2	1	2	9
Dairy goats	SUA	Booklet	2	1	4	2	9
Vegetable growing	INADES	Booklet	5	-	-	3	8
Mushroom farming	SUA	Booklet	5	-	1	2	8
Rodent /food storage	SUA	Booklet	4	1	2	-	7
Dairy cattle shed	MAFS	Leaflet	5	1	-	1	7
Keeping small animals	INADES	Booklet	4	2	-	1	7
Improved dairy cattle	MAFS	Booklet	2	2	-	1	5
Total			**108**	**54**	**56**	**46**	**264**

Source: Field Data

The subjects requested were almost similar to the subjects that were frequently accessed in the VIC. Some users were even ready to pay for the materials that they needed. The eagerness to get personal copies was demonstrated during the village meetings right at

the beginning of the research following the display of a few sample materials. Only a few of their requests were fulfilled because of lack of extra copies except for some few copies of the titles by SUA research projects. Unfulfilled requests were noted down by the VIC coordinators for future requests. It was encouraging to find out clearly that, as the main assumption of this research, and as reported in another research in South Africa (Stefano et al, 2005), illiteracy is no longer a major limitation to the use of printed information in rural areas. This finding could have implications for planning and policy developments to influence modalities in influencing access to agricultural information.

5.2.4.6 Possible motivating factors for visiting the VIC

According to the VIC attendance records, some days recorded a very high attendance and in some days the number dropped drastically as already indicated in Figure 14. This phenomenon was especially true for Kongwa and Melela villages. The fluctuations in attendance could be because of what other users perceived as motivations that attracted them to the centres. Three main motivating factors were identified from the logbooks as summarized below:

Availability of new printed materials

It was observed that each time new materials were available at the centre the number of users rose and then declined with time. It appears that availability of new materials could have been one of the motivations attracting readers to the centre. Therefore this being

the case, regular updating or introduction of new materials to the collection would be a crucial undertaking in order to have continuous use of the VIC by farmers.

Availability of Newspapers

Newspapers were being added once a month when the researcher visited the centre. It appears that availability of popular newspapers was another motivating factor which probably encouraged users to visit the centre. Even though most of the papers were from the past few days, users were always looking forward to having new ones in the collection. This was especially true for Dihinda and Kongwa centres. These two villages are situated relatively far from the town centre (93 and 94 km respectively) and so newspapers are not readily available. Therefore, they probably needed them at the centres more than other villages that are closer to town, and from where more people might be making trips to town. For the two villages, having the newspapers at the centre was almost the only means of accessing and reading papers regularly.

Availability of a team of professionals

Having a team of professionals making visits to the village was another possible attraction at the centre. During research field visits farmers and researchers used the centre not only for accessing printed information resources but also as a forum for exchanging ideas and knowledge through informal discussions. Three examples from Dihinda and Kongwa villages may further support this point. In one case at Dihinda, farmers as well as the VEO_2 raised concerns over a disease affecting their vegetables for

which they wished to get a solution. The researcher participated in a discussion on how to get assistance from SUA and also in channelling their request to SUA for further investigations. In the second case, farmers had formed groups and wished to become members of MVIWATA, the country's network of farmer groups. The discussions led to linking Dihinda farmers to MVIWATA offices in Morogoro town.

During the researcher's field trips at both Dihinda and Kongwa villages, farmers organised themselves and asked for maize seeds that are normally purchased from agricultural implement shops in town. With this arrangement they saved some money which would have been used for bus fares in that farming season.

These findings imply that having other relevant activities at the VIC would probably contribute to ensuring continuous usage of the VIC. The findings may further form the basis for making decisions on which other activities could be included in the VIC in order to make it more useful and effective.

5.2.4.7 Summary of comments and opinions as captured from the logbooks

In order to capture what might have been missed during informal discussions, users had an opportunity to record their opinions and comments about the VIC. They also had general comments regarding agricultural information and other development-related issues. User comments were used to reflect upon a number of issues such as: farmer's

attitudes to the VIC; their wishes on how best the VIC could be operationalised or improved; as well as any other suggestions in relation to improving farmer livelihoods

Table 20 presents a summary of user comments, opinions or suggestions as extracted from the logbooks. The first five comments were captured from all villages. Although the number of users for each comment was not counted, the possibility of borrowing and acquiring personal copies were the most frequently encountered comments. This finding could be taken as a proof of the presence of functional readership as well as unmet information needs among small-scale farmers. Most of the other comments were either by individual users or location and situation specific. For example, information on biogas was requested by only one user at Dihinda village. Likewise, livestock keepers in Kongwa village consistently pointed out the lack of a dip for prevention of tick-borne diseases for their livestock. This comment was also raised a number of times during field visits and village meetings. Of the four villages, Dihinda appears to have revealed outstanding enthusiasm, including having contributed more comments than any other village.

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Table 20: Summary of user comments and opinions

Comments and opinions	Name of the village			
	Dihinda	*Melela*	*Kongwa*	*Kiroka*
Borrowing be allowed	v	v	v	v
Would like to acquire some personal copies	v	v	v	v
Would like to have story books as well	v	v	v	v
The centre should be permanent	v	v	v	v
Found very informative materials	v	v	v	v
Include adult education activities	v	v	v	-
Would like to have newspapers	v	-	v	-
A change in the time of opening	v	-	-	v
Centre is far from other parts of the village	v	v	-	-
Need more than one centre in the village	v	v	-	-
More cookery books on other local foods	v	-	-	v
Provide books on improved seeds	v	v	-	-
Would like to have farmer seminars	v	v	-	-
Each sub-village have its own coordinators	v	v	-	-
Would like assistance to form farmer groups	v	v	-	-
Would like to have agricultural implement shops near the village	v	-	v	-
Need information on traditional farming	-	-	-	v
Modern methods for cultivation of fruit	-	-	-	v
Need information on biogas	v	-	-	-
Use other places e.g. MCH clinics, and schools to create awareness	v	-	-	-
More women be encouraged to attend	v	-	-	-
Information on cross-breeds of chicken	v	-	-	-
The village lacks a dip for the livestock	-	-	v	-

Source: Field Data

Key: v Represents villages where a particular comment was captured

It was apparent that comments relating to facilitating information acquisition by farmers were dominant over all others. This further testifies to the presence of unmet information needs among farmers that may have been stimulated by exposure to information. Farmers' views are a useful input reflecting their wishes and preferences which could be worked upon by planners and policy makers to establish practical and sustainable mechanisms for enhancing farmers' access to and use of recorded agricultural

information. This finding poses a challenge to information agents who apparently have not been in the front line in the process of farmers' economic development, although they have an apparent role to play in this process.

5.2.5 Assessment of utilization of the VIC as captured through FGD

As stated earlier, the FGD served as a triangulation method and complemented the other tools and for in-depth information regarding the VIC as obtained from the VIC journals and logbooks. Discussions for the two groups in each village were held on the same day. All discussions lasted approximately seventy five minutes. For the purpose of maintaining consistency, the discussion guide (Appendix 4) was used for all groups in all villages. The discussion guide covered seven main topics as discussed in the following sections.

5.2.5.1 Composition of the groups

Two groups were formed in each VIC in order to capture as much information as possible and for flexibility on a suitable time for the discussions. The groups were composed of 10 to 12 most frequent users of the VIC. A total of 87 users participated in the discussions, out of whom 31 (36%) were women. The majority of participants, i.e. 79 (90.8%) of all participants, were crop farmers, while 8 (9.2%) kept livestock as their main occupation. The majority (80.4%) had attended formal school at primary school level (class I up to VII/VIII), while 11 participants (13%) had no formal education. The detailed composition of the discussion groups is presented in Table 21.

Table 21 Composition of the groups in the four villages

Village	Gender		Profile of the group members in the four villages						
	M	*F*	*Younggest (yrs)*	*Oldest (yrs)*	*Crop farmers*	*Livestock keepers*	*Informal education*	*Primary (I-VII/ VIII)*	*Secondary or above*
Dihinda									
I	7	5	22	70	10	2	-	10	2
II	7	4	20	63	11	-	1	9	1
Melela									
I	8	3	28	71	11	-	2	9	-
II	6	4	21	69	8	2	3	7	-
Kongwa									
I	8	4	20	62	10	2	2	9	1
II	7	4	18	60	9	2	1	9	1
Kiroka									
I	6	4	17	75	10	-	2	7	1
II	7	3	19	63	10	-	-	10	-
Total	**56**	**31**	**N/A**	**N/A**	**79**	**8**	**11**	**70**	**6**

Source: Field Data

5.2.5.2 Some factors that influenced regular attendance at the VIC

One of the ways used to find out participants' perceptions about the usefulness of the VIC was to make them discuss the reasons that compelled them to attend and use the VIC regularly.

Group participants at Dihinda village discussed the main reasons including in descending order of importance the following:

- Eagerness to get new ideas on agricultural activities
- Availability of newspapers
- Hoping to get more knowledge on livestock keeping
- Knowledge sharing especially those who had newly established the farmer groups in the village, particularly the non-literate ones
- Having contact with experts for advice on different development issues.

It was observed that the majority of participants in Dihinda displayed more dynamic attributes, such as enthusiasm to learn new things, asking follow-up questions and eagerness to put into practice what they had read about, such as better agricultural practices and alternative crops. For example, close to half of the frequent users of the centre belonged to newly established farmer groups that were established following information about forming farmer groups as obtained from printed materials at the centre. On emphasizing the importance of the centre to their village, the oldest member of one of the groups, recalling his past experiences in the northern part of Tanzania where he originated, had this to say:

> "...During the colonial period parents were being paid to take their children to school to get knowledge, not realizing that education was such an important investment so that sooner or later they would actually start looking and paying for it. So I see this centre as a precious stone in our village, we should hold it firmly".

Melela FGD pointed out reasons such as getting knowledge on modern ways of cultivating and having a chance to renew their reading skills. It was revealed that the centre gave them other members an opportunity to practise reading on their own. Some of the comments supporting this reason included:

> "The centre reminds me of the skills I acquired at school"
> "I don't read often, because of lack of reading materials"
> " The centre makes me practise the skills I was about to forget"

Accessing newspapers was among the major reasons that influenced Kongwa farmers to visit the centre regularly. The majority agreed that the long distance from their village to the urban centre limited them from getting newspapers regularly. On probing the type of information they liked to read in the papers, the majority indicated an interest in following up current affairs, especially the country's election politics which was still among current issues at that time, and leisure news such as news on soccer. Other reasons were similar to those given by other groups in the other three centres.

In this study the VICs have been used and shown to be effective tools for studying how the practice of proactive information seeking can develop and evolve among smallholder farming communities. However, in the process of this study it has become apparent that the VICs have themselves turned out to be a motivation for inculcating the practice of information seeking and stimulating the habit of reading in the society. In other words, the effect has actually become the cause. Therefore there is a dual effect with the VIC in

that while they are used as tools for promoting the practice of proactive info seeking, they could also be effective in promoting dissemination of printed materials.

The majority of participants in Kiroka village were attracted by the availability of informative materials within their village and hoped to come across new crops suitable for their area as they continue using the collection.

On information materials that attracted them, it was revealed that users were attracted by what they expressed as "new information", such as different ways of preparing local foodstuff, mushroom growing, control of local chicken diseases, control of rabies and keeping dairy goats to mention a few. This generally implies that the content of the document is among the main factors influencing users' attraction to access and use the documents.

Participants were required to mention specific information, if any, that attracted them most. The majority pointed out titles on local chicken production to have attracted them more than any other titles. The majority pointed out the presentation and layout of the content with regard to readable fonts, short and simple text with easy illustrations (mostly true for materials by INADES), were important factors determining attractiveness of the documents.

5.2.5.3 Farmers' perception of new information at the VIC

Participants were required to discuss whether they found new and useful information, ideas or any other thing that they were otherwise not aware of. This section also served to countercheck the readership of the participants, their preferences for the publications as well as usefulness of the VIC. Table 22 presents a summary of the findings of what was new to most participants, starting with the most mentioned to the least in all villages.

Table 22 Information subjects that were new to users

New information	*Name of the village*			
	Dihinda	**Melela**	**Kongwa**	**Kiroka**
Mushroom growing	v	v	v	v
The network of farmer groups (MVIWATA)	v	v	v	v
Improved methods of preparing local foods	v	v	v	v
Control of rabies	v	v	v	v
Rodent control methods	v	v	v	v
Control of yellowing of the paddy/rice	v	v	v	v
Preparations of Soya bean-based foods	v	v	v	v
Vaccination against chicken diseases	-	-	v	v
Keeping dairy goats	v	-	v	v
Better simsim seeds	-	v	v	-
Construct improved cereal storage facility	v	v	-	v
Construction of dairy cowsheds	v	-	-	v
Local herbs against livestock diseases	v	-	-	-
Improved methods of cassava processing	-	v	-	v

Source: Field Data

Key: v Represents villages where particular information was perceived as new

5.2.5.4 Information requirements that were not met

Participants discussed some other subjects they wished to have been covered in the documents at the centre. At Dihinda, for example, participants wished to have information on alternative crops that could be cultivated instead of relying on traditional crops such as paddy and maize. They also wished to get information on the availability of good markets for different produce. It was interesting to note that they also wished to know more about bird flu, a disease which, although it had not hit the area, dominated the media at that time and participants had scarce information about it.

Farmers in Melcla wished to have publications covering the cultivation of banana, cassava and coconut. They argued that, although these crops have been grown for a long time in that area, unlike maize or paddy, farmers have continued to practise traditional ways of cultivation. This could be one of the reasons for poor harvests.

Kongwa farmers discussed more about publications on cotton, a crop which used to be grown in the area with good results many years back. They argued that they would like to resume growing the crop if they had appropriate information regarding cultivation and marketing. They also discussed having limited information on the techniques of producing forest tree seedlings which could have benefited them because they had good and ample land suitable for forest trees.

Participants in Kiroka, like for some in Melela, wished to have information on banana cultivation as well as harvesting and preservation in order to avoid damage so that they could safely transport their produce to Dar es Salaam where they had the largest market. In addition, they discussed the need to have different story books for leisure reading, arguing that such materials are relaxing and would attract many farmers to visit the centre. Most of these requests were similar to the request extracted from the VIC journals and logbooks. The consistency of this finding could probably confirm some of the farmers' information needs. In addition, it further supports arguments by Aina, (1991_b op. cit.) and Kaniki (1991 op. cit.) that regular studies to find out the information needs of farmers is crucial for effective information dissemination mechanisms.

5.2.5.5 Reasons that hindered other farmers from using the VIC

As a follow-up question, participants were required to discuss what they thought were possible reasons why other farmers had not used the VIC regularly and why some had even not used it at all. All reasons including those agreed by only a few participants were summarised and presented in Table 23.

Some participants in Dihinda, for example, raised their concern regarding the presence of fewer women users than men. They pointed out that the reasons for this phenomenon include socio-cultural beliefs that make women more home-based and less free to interact. They also pointed out attitudes that might be discouraging for some women. For example, a woman member in one of the groups was once told (translated):

"How can a woman be seen at the centre just reading? Some people in the village would think you have bad manners or you are lazy".

Table 23 Possible reasons for non-use as pointed out by users of the VIC

Reason	Name of the village			
	Dihinda	Melela	Kongwa	Kiroka
No good reason/ lack of interest	v	v	v	v
Limited reading skills	v	v	v	v
Could not set aside time for it	v	v	-	v
Distance/staying too far from the centre	v	v	-	v
Little awareness of it	-	v	v	v
Waiting to see impact on regular users	-	v	-	v
Having same publications for a long time	v	-	-	-
Did not like the location of the centre	v	-	-	-
Did not think it would be useful	-	-	-	v
Cultural bias against women	v	-	-	-

Source: Field Data

Key: v Represents villages where a particular reason was mentioned

Users thought there should be efforts to deal with attitudinal problems, including a deliberate effort to target female users, such as including more materials that seem to be popular with women such as about cookery and human health in general.

Based on these findings, it appears that there were various reasons that hindered farmers from regular use of the VIC or from using it at all. However, when all the reasons are examined, apart from limited literacy and long distance to the centre, attitudinal reasons seem to dominate the list as indicated in Table 23. Changing people's attitudes or mindset is a gradual process and so needs a long-term strategy that will involve farmers

and leaders in the community, right from establishment of the strategy to implementation. While attitudinal matters could be dealt with by creating awareness among farmers, so that as many potential users as possible become used to the facility, location limitations in terms of long distance from the farmers' residences is one of the crucial things to consider at the participatory decision-making stage. When the facility is placed at a central location, for instance, it would increase its chances of becoming reachable and useful to many more farmers.

5.2.5.6 Preference for methods for using printed materials

Participants also discussed how they liked to use printed materials for optimum effect. The majority liked the idea of having a facility within a reasonable distance from their homes where materials would be collected and put together ready for use by village or community members. Some farmers at Dihinda were particularly happy that individuals could come at their own time without having to wait for others as was being done in programmes requiring group mobilisation. However, they were of the opinion that there should also be groups that could meet at an agreeable time for the purposes of having a discussion. In this village the issue of ICT was raised by one member who wished to have a seminar at the centre on basic knowledge about computers. The participant had heard of computers and that some villages in the country were having computer projects. Such discussions show increasing awareness about computers in the villages. With improvements in the infrastructure, ICT-based methods would be one of the options for farmers in rural areas.

At Kongwa, members discussed the idea of getting experts in different fields to visit the centre for elaborating on various subjects in the documents as may be required. The issue of possibility of lending out the materials was raised in all groups. At Melela in particular, members residing far from the centre thought they should be allowed to borrow the materials, considering the fact that it took not less than 30 minutes to walk to the centre from their homes in another part of the village.

It became apparent that with a few modifications the VIC model could play a role in the proactive access to and use of agricultural information by farmers in remote areas.

5.2.5.7 Reported changes in farmers' practices following utilization of the VIC

Participants were required to discuss changes or skills they had acquired if any as a result of attending the VIC. Some women participants in all the groups reported to have tried with success preparing local foods using the methods described in the documents. They explained confidently about the recipes and how easy the methods were. The majority of these women had completed primary school education with only one having had secondary education. The information about the availability of publications on local foodstuff was quickly shared among women, making the requests for personal copies during field visits overwhelming. This was another area where the need and therefore demand for information followed exposure to what is available.

In Kongwa village group members recalled a discussion at the VIC after which they organised themselves, together with other farmers in the village, and requested the village chairman to get them the chicken vaccine during one of his official trips to Morogoro town. They were encouraged to learn the fact that only one vial of vaccine would be enough for all their chickens at that time.

Information on the importance of farmer groups, including practical aspects on how to establish them, appears to have stimulated interest in almost all the groups to the extent that participants suggested having farmers' reading groups. They further suggested possible Kiswahili names for the groups including 'KWADI', (Kikundi cha Wakulima wa Dihinda) 'KWAWAKO' (Kikundi ca Wakulima Wasomaji wa Kongwa), and 'KWAKI' (Kikundi cha Wakulima wa Kiroka), which were put forward as possible names for Dihinda, Kongwa and Kiroka villages respectively. Participants in Melela though did not propose any name, and participants in Kongwa thought of beginning forming farmer readers' clubs to make the centres livelier and as a way of improving farmers' literacy. It was argued that through such clubs people with limited literacy could improve and benefit from the publications.

Participants in one of the groups in Melela discussed an idea of establishing demonstration farms where they would collectively try out methods they read about. It was argued that for the purposes of demonstration, it would be easier to do it collectively

and share the required costs. However, one of the participants who had grown a new variety of maize by the name 'STUKA' after reading about it had this to say (translated):

> "I have planted this new maize following the instructions in the book. I am eager to see how the yield will be this year"

It was apparent that, with the right situation, farmers could actually search for and use new information for improving their livelihoods. A similar finding has been reported by Stefano et al, (op. cit.), giving an example of an experiment by a farmer regarding a new farming technique following instructions from a book. Likewise in this research, two farmers in Kiroka village reported to have applied the knowledge obtained from the publications regarding growing maize using quality seeds and proper spacing during the farming season under the research period.

Perhaps a more important change that was observed and reported by farmers was concerning the practice of proactive information acquisition by farmers as proved by requests made following exposure to information materials.

5.2.5.8 Improvements to the VIC

Participants were required also to discuss what they thought could have been done or could be done in future so as to make the VIC a better facility for the purposes of enhancing farmers' access to and use of recorded agricultural information, as well as inculcating proactive information acquisition by farmers.

Users at Dihinda suggested having the facility moved to an independent room outside the village office due to interferences that were experienced at the centre. In another group, it was suggested that the village administration could approach the school and ask for a room that could be used for the VIC. They thought the idea would be possible because, apart from the school being within the village and near the centre, it had a close working relationship with the village administration. This idea is somewhat similar to the concept of the rural community library model in Uganda (Dent, 2006), which has been reported as a successful working model. In the Uganda model, it is reported that the school played an important role in the community library. However, some group members in Dihinda, Kongwa and Melela villages were not comfortable with the idea of having the VIC within the school, arguing that the village administration may not have control over the centre. Furthermore, to that they thought the centre would look like a facility for school children.

There was a discussion in Dihinda village about having other information methods at the centre such as farmers' videos and cinema which were common mobile services to the villages in the seventies. Group members seemed to agree that video shows would attract a lot of attention of farmers as they would show a practical aspect of what is written in the books. They also thought the presence of the VEO_2 at the centre would be useful for assistance or clarification of subjects that may be difficult to understand. This method could be cheaper as many farmers could be assisted at one go. In addition, the method was likely to be more interesting as it could stimulate discussion at the centre.

All these suggestions notwithstanding, printed materials would still stand out as superior to other methods, because in addition to the earlier stated advantages, they can be used by farmers in many different ways.

Melela groups raised the issue of security of the materials. Their concerns were valid, mainly because at least two publications in each centre got lost after a few months of use due to the poor security system. It was agreed that better display shelves with a lock and key together with close supervision of the centre would minimize this problem. Disappearance of the materials could probably be an indication of unmet needs for information as well as farmer preferences. With this assumption, theft of the materials should be dealt with from both the negative as well as the positive aspects.

Groups at Kiroka were specifically concerned with restricted opening hours. Kiroka was in a unique situation in that, although the times were suggested and agreed at the village meeting, the village leaders advised having an overall supervisor so as to take care of other printed materials in the VIC room that belonged to a different project altogether that was brought to the village much earlier. These materials appeared to have been "stored" on the open shelf in the village office. The overall supervisor was an adult class teacher with limited time for the centre. It is probably of interest to note that the collection that was found at Kiroka was not being used until after the establishment of the VIC. The main reason for non-use of this collection was lack of awareness, because the majority of participants did not even know it existed. The situation at Kiroka serves

as an example of the importance of creating awareness of the availability of information materials as well as the importance of the organisation of a collection.

All groups wished to have their centres improved, specifically regarding the rooms, by having cement floors to minimize the dust, and to have better bookshelves. Other suggestions that were discussed by all groups were about improving the collection by having more reading materials to widen the choice.

With a few improvements, the VIC could be a realistic stimulus to farmers as they become proactive in the process of access to and use of information. Furthermore, after farmers have become used to proactive access to and use of printed information, the centre could serve as a facility where ICT formats could be gradually included in the services.

5.2.5.9 Sustainability of the VIC

In conclusion of the discussions, it became apparent that the majority appreciated having the centre at their village. Most of them wished to have the centre open and usable even after the research work had come to an end. However, the issue of achieving sustainability of such a facility posed a challenge to both the researcher and research participants. Therefore, the moderator probed for any suggestions from the participants on how sustainability could probably be achieved. Ways that could help sustain the VIC in each village generally evolved around five areas including:

- Involvement of the village government

The majority of participants felt that full involvement of the village government would be necessary so as to give them confidence of ownership of the centre by respective villages. These governments are in most cases well organised and command recognition, authority and respect by members of the village.

- Cooperation with SNAL and other experts

Participants suggested continued cooperation with SNAL and other experts for monitoring the centres at least once in a while. It was felt that the experts would assist in establishing of the centres and keeping an eye on their progress, particularly at the beginning. Assistance would also be needed in identifying publications by various organisations that might be available for farmers.

- Small contributions

Participants proposed the introduction of small contributions to mainly meet travel costs (usually a day or two-days trip) to town centres for the VIC representative or VEO_1/VEO_2 to collect publications. It was learnt that the VEO_1 and VEO_2 normally take official trips to town at least once a month. The contributions would also be used for minor maintenance. Repairs would be done on a voluntary basis by local carpenters.

- Information resource sharing

It was surprising that participants raised the issue of information resource sharing, whereby they discussed having some publications at home that could be pooled into one

collection for optimum use. However, they thought that private ownership should be maintained and individuals would be free to withdraw their materials when it happens that they need them at home. They however pointed out that such an arrangement would require specific rules and regulations.

- Orientation or seminars for the coordinators/representatives

It was suggested that VIC coordinators and representatives should be oriented on how to manage the centre. The seminar could be carried out at the VIC at the beginning, with occasional seminars as the need arises. Proposals on the sustainability of the VIC as captured during group discussions have been summarised and presented in table 24.

Table 24 Proposed ways for sustaining the VIC

Proposal	Name of the village			
	Dihinda	**Melela**	**Kongwa**	**Kiroka**
Be part of the village administration	v	v	v	v
Improve the rules and regulations	v	v	v	v
Cooperation between SNAL and villages	v	v	v	v
Establish link between farmers and experts	v	v	v	v
Establish a link between users and SNAL	v	v	v	-
Small contributions for daily management	v	v	v	-
More involvement of the village government	-	-	v	v
Bring in publications owned by individuals	v	-	-	v
Regular visits and monitoring by experts	v	-	v	-
Orientation/seminars for coordinators	-	v	v	-
Collection of more publications by VEO_2	v	-	-	-

Source: Field Data

Key: v Represents villages where a particular sustainability suggestion was made

A number of other general suggestions that were captured in the logbooks came up again during the FGDs. These included issues of poor or lack of infrastructure, mainly in association with electricity and telecommunications, farmer training, lack of agricultural implement shops close to their villages, and a need for regular visits by agricultural and other development agents.

The issue of sustainability was discussed from the practical and realistic point of view, and in view of farmers' enthusiastic discussions it became apparent that they wished to have the VIC in their villages beyond the research time. This therefore implies that, unlike the rural library model that suffered sustainability problems among others, (Katundu and Nyerembe, op. cit.; Kilindo, op. cit.), with little assistance, the VIC model could be sustained by the communities where they are located.

5.2.6 Factors influencing awareness of, access to and use of the VIC

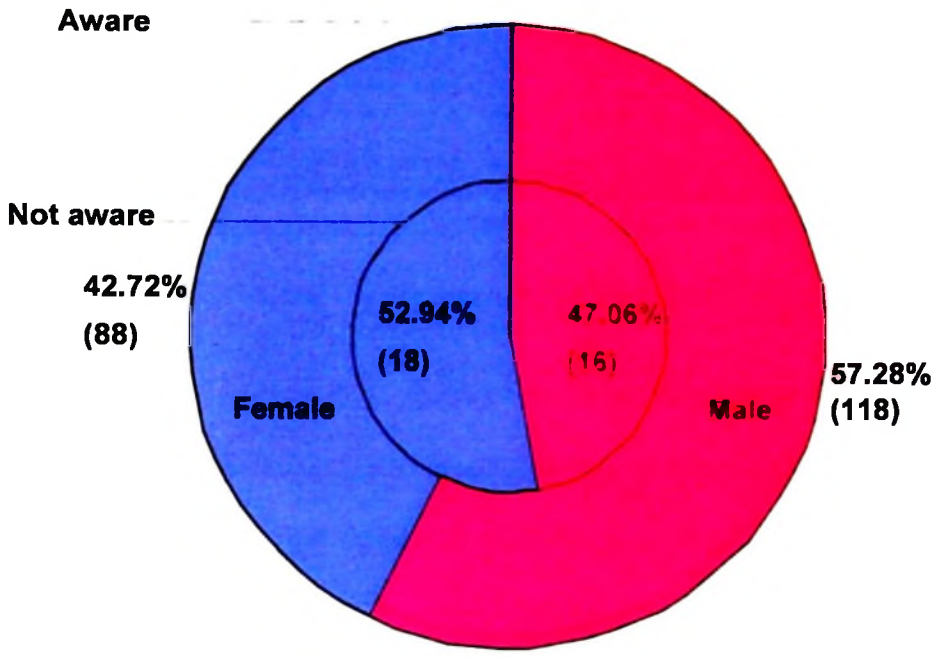
After a period of one year of establishment of the VIC, it was considered useful to find out some key issues regarding the presence and use of the VIC in the research villages, including the level of awareness of existence of the VICs within the research area, their acceptability, and factors influencing their access and use.

5.2.6.1 Awareness and frequency of use

A total of 240 men and women were interviewed in the four research villages. Out of these 106 (44.2%) were women. It was revealed that, on average, about 86 percent

(85.8%) of all respondents were aware of the VIC in their villages (Figure 15). Kongwa village had the highest level of awareness followed by Mclela, Kiroka and Dihinda. The higher level of awareness in Kongwa village could probably be because of the method used to inform people about the village meetings at the beginning of the research. In Kongwa, unlike in other villages, young people were sent out on their bicycles to all sub-villages (vitongoji) and announced the meetings just before they started. Although this method proved effective, due to situational differences it could not be employed in the other villages. Level of awareness in a village did not seem to be related to frequency of use of the VIC. For example despite the low level of awareness seen in Dihinda, the village had a higher number of registered users who were more consistent and enthusiastic in using the VIC as discussed in the previous sections.

Figure 15: Awareness of presence of VIC by gender of respondents



Source: Field Data

The majority of respondents, i.e. 110 out of 206 (53.4 %), reported to have known about the VIC through village meetings. This implies that the village meetings were one of the effective means of raising awareness of the presence of the VIC. This method was followed by word-of-mouth from village leaders and friends and neighbours that was reported by 28 respondents (13.6%) each. All other methods (a visit to the village office, the VIC coordinator and extension officer) were reported by 40 respondents (19.4%).

On average, 160 respondents (66.7%) had visited and used the VIC at least once by the end of the one-year period. Out of these the majority, i.e. 70 respondents (43.8 %), had

used the centre one to two times a month. A total of 26 respondents (16.3%) reported to have used the VIC frequently. Another 16.3 percent used it only once while the remaining 38 respondents (23.8%) reported to have visited the centre three or four times a month.

This finding may suggest that, with the same sensitization methods, it could take about one year to have at least 80 percent of the community aware of the VIC, and within the same period, at least 65 percent would have used the VIC at least once. Villages need different strategies for awareness creation according to the existing situation in a particular village.

5.2.6.2 Satisfaction and readiness to continue using the VICs

On the issue of satisfaction with the information available at the centre, 133 (94.8 %) of all who responded to the question (n = 156) wished to have some more printed information materials at the centre. All 25 respondents from Dihinda village wished the centre had more printed information materials. The majority (83.6) of people who responded to the question regarding opening times of the VICs (n = 159) were satisfied with the opening schedule.

Out of 26 respondents who were not satisfied with opening times, 17 (65.4 %) were from Kiroka village. As reported in sections 5.2.3.1 and 5.2.4.1, this village which also recorded the lowest frequency of visits as shown in Table 16, had a unique situation as

far as daily management of the centre is concerned. In this village, a volunteer adult class teacher was the overall supervisor of the centre because of her other adult education duties that took place at the VIC place. For this reason, some people could not use the centre because of lack of flexibility in the opening time, among other reasons.

It was also found out that all respondents, who had used the centre irrespective of where they came from or their frequency of use, wished the centre to remain available. They also indicated their wish to continue using it. The finding that all those who were not sure of whether they would like to continue using the centre or not happened to be among non-users of the centre, which in a way confirmed that this group did not know enough about the VIC. This could imply that those who had been exposed to the VIC had a positive opinion about it. Different suggestions given by 192 out of 240 respondents (80%) about the VIC included the following:

- The VIC be permanent 83 (43.2%)
- More awareness creation 27 (14.1%)
- Have a room dedicated to VIC activities only 25 (13.0%)
- Add more publications 20 (10.4%)
- Allow borrowing 17 (8.9%)
- Have more than one centre in the village 4 (2.1%)
- Have more than one copy of each title 2 (1.0%);
- All others, e.g. mobile video/cinema, electricity 14 (7.3%).

It was apparent from the interviews, just as what was captured during monitoring of the use of the VIC through logbook records and in the FGD, that the VIC model had had a positive impact on farmers in as far as cultivation of proactive acquisition of information as a tool for empowering farmers to overcome some of the challenges they face in their daily activities. The majority of farmers, including those with limited literacy skills, were eager to have the VIC as a permanent facility in their villages.

The hunger by farmers for information was apparent in this study, a finding which puts a challenge to information agents to come up with practical methods that will play an active role in the country's agricultural development endevours.

5.2.7 Regression analysis of some factors influencing observed behaviour

Considering the possibility that a number of socio-economic and environmental factors could influence the response of farmers to access and utilize the VICs, it was considered appropriate to conduct a regression analysis for a selected set of dependent variables against a set of independent variables as detailed in subsequent paragraphs.

To that effect, a General Linear Model (GLM) was used to measure how different socio-economic factors could have influenced the behaviours exhibited by different respondents during access to and utilization of the VIC.

Therefore, a regression analysis was performed to test the observed behaviourial patterns of the respondents on the different predictors (related to running the VIC) on how they were influenced by a number of socio-economic factors, including age, sex, education level, distance to the centre as a function of village location and reading ability of the respondents.

The GLM was specified as:-

$Y= \alpha + \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4 \beta_5X_5+ \varepsilon_i$

Where:-

Y= The dependent variable (Observed behaviour of respondents on using VIC)

α = Constant

β_1- β_5= Coefficients

X_1. X_2= The independent variables (Village, Gender, Age, Education level, Reading ability)

ε_i = Error term

The five predictors that are assumed to be a cause of the observed behaviour on use of the VICs placed at various village government offices and hence affecting access to and utilization of VIC were:

- Age of the respondent
- Gender
- Education level
- Village of the respondent and
- The reading ability of the respondent.

These were regressed against:

- Awareness of the availability of the VIC
- How one got to know the presence of the VIC
- Whether one had visited the VIC
- Reasons for not visiting
- Number of times one visited the VIC and used it
- Whether one got any new information at the centre
- Need for new information and
- Satisfaction of time the VIC was open.

The socio-economic factors (predictor variables) were defined as:-

Age category:- 1= Less than 18 years; 2= 18 to 27 years; 3= 28 to 37 years; 4= 38 to 47 years; 5= 48 to 57 years and 6= 58 years and above.

Sex of the respondent:- 1= Male; 2= Female

Village of the respondent:- 1= Dihinda; 2= Melela; 3= Kongwa; 4= Kiroka

Education level of the respondent:- 1= No formal education; 2= Ended at STD VI; 3= Completed primary education; 4= Completed Form II; 5= Completed secondary education; 6= Attended post-secondary education.

Reading ability of the respondent: - 1= very poor; 2= Average; 3= Good; 4= Very good

The products (Dependent variables) measured were defined as:-

Awareness of the presence of the VIC:- 1= YES; 2= NO

Means of knowing the presence of the VIC:- 1= Village government leaders; 2= Friends and neighbours; 3= Village meetings; 4= Village extension officer; 5= A visit to village office; 6= An advertisement on the VIC door; 7= VIC representative

Whether visited and/or used the centre:- 1= YES; 2= NO

Reasons for not visiting the VIC: - 1= No time to visit (pressed by other responsibilities); 2= VIC is too far from where one resides; 3= Little awareness of VIC's usefulness; 4= Poor reading skills

Number of times one visited VIC:- 1= Only once; 2= Once to twice per month; 3= Three to four times a month; 4= Frequently

Any new information found at the VIC:- 1= YES; 2= NO

Need for new reading materials:- 1= YES; 2= NO

Satisfaction with time of opening VIC:- 1= YES; 2= NO

According to Cohen and Cohen (1983:545) and Gujarati (1988:705), beta values (ß), which are the partial regression coefficients (as optimal estimates of the product (dependent) variable), reflect the weight to be applied to a predictor (independent) variable when one or more specified predictor variables are included in the equation. In addition, the standard error (SE) is an estimate of the magnitude of error that can be expected in estimating future values of the depended variable. The standard error of beta (SE ß) is the sampling variability of the partial coefficients. The t-value signifies the departure of the partial regression coefficients of the independent variables from zero, and they are compared to the unstandardized regression beta (b*) values for their

statistically significant contribution to the magnitude of the product variable and yield the levels at which the observed t-value is statistically significant.

5.2.7.1 Awareness of the presence of VIC

The relationships of the independent variables (socio-economic factors) to awareness of the presence of the VIC at the village government office were as shown in Table 25. There were differences between villages in awareness of the presence of the VIC at the village government offices. The negative coefficients on villages signified that Dihinda had the least awareness compared with other villages. Greater awareness was exhibited more in Kiroka village and the differences between villages in awareness were statistically significant at $P \leq 0.05$. Awareness was less among women than men and tended to decline with age (Figure 16). Again, awareness was greater among better educated ones and tended to increase with the respondents' reading ability as shown by the negative coefficients in education and reading ability of the respondents. However, these predictors were not statistically significant at $P \leq 0.05$.

Table 25 Awareness of presence of VIC at the village government office

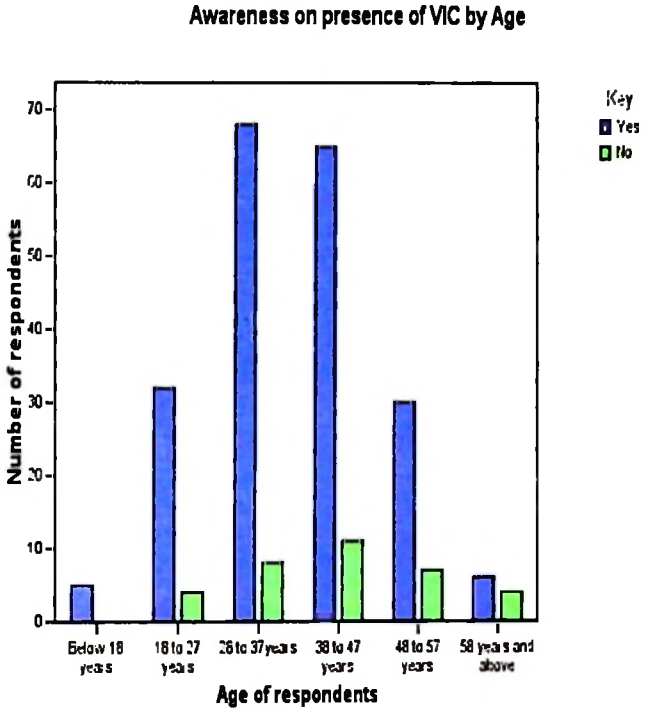
Y= Awareness of the presence of VIC					
SE= 0.34	R^2 = 0.65				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	1.285	.175		7.332	.000
Village	-.044	.020	-.140	-2.191	.029*
Gender	.038	.046	.054	.824	.411
Age	.027	.022	.087	1.250	.213
Education level	-.001	.036	-.002	-.023	.981
Reading ability	-.064	.035	-.178	-1.843	.067

Source: Field Data

F= 3.84 d.f $_{(5,234)}$; P≤ 0.05
* significant at P≤ 0.05
Y= Awareness of the presence of VIC:- 1= YES; 2= NO
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

Furthermore, Table 25 shows that the regression was significant (P≤ 0.05) with a coefficient of determination (R^2) of 0.65 for the predictor variables and a standard error of 0.34. From these results, the F-value of 3.84 obtained was greater than the tabulated F-values (at α 0.05). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 65% of the awareness of the presence of the VIC at the village government offices (Cohen and Cohen, op. cit).

Figure 16: Distribution of awareness of presence of VIC by age



Source: Field Data

In the light of the differences in levels of awareness between the villages cited above, it is imperative to figure out the factors responsible for such an outcome. It may be considered that the size and setting of the villages with respect to logistical attributes could be a contributory factor. Dihinda, whose respondents showed a significantly lower level of awareness, is in spatial terms a much bigger village with a number of subdivisions located at considerable distances within the village. On the contrary and to a large extent, Kiroka village which exhibited a relatively higher level of awareness has fewer subdivisions relatively closer together and most of them traversed by the same

fairly busy road. It would appear therefore that any future attempts to enhance awareness of VICs, which have proved to be effective models for delivery of information materials to farmers, would need to take into consideration and factor in accordingly the logistical and spatial disposition of target villages.

The observation that awareness levels were relatively higher among individuals with better literacy skills and also that they tended to rise with an increase in the level of literacy skills serves to signify that access to and use of printed information is positively related to levels of literacy skills. Considering revelations made during the pre-intervention study that literacy levels in rural areas were fairly high and on the increase, it is apparent that VICs have a significant contribution to make in delivering of information materials to farmers in rural areas.

Further, the observation that women were less aware than men seems to tally with an earlier observation that women visited the VIC less frequently than was men. This may be attributed to a number of socio-cultural settings, probably including ones that relegate women to caring for the family, thereby constraining the amount of time and flexibility they could possibly have for participating in awareness-raising forums for accessing and using the VICs.

It is hoped that future intervention initiatives will benefit from the experiences of this study, so that, among other things, women are made to feature more prominently in aspects of awareness, access to and use of information materials available at the VICs.

5.2.7.2 Means by which respondents came to know about the presence of the VICs

Another attempt was made to determine whether there was an influence of the dependent variables on the means by which respondents came to know about the presence of the VICs.

The relationship of the means by which respondents knew about the presence of VICs within their villages as they relate to age, education, gender and reading ability of the respondents is shown in Table 26.

The positive coefficients observed with village, gender, education level and reading ability of the respondents signifies that women, educated respondents and those with good reading ability relied more on village extension agents, visiting village offices, reading advertisements placed on the door and knew of the presence of the VIC through the VIC representatives. Those with poor reading ability, poorly educated and men relied more on either getting information from friends and neighbours, through village government leaders and occasionally through village meetings. The negative coefficient with age of the respondents could be attributed to the fact that young respondents were

better motivated, relatively more able to walk to village government offices and had more contact with the VIC representatives than older respondents.

Table 26 The relationship of means by which the presence of the VIC was known

Y= Means of knowing presence of VIC					
SE= 1.80	R^2 = 0.49				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	1.672	.955		1.750	.081
Village	.248	.109	.148	2.285	.023*
Gender	.006	.252	.001	.022	.982
Age	-.095	.119	-.056	-.804	.422
Education level	.049	.194	.024	.252	.801
Reading ability	.226	.191	.116	1.183	.238

Source: Field Data

F= 2.40 d.f $_{(5,234)}$ P≤ 0.05
* significant at P≤ 0.05
Y= Means of knowing presence of VIC:- 1= Village government leaders; 2= Friends and neighbours; 3= Village meetings; 4= Village extension officer; 5= A visit to village office; 6= An advertisement on the VIC door; 7= VIC representative
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

The relationship of means of knowing the presence of the VIC to the villages of the respondents had a positive regression coefficient, indicating that while Dihinda and Melela villages relied more on village government leaders and friends and neighbours and occasionally on village meetings, the other two villages, Kongwa and Kiroka, relied on visiting village offices, reading advertisements place on VIC doors and getting

information through VIC representatives. The differences between villages in means of getting information about the presence of the VIC were statistically different at $P \leq 0.05$. Again, Table 26 shows that the regression was significant ($P \leq 0.05$) with a weak coefficient of determination (R^2) of 0.49 for the predictor variables and a standard error of 0.48. However, from these results, the F-value of 2.14 obtained was less than the tabulated F-values. This implied that there was a weak relationship of the predictors and means of knowing about the presence of the VIC among respondents and the independent variables accounted only for 49% of the variations observed on means of knowing about the presence of the VIC (Cohen and Cohen, op. cit).

Once again, it would appear that differences in means by which respondents came to learn about the presence of VICs in their respective villages may have been influenced by differences in the socio-economic factors, as well as the physical attributes of the villages. It is apparent that the size and setting of the villages with respect to logistical attributes could be a contributory factor. Farmers who relied more on visiting the Village government offices belonged to villages that were better endowed with respect to logistical settings and proximity of the farmers to village offices. Furthermore, better educated and relatively younger respondents were more motivated to visit village offices and attend meetings than the less educated and/or older ones. These observations, just as was the case for the preceding section, seem to envision that any future attempts to enhance awareness of VICs, which have proved to be effective models for delivery of

information materials to farmers, must take into consideration and factor in accordingly the logistical, spatial, age and literacy disposition of target villages.

5.2.7.3 Visiting patterns of respondents to VIC on the basis of the independent variables

The relationships of the independent variables to the frequency with which they visited VICs are indicated in Table 27. Mostly women and older respondents had not visited the VICs as shown by the positive regression coefficients. The negative coefficients shown by villages, education level and reading ability of the respondents indicated that more respondents in Kongwa and Kiroka villages had visited the VICs than those from Dihinda and Melela. However, the frequency of visiting the VICs was related to the education level and reading ability of the respondents. That is, respondents in the category of better educated ones and with good reading ability showed greater interest in visiting the VICs.

Furthermore, Table 27 shows that the regression was significant ($P \leq 0.05$) with a coefficient of determination (R^2) of 0.64 for the predictor variables and a standard error of 0.34. From these results, the F-value of 11.39 obtained was greater than the tabulated F-values (at α 0.05). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 64% of the behaviours observed on visiting the VIC. The differences observed on visiting the VICs with respondents' villages, gender and reading ability were statistically significantly

different at P≤ 0.001; P≤ 0.05 and P≤ 0.05, respectively, indicating that village location, gender and reading ability of the respondents were the most influential factors in relation to the frequency of visits to VICs (Cohen and Cohen, op. cit.; Gujarati, op. cit).

Table 27 Relationship of respondents' attributes on visiting the VIC

Y= If they visited VIC?					
SE= 0.34	R^2 = 0.64				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	1.776	.221		8.033	.000
Village	-.096	.025	-.227	-3.813	.001***
Gender	.160	.058	.169	2.750	.006**
Age	.005	.027	.011	.167	.868
Education level	-.019	.045	-.037	-.430	.668
Reading ability	-.139	.044	-.283	-3.149	.002*

Source: Field Data

F= 11.39 d.f $_{(5,234)}$; P≤ 0.05
* significant at P≤ 0.05; **P ≤ 0.01; ***P≤ 0.001
Y= If respondents visited the VIC:- 1=YES; 2= NO.
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

The findings from the analysis of the variables above underscores the influence of the independent variables analysed on the access and utilisation of information materials deposited at VICs. Consequently, the same factors will need to be considered during designing and implementing future intervention undertakings. The consideration would be in order to optimize the benefit to socio-economic groupings that seem to have been disadvantaged by the current arrangement.

5.2.7.4 Some reasons why other respondents did not visit the VICs

The relationships of reasons cited by respective respondents for not visiting VICs to the respondents' attributes are shown in Table 28. Reasons like little awareness of the usefulness of VICs and poor reading abilities of respondents featured highly among the majority of women and old-aged respondents that failed to visit the VICs as shown by the positive regression coefficients.

Table 28 Reasons for not visiting the VIC

Y= Reasons for not visiting the VIC					
SE= 0.78	R^2 = 0.55				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	.994	.406		2.451	.015
Village	-.069	.046	-.094	-1.506	.133
Gender	.169	.107	.102	1.581	.115
Age	.014	.050	.019	.278	.781
Education level	-.126	.082	-.139	-1.525	.129
Reading ability	-.150	.081	-.175	-1.852	.065

Source: Field Data

F= 6.17 d.f $_{(5,234)}$; P≤ 0.05
Y= Reasons for not visiting the VIC:- 1= No time to visit (pressed by other responsibilities); 2= VIC is too far from were one resides; 3= Little awareness of VIC usefulness; 4= Poor reading skills
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

However, those who were relatively highly educated and had good reading abilities failed to visit VICs on the grounds that most of them had no time to visit it as they were pressed with a lot of duties to perform and that VICs were located too far from where

they resided. Similar observations on reasons for not visiting VICs were exhibited in Kongwa and Kiroka villages.

Again, Table 28 shows that the regression was significant ($P \leq 0.05$) with a coefficient of determination (R^2) of 0.55 for the predictor variables and a standard error of 0.78. From these results, the F-value of 6.17 obtained was greater than the tabulated F-values (at α 0.05) (Cohen and Cohen, 1983 op. cit). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 55% of the behaviours observed on reasons for not visiting the VICs relative to the respondents' attributes. But reasons for not visiting the VICs on respondents' attributes were not statistically different (Cohen and Cohen, op. cit.; Gujarati, op. cit).

Generally, as presented in the preceding sections, it was among the younger respondents that the frequency, awareness and motivation to access and utilise the VICs was highest. The observation from this section that respondents in this age category cited logistical and locational attributes as one of the limiting factors, though smaller in number, does nevertheless underscore the influence that size, logistical and spatial attributes of respective villages have on optimizing access to and utilization of VICs.

Considering that the second reason given is related to preoccupation with a lot of other activities by this relatively dynamic age group may serve to underline the importance

that excellence, relevance and innovativeness in information repackaging may have in commanding the attention of targeted readers.

5.2.7.5 Number of times that respondents visited VICs

The relationship of respondents' attributes to the number of times they visited the VICs is summarized in Table 29. Women and old-aged respondents made the lowest number of visits to the VICs as shown by the negative regression coefficients. However, villages that had greater awareness of presence of VICs like Kongwa and Kiroka also had a higher number of visits. Increased number of visits to VICs was greatly associated with the reading ability and education level of the respondents as indicated by the positive regression coefficients. The differences among respondents on number of visits to the VICs were statistically different in relation to village locations, gender and reading ability of the individuals.

Similarly, Table 29 shows that the regression was significant ($P \leq 0.001$) with a coefficient of determination (R^2) of 0.60 for the predictor variables and a standard error of 1.16. From these results, the F-value of 20.55 obtained was greater than the tabulated F-values (at α 0.001). This implies that with at least 99% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 60% of the behaviours observed on number of visits to the VIC relative to the respondents' attributes (Cohen and Cohen, op. cit).

Table 29 Number of times one visited the VIC

Y= Number of times one visited the VIC					
SE= 1.16	R^2 = 0.60				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	-.138	.597		-.231	.818
Village	.221	.068	.180	3.255	.001***
Gender	-.449	.157	-.163	-2.852	.01**
Age	-.038	.074	-.031	-.513	.608
Education level	.117	.121	.078	.964	.336
Reading ability	.575	.119	.404	4.826	.001***

Source: Field Data

F= 20.55 $d.f_{(5,234)}$, $P \leq 0.001$
** significant at $P \leq 0.01$; ***$P \leq 0.001$
Y= Number of times one visited VIC (Continuous)
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

Just as was the case for the dependent variable on the degree of awareness across the list of independent variables, differences in the number of times that respondents visited VICs were related to their age, literacy skills and size of the village. The fact that respondents from villages that had exhibited the highest level of awareness also exhibited the greatest frequency of visits serves to underscore the importance of creating awareness about what VICs were for and what were their roles in enhancing farmers' access to and utilisation of printed information.

Similarly, the observation that frequency of visits was also higher among individuals with better literacy skills and also that it tended to rise with an increase in the level of

literacy skills may serve to indicate that, among the literate respondents, the availability of VICs may serve as a stimulant for access to and utilization of information, including agricultural information.

As expressed earlier, it is hoped that future intervention initiatives will exploit this apparent effective role that VICs seem to have in stimulating the practice of proactive information seeking among farmers.

5.2.7.6 Getting new information at the VIC

It was realised that VICs' attractiveness to readers would also depend on whether readers on the occasion of their first or second visit would appreciate that the Centres would have new value-adding materials to rouse their interest.

In this respect, an analysis was made to visualize the relationship between respondents' attributes and their opinions on whether the VICs had new information materials to offer. Table 30 summarizes the results of the analysis. It became apparent that women were among the majority of respondents that felt that they could not find any new information at the VIC. This observation could probably be due to prejudices or attitudes that the VIC could have nothing new to offer, although this notion was proved wrong by a few women who visited the centre, as discussed under sections 5.2.4- 5.2.5.

Table 30: Relationship on getting new information at the VIC

Y= Getting any new information					
SE= 0.43	R^2 = 0.56				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	1.928	.223		8.645	.000
Village	-.088	.025	-.206	-3.460	.001***
Gender	.142	.059	.148	2.410	.017*
Age	-.013	.028	-.031	-.485	.628
Education level	-.036	.045	-.070	-.801	.424
Reading ability	-.146	.045	-.296	-3.290	.001***

Source: Field Data

F= 11.42 d.f $_{(5,234)}$; P≤ 0.05
* significant at P≤ 0.05; ***P≤ 0.001
Y= If found any new innovation/information:- 1= YES; 2= NO
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

Although it is not yet precisely clear what would be the differences between what appears new to men and what would appear new to women, this observation could possibly serve to again underscore the importance of a thorough needs assessment and to also ensure that such a needs assessment study cuts equitably across the whole targeted readership. Further, it underscores the importance of flexibility among information agents to the effect of being open minded and responsive to address emerging gaps in the initiative.

One could also probably argue that the perceived lack of new information resources at VICs may have contributed to the diminishing numbers of women participating in VICs when compared with that of men, as shown by the positive regression coefficient. However, it should be recalled that the fact that in total only a few women had visited the VIC by the end of one year may have contributed to the finding above.

Furthermore, Table 30 shows that the regression was significant ($P \leq 0.05$) with a coefficient of determination (R^2) of 0.56 for the predictor variables and a standard error of 0.43. From these results, the F-value of 11.42 obtained was greater than the tabulated F-values (at α 0.05). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 56% of the behaviours observed on obtaining new information from the centres relative to the respondents' attributes (ibid).

5.2.7.7 Need for new printed materials at the VIC

The need for new printed materials would signify the usefulness of the VIC to various groups of users and perhaps more importantly may imply farmers' proactiveness in searching for and using the information materials.

The relationships between respondents' attributes and their needs for new printed materials are indicated in Table 31. Women had a higher need for new printed materials than men as shown by the negative regression coefficient. The need for new printed

materials was also higher among respondents with low education, old-aged respondents and those with poor reading ability. This signifies that the materials placed at the centres required reading ability and formal education and that more simplified materials were required to serve the different needs of reading ability, age groups and education levels.

Table 31: Need for new printed materials at the VIC

Y= Need for new printed materials at VIC					
SE= 0.48	R^2 = 0.48				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	.161	.256		.630	.529
Village	.117	.029	.247	4.034	.001***
Gender	-.152	.068	-.142	-2.244	.026*
Age	.012	.032	.024	.367	.714
Education level	.008	.052	.015	.163	.871
Reading ability	.134	.051	.242	2.617	.009**

Source: Field Data

F= 8.42 d.f $_{(5,234)}$; P≤ 0.05
* significant at P≤ 0.05; **P≤ 0.01; ***P≤ 0.001
Y= Need for new printed materials at VIC:- 1= YES; 2= NO
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

The differences among respondents on the need for new printed materials were statistically different relative to village location, gender and reading abilities. Furthermore, Table 31 shows that the regression was significant (P≤ 0.05) with low coefficient of determination (R^2) of 0.48 for the predictor variables and a standard error of 0.48. From these results, the F-value of 8.42 obtained was greater than the tabulated

F-values (at α 0.05). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 48% of the behaviours observed on need for new printed materials at the centres relative to the respondents' attributes (ibid).

The finding that the need for new printed information materials was higher in women, the elderly, and those with low reading skills, though somewhat surprising, could be an indication that these categories were less satisfied with the printed materials in the collection, probably because they all needed more simplified materials . Future initiatives may need to make a deliberate effort to capture the attention of these groups too.

5.2.7.8 Satisfaction with time VIC was open

The relationships of respondents' attributes to satisfaction with the opening time of the VICs are shown in Table 32. Women and old-aged respondents were more satisfied with the time the centres were open as indicated by the negative regression coefficients. However, respondents from villages that had greater awareness, with a high number of visits to the centres like Kongwa and Kiroka, were not satisfied with the time the centres were open. Those with higher education levels and good reading ability were also not satisfied with the time the centres were open. The relationship of village location, gender and reading ability of the respondents to satisfaction with time the centres were open were significantly different at $P \leq 0.001$; $P \leq 0.01$ and $P \leq 0.01$, respectively.

Table 32 Satisfaction with time VICs were open

Y= Satisfaction on time VIC was open for users					
SE= 0.54	R^2 = 0.51				
X_i	ß	SE ß	Unstandardized (b*)	t-value	Sign. level
Constant	.172	.280		.612	.541
Village	.174	.032	.310	5.450	.001***
Gender	-.232	.074	-.184	-3.135	.01**
Age	-.037	.035	-.065	-1.049	.295
Education level	.045	.057	.065	.783	.434
Reading ability	.177	.056	.271	3.155	.01**

Source: Field Data

F= 17.21 $d.f_{(5,234)}$, P≤ 0.05
**significant atP ≤ 0.01; ***P≤ 0.001
Y= Satisfaction with time the VIC was open for users:- 1= YES; 2= NO
X_i= Independent variables (Predictors)
R^2 =Coefficient of determination

In addition, Table 32 shows that the regression was significant (P≤ 0.05) with a coefficient of determination (R^2) of 0.51 for the predictor variables and a standard error of 0.54. From these results, the F-value of 17.21 obtained was greater than the tabulated F-values (at α 0.05). This implies that with at least 95% confidence interval it was certain that the predictors incorporated in the GLM accounted for at least 51% of the behaviours observed on satisfaction with time the centres were open relative to the respondents' attributes (ibid).

The finding that relatively better educated respondents with better reading skills and villages that exhibited the highest level of awareness and higher frequency of visits to the VICs were least satisfied with the opening times may be an indication that the VICs

proved very useful to the respondents in these categories, such that they would appreciate flexibility in opening times to enable them to fit visits to the VIC into their routine activities during the times that they wished to use the VIC.

The fact that women once again had a different preference calls for deliberate efforts on how to target women so that they may overcome obstacles in accessing and using information available at the VIC.

CHAPTER SIX

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of the findings

This section presents an integration of the findings from the three stages of the study. It addresses the research objectives by giving brief answers to the research questions.

6.1.1 Objective number one: assessing agricultural information needs

The first objective was to assess the current agricultural information needs of farmers in the study area. With this objective the following research question was asked:

- What were the current agricultural information needs of the farmers in the study area?

As explained in chapter four, the information needs were determined using a combination of methods in an effort to bring to the surface as many information needs as possible. All needs that were reported, noted down or discussed have been extracted from different sections of this chapter. The information needs could be grouped into eight. The major group covers information geared towards improving traditional and non-traditional farming activities (for both crops and livestock) for better yields and increased income. Other groups were about information related to environmental management and weather forecasts; information related to human health and nutrition;

information on farmer groups, marketing and credit; information related to appropriate technologies; information on politics and for leisure or entertainment. The summary of information needs under each group is as follows:

1) Traditional and non-traditional farming activities

- Management of crop pests and diseases
- Control of rodent infestation
- Poultry management, specifically local chickens, and information on bird flu
- The use of chemical fertilisers
- Animal husbandry (dairy and beef cattle, dairy goat, sheep and rabbits)
- Control of rabies
- Improved quality of seeds
- Growing maize, paddy, beans, cassava, coconut and cotton,
- Growing horticultural crops (fruit, vegetables, mushrooms and spices, specifically vanilla and simsim)
- Weed control
- Traditional farming skills

2) Environmental management and weather forecasts

- Growing and harvesting forest trees

- Irrigation agriculture
- Bee-keeping techniques
- Water-harvesting techniques
- Soil conservation techniques and environmental protection methods
- Weather forecasting

3) Human health and nutrition

- Preparation of different local foods available in Morogoro region
- HIV/AIDS (prevention of, nutrition for HIV/AIDS conditions, care of the sick)
- Control of rabies
- Food processing and preservation (tomatoes, meat, cassava)
- Soybean food preparation

4) Farmer groups, marketing and credit information

- Requirements for and getting assistance in forming the groups
- Becoming members of MVIWATA
- Alternative produce to cultivate that fetch higher prices
- Where to sell for optimum prices
- Price negotiations
- Sources of funding for farmers

- Overcoming infrastructural problems

5) Appropriate technologies

- Simple hatchery technology
- Biogas technology

6) Information on politics and for leisure

- Newspapers
- Story books

From these findings, it is apparent that farmers have diverse and unmet information needs, not necessarily in relation to agricultural activities taking place in a particular area, but also attributed to individual preferences as may be stimulated probably by exposure to a variety of awareness-creating situations. Such situations could include exposure following a research project or a development programme such as PADEP which was being implemented in Kongwa village at the time of this study. It was also observed that information needs differ between gender. This was apparent with regard to information related to human nutrition and health where women made up the majority of users who accessed and requested such information. Likewise, a difference was observed with regard to dominant agricultural activities. For example, publications on tick-borne diseases were more popular with farmers whose main occupation was livestock keeping than other farmers. This finding is probably not surprising because

such information is specific and could not have made much sense to farmers who have nothing to do with livestock.

6.1.2 Objective number two: availability of printed information

The second objective was to identify and collect printed sources of information on agriculture that were available and could be used by farmers in the study area. Two questions were asked:

i) Were there printed sources on agricultural information for use by smallholder farmers?

ii) Which ones were available and could be used by smallholder farmers?

It was found out that printed materials that could be used by farmers were abundantly available in many agricultural-related institutions. While some of these materials had not been disseminated beyond the institutions of their origins, the majority had limited circulation to other institutions. Furthermore, the majority of farmers were not aware of the existence of most of the printed materials that could be of interest to them. In this study, an assortment of printed materials was collected, assessed for their suitability and categorised. About 229 titles of printed materials were collected, of which a total of 102 titles (44.5%) were displayed at different times in the VIC for access and use by farmers.

It should be noted that not all the materials collected were selected for inclusion in the VIC because others did not meet the criteria for inclusion, which included having a

minimum number of copies per title and the publication being in Kiswahili. The content of the materials in terms of the main subject matter was the major factor that determined preference of farmers in accessing and using a certain piece of information more frequently than others. Other factors included the layout and presentation in terms of readability of the text and presence of illustrations in between the text.

All materials were in the form of booklets, pamphlets, leaflets and magazines/newsletters, and all were in Kiswahili. All of the materials were secondary publications in that they were repackaged from the original publications emanating from research findings or ideas. Repackaging was necessary so that farmers with low literacy skills could be encouraged to access and use them with minimal assistance. A sample of such materials is shown in Photo 11.

The finding that most of the printed materials that were available in various institutions and were relevant for farmers' direct use were not known to farmers calls for a policy development about dissemination strategies aimed at making them more accessible to farmers.

6.1.3 Objective number three: capacity to access printed information

The third objective was to assess farmers' capabilities, attitudes and limitations in accessing and using printed information. The following questions were asked:

i) What were the farmers' capabilities and attitudes in relation to accessing and using printed information?

ii) What were the farmers' limitations, if any, in proactive access to and use of printed information?

The study found out that about 73 percent of farmers had attended formal school and at least 56 percent had completed primary education. This finding implies that the majority of farmers had satisfactory levels of functional literacy, and therefore were capable of making effective use of printed information. Their individual reading abilities were further proved by a number of things including owning printed materials, reading newspapers, discussions and comments made by users of the VIC and the significance of reading ability as a factor influencing visits to the VIC.

It was found out that education level was a significant factor affecting awareness and use of the VIC and that interest in visiting and using the VIC tended to rise with increasing level of education and reading ability.

Regardless of education and literacy levels, farmers were receptive and eager to access and use printed materials, which they thought were useful sources of information on agricultural innovations as well as other information. Some farmers were even ready to pay a certain amount of money to purchase relevant books according to their individual interests. Those who could not read liked to visit the centre too, arguing that they could still get information from fellow literate farmers. However, farmers had a high opinion of and depended more on agricultural extension officers who, when available, could give

further explanations and guidance regarding agricultural activities. The finding that the majority of farmers, irrespective of education level, age and gender, expressed great preference for consulting extension agents as their main source of agricultural information appears to imply that most farmers may have developed dependence on extension staff. This dependence could be a result of lack of encouragement to use complementary sources of information such as printed materials. In addition, farmers liked to interact and discuss with researchers who occasionally made visits to villages.

It was observed that awareness of the existence of the VIC increased with time, so that after a period of one year awareness was as high as 85 percent of all farmers in the research villages, while about 65 percent had visited the VIC at least once. Only a few farmers had no interest in or did not manage to make time to access printed information materials, thus did not read them at all despite their being literate. On this finding prejudicial attitude probably due to doubts as to whether the VIC had useful information to offer, could be the reason behind farmers' lack of interest in visiting the VIC.

Farmers pointed out a number of constraints in accessing and using printed materials, which, if addressed well could improve farmers' proactive information acquisition. These include limited relevant and appropriate reading materials in terms of content and presentation, low functional reading skills, lack of time, limited access points, long distances to the centre, little awareness of availability of the materials, cultural barriers particularly against women, and sight problems. Despite these limitations, all farmers

who had visited the VIC, irrespective of their education levels and literacy skills, wished to have the centres as permanent facilities in their villages.

6.1.4 Objective number four: enhancing access to agricultural information

The fourth objective was to explore viable mechanisms for enhancing farmers' access to and use of recorded agricultural information. The question for this objective was:

- How best could farmers access and use recorded agricultural information in rural settings?

From the findings of the study, the VIC model established with a participatory approach was a centre where printed information was collected, organised and accessed by interested users. Farmers were eager to get information not only on agriculture but on other development issues as well as for entertainment purposes. They demonstrated the ability to use their reading skills functionally and independently. Individual reading was preferred by the majority rather than reading in a group, although users held discussions among themselves as they came across new or interesting subjects. There was informal and free interaction between farmers, extension workers and information workers. The free interaction was a useful indicator and a starting point for possible future collaborations between the three parties.

Among suggestions put forward by farmers as a way to improve effectiveness of the printed information resources was to have assistance from development agents such as

agricultural extension officers when using printed materials so that they provide elaboration where required.

Due to the inevitable influences of technology which have not spared rural areas, it was found useful to get a general picture of the basic facts in the rural areas in order to know what were the possibilities of ICT-based resources in rural areas. Therefore the current levels of awareness, knowledge and farmers' attitude to ICT were also explored. It was found out that the majority of farmers were aware of cellular phones in particular. They were eager to acquire personal mobile phones, for example, and were ready to learn new technologies, including the use of computers. Some farmers showed interest in acquiring basic knowledge about computers. Although farmers were eager to have computer-based facilities, they realised the infrastructural constraints that they faced, especially in the rural areas.

From the above observations, it is apparent that the VIC model could be a realistic and practical approach for stimulating the practice of proactive information search and acquisition. The VIC could also serve as a centre where at an appropriate time ICT tools could also be included as additional services offered at the VIC.

6.1.5 Objective number five: promoting proactive information acquisition

The fifth objective was to recommend an approach for promoting the practice of proactive information acquisition by farmers.

The question for this objective was:

- What could possibly be done in order to cultivate the practice of proactive information acquisition by farmers?

Considering the design and approach for this study, the farmers themselves in collaboration with the researcher gradually developed some methods for proactive information acquisition and put forward some recommendations for improving them.

6.2 Conclusions

This study was designed to explore and test a candidate intervention approach that could stimulate, cultivate and promote the practice of proactive information acquisition, as one strategy towards enhancing access to and use of agricultural information for empowerment and poverty reduction among smallholder farmers. Below are conclusions from the study:

- **Farmers' information needs**

Smallholder farmers have diverse and real information needs that have not been met. The needs are not necessarily related to agricultural activities taking place at that particular time. In some cases, exposure to information brought out the information needs that were not expressed in the first place. This also implies that in some situations exposure to information is needed in order to stimulate a demand for information.

Information content, presentation style and language used were among determinants influencing the demand for particular information.

- **Availability and usefulness of printed sources of information**

Recorded information in the form of printed media is available in various institutions. However, in order for farmers to get access to this information and utilise it, deliberate initiatives need to be undertaken by all parties concerned. Unlike other information channels such as radio broadcasts, video, TV and also oral channels, printed information is not only readily available but can also be used by users at their own pace. Farmers seem to have been motivated to access printed information available at the place of their choice. Assimilation of information in printed media is regulated by individual users at their own pace and according to their abilities. In other words, users had a chance to set their own pace and speed of assimilation without necessarily having to fit into a specific timeframe and space as would have been the case for broadcast media for example. Furthermore, users could set their own priorities in regard to information search rather than being compelled to use predetermined and prescription-oriented information packages.

Some of the popular newspapers were among sources of attraction for farmers to visit the VIC. It is therefore apparent that newspapers could be useful vehicles through which agricultural information could be made available to farmers.

- **Farmers' capabilities to access and use printed sources of information**

There are adequate levels of literacy among smallholders to effectively access and make use of printed information. The findings also demonstrated the presence of reading skills that are otherwise underutilized, not only by the farmers themselves but also by information professionals. This is a niche for information professionals whose approaches promote the practice of proactive information acquisition for sustainable knowledge building. In view of this finding, information professionals and information workers have a challenge and an opportunity to assume a role which is complementary and parallel to extension workers.

Documentary information professionals have a greater role to play in encouraging farmers to proactively seek information. With this approach, "**farmers learn how to fish rather than being given fish**". It is therefore hoped that in the process farmers acquire useful information search skills for sustainable knowledge building. The sustainability in knowledge building in this respect is a function of the "pulled information" as opposed to the "pushed information" phenomenon. In the "pulled information" phenomenon as described by de Smet (2006)[7], target agents are exposed to a wide diversity of information resources from where they only pick and internalize what adds value to their needs.

- **Enhancing Farmers' access to information**

[7] A phenomenon explained by Prof. E. de Smet during an open discussion after the researcher's presentation to postgraduate students in Library and Information Science at the University of Antwerp, Belgium 22/04.2006.

The preintervention study revealed that there is fertile ground in smallholder farming to deploy the Village Information Centre (VIC) as a potential tool for enhancing the cultivation of proactive seeking and utilisation of printed agricultural information. Further, it has been demonstrated that the higher the literacy rates, the higher the motivation to access and use printed information. In addition, the expectation that relevant information may be available at the VIC facilities is a further motivation to proactively seek, access and utilize printed information. It was interesting though to note that some enthusiastic users of the VIC had relatively low education and literacy levels, and some had not even had any formal education. Although this category formed the minority of users, it should be taken into consideration when designing future VICs so that this group is also targeted as they constitute close to a quarter of the population.

The assertion that VICs have proved to be potent tools in promoting proactive access and use of printed information is underscored by the emergence of increased demand for printed information. The increase in frequency of visits to VIC was further catalysed by the introduction of new information materials at the VICs.

The VICs have also shown to be effective tools for studying how the practice of proactive information seeking can develop and evolve among smallholder farming communities. However, in the process of this study it became apparent that the VICs have themselves turned out to be a means of inculcating the practice of the information seeking and stimulating the habit of reading in the community. In other words, the effect had actually become the cause. Therefore there was a dual effect with the VIC model.

While they were used effectively as tools for promoting the practice of proactive information seeking, they could also be effective in promoting dissemination of information as well as promoting access to printed materials.

- **Promoting the practice of proactive information acquisition**

The standard ways of availing information to farmers have been through extension agents that has gradually rendered farmers dependent on them. The deployment of VICs as tools for enhancing access to and use of printed agricultural information is certainly a new initiative directed at empowering farmers through access to and use of information. It is also a significant paradigm shift in building conventional information base approaches, especially to smallholder farmers.

Being a significant evolutionary change in approach, the VIC model does therefore bring into perspective a role that is in essence the domain of 'documentary information workers'. These will have the challenge to work using a complementary and parallel strategy for enhancing proactive information access to and use of through print media by farmers. The VICs appear to be relevant, appropriate and effective tools for promoting the practice of proactive information acquisition, and therefore the acquisition of knowledge for the purpose of empowering farmers.

6.3 Recommendations

From the above conclusions, the study recommends the following:

6.3.1 Policy issues

- **Assessment of farmers' information needs**

  Recognising that farmers have unmet information needs and that these needs are not constant, also that some needs can only be apparent following exposure to information, it is recommended that relevant organs, such as the MAFSC, agricultural institutions and extension organisations include regular information needs assessments in their regular activities. Furthermore, a combination of approaches yields more results when assessing farmers' information needs than a single method.

- **Improve usefulness and availability of printed sources of information**

Appropriate printed information materials, though available elsewhere, are apparently a scarce resource for farmers who need them most. It is therefore recommended that generators of agricultural information, particularly the research institutions, perceive and accept the obligation to have in-built mechanisms for repackaging their research findings and consequent relevant innovations for direct consumption by farmers. It is also recommended that newspaper publishers be motivated to include regular articles on agricultural information as well as information that could contribute to improving the livelihoods of smallholder farmers in general.

- **Improve farmers' capabilities to benefit from printed information**

The observed acceptability, practicability and farmers' enthusiasm to share information at the VIC for knowledge building, poses a challenge to the information specialists and extension workers as well as the education sector to utilise this model to further improve the literacy levels of target communities.

- **Enhance farmers' access to information through VIC**

Having found out that VICs have proved to be relevant, appropriate and effective tools for enhancing access to and use of recorded agricultural information, it is recommended that VICs be mainstreamed into the village government body so that they can truly be owned by the respective communities. The presence of the VIC as one of the facilities in the village could be a further motivation for propagating the practice of information acquisition by farmers. It should also be noted that regular usage of the VIC could assist in assessing from time to time farmers' information needs that are created by exposure to information. With improvements in infrastructure, recorded information in diverse media and formats - including ICT-based ones - could be included to further enhance the value of VICs.

- **Promote proactive acquisition of information through integration of roles**

It is recognised also that mainstreaming the VICs into formal and regular strategies for enhancing access to and use of recorded agricultural information by smallholder farmers calls upon the integration of roles between information workers and extension workers. Therefore, it is recommended that documentary information professionals prepare a

strategy of linkage with extension workers so as to be able to effectively contribute to promoting proactive acquisition of information by farmers for empowerment, reduction of poverty and improved livelihoods.

Implementation strategies

Recognising that recommendations have to be followed by implementation strategies, it is recommended that documentary information professionals carry out preliminary sensitization and awareness-raising activities, as well as developing and operationalizing guidelines for the following measures:-

i. Mainstreaming of VICs into formal and regular strategies for enhancing access to and use of printed agricultural information.
ii. Integration of roles between information workers and extension workers to serve the purpose demonstrated by this study.
iii. The Sokoine National Agricultural Library (SNAL) should spearhead the designing and establishment of a sustainable information outreach programme for farmers.

6.3.2 Recommendation in relation to methodological approach

As opposed to the conventional survey method, PAR goes a step further by designing and testing an intervention for the stakeholders. By linking the survey results to actions, the farmers or any other research participants feel they were taken seriously, thus the "let us wait and see" phenomenon is avoided. For this reason the PAR methodologies are

recommended in Library and Information research when there is an intention of making a practical difference to the stakeholders.

Likewise, there is room for the application of experimental designs with a control sample as applied in natural sciences to determine whether there has been any improvement in the information base of the participants or research subjects that may have been influenced by the intervention.

6.3.3 Suggestions for further research

Up-scaling and out-scaling of the VIC model

The VIC has proved to be a relevant and effective tool for inculcating the practice of proactive information seeking, the effect being an increase in farmer empowerment for improvement of livelihoods. The emerging challenge therefore is setting the stage for moving and establishing the VIC model outside the pilot research area through out-scaling and up-scaling in order to share the model and test its adaptability in slightly different circumstances.

Integration of roles

The integration of roles between extension workers and information workers is also a matter that emerges to command attention as a viable way forward in the quest for an enhanced strategy for the promotion of the practice of the proactive information seeking and utilisation. Therefore, an additional study may be needed to forge viable

arrangements to the effect of integrating the roles of information and extension workers for the purpose stated above.

The role of ICTs in improving farmers' livelihoods

Given the fact that the urge to adopt some ICTs is growing rapidly in rural areas just like in urban areas, and given the present state of the infrastructure, awareness and abilities, there is a need to conduct an in-depth research on how best the technology could be adopted in the current economic and infrastructural situations.

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APPENDICES

Appendix 1:

A QUESTIONNAIRE FOR THE BASELINE INFORMATION REGARDING FARMERS' ACCESS TO AND USE OF AGRICULTURAL INFORMATION IN MOROGORO REGION

INTRODUCTION

This questionnaire is for an on-going PhD study whose purpose is to explore and test an intervention approach that could encourage farmers to actively acquire information, become empowered, reduce poverty and improve livelihoods using existing information resources on agriculture. The findings of the study are expected to provide the basis for the government and other rural development agencies to use complementary approaches in the process of access to and use of information by farmers. Being a farmer in this village you have been selected to participate in the study whose successful completion depends very much on your full participation. I therefore kindly request your participation, feel free to give your opinion, and respond honestly to the questions so that together we successfully accomplish this work. The information you provide will be confidential and used strictly for the purpose of the study or academic reasons and not otherwise. Thank you very much for your cooperation.

Signature----------

SECTION I GENERAL INFORMATION

1. Date of the interview _____ 2. Name of the District _____
3. Name of the Division _____ 4. Name of the Ward _____
5. Name of the Village _____ 6. Name of the farmer (optional) _____
7. Name of research assistant _____

SECTION II PERSONAL INFORMATION

8. Gender (Please tick the applicable)
   (i) Male (----------)
   (ii) Female (----------)

9. Which is your age group? (Tick the applicable)
   (i) Below 18 years (----------)
   (ii) 18-27 years old (----------)
   (iii) 28-37 years old (----------)
   (iv) 38-47 years old (----------)
   (v) 48-57 years old (----------)

(vi) 58 years old and above (----------)

10. Are you a member of any social club (development groups) in your village/community?
(i) Yes (----------)
(ii) No (----------)

11. If yes, what is its main purpose? Please explain briefly.

_____

_____

12. Did you attain any formal education? (Non-religious)
(i) Yes (----------)
(ii) No (----------)

13. Are you able to read?
(i) Yes (----------)
(ii) No (----------)

If No, continue with all the rest **except section IV.**

SECTION III AGRICULTURAL AND OTHER LIVELIHOOD ACTIVITIES

14. What do you do for your livelihood? (Please tick the applicable)
(i) Agricultural activities only (----------)
(ii) Agricultural and other activities (----------)
(iii) Mention other activities apart from agriculture

_____

_____

15. What are your major agricultural activities?
(i) Crop farming activities only (----------)
(ii) Livestock keeping activities only (----------)
(iii) Crops and livestock keeping (----------)

16. Which is your main agricultural activity between crop farming and livestock keeping?
(i) Crop farming (----------)
(ii) Livestock keeping (----------)
(iii) Crops and livestock keeping on equal basis (----------)

17. Which crops do you cultivate?

_____

18. Which livestock do you keep?

_____

19. Are you cultivating any new crop or keep animal(s) that were not traditionally kept in your village?
    Yes (----------)
    No (----------)
20. If yes, please mention them.
    Crops: Animals:

    _____ _____
    _____ _____

SECTION IV LEVEL OF EDUCATION AND FUNCTIONAL LITERACY

21. What is your highest level of education?
    (i) No formal education (----------)
    (ii) Semi-formal (adult education, self-teaching, Memkwa, etc.)(----------)
    (iii) Class I- VI (----------)
    (iv) Completed Primary education (----------)
    (v) Secondary education ("O" or "A" level) (----------)
    (vi) Post secondary education (college and above) (----------)

22. Do you read anything at all for any reason?
    (i) Yes, often (----------)
    (ii) Yes, but occasionally (----------)
    (iii) No (----------)

If No, please go to question 28.

23. What do you normally like to read? Mention briefly.

    _____
    _____

24. When do you remember to have last read anything? (May be a rough estimate)

    _____

25. Mention what you remember to have read during that period (e.g. a letter, newspapers, agricultural information, health information, story books, religious publications, etc.)

    _____

26. Which reading materials do you have at home? (Please tick what is applicable)
    (i) Newspapers (----------) Mention titles_____

    _____
    _____

    (ii) Health information/awareness publications (----------)
    (iii) Agricultural publications (----------)

(iv) Government or political publications (----------)
(v) Religious materials (----------)
(vi) Story books (----------)
(vii) Any other, please specify _____
(viii) Have no any reading materials at home (----------)

27. How do you get the reading materials? For every possible answer indicated below, put a circle to numbers 1, 2, or 3 to indicate how you get them, where 1 stands for **Frequently**, 2 **Sometimes**, and 3 **Never**

(i)	Buying	1	2	3
(ii)	Borrowing or gifts from friends and relatives	1	2	3
(iii)	Development agents (agriculture, health etc)	1	2	3
(iv)	Researchers visits	1	2	3
(v)	Rural information centres/library	1	2	3
(vi)	Nearby schools	1	2	3
(vii)	Religious gatherings/agents	1	2	3
(vii)	Any other means, please specify_____	1	2	3
	_____	1	2	3

28. If you do not read, please state reasons hindering you from reading. For every possible reason stated below, put a circle to numbers 1 if the reason is **Completely true**, 2 if it is **Sometimes true**, and 3 if it is **Completely not true**

(i)	I do not have any reading materials	1	2	3
(ii)	I do not find time for reading	1	2	3
(iii)	I have no interest in reading	1	2	3
(iv)	Reading is not useful	1	2	3
(v)	I have sight problems	1	2	3
(vi)	I cannot read meaningfully	1	2	3
(vi)	Any other reason (please specify) _____	1	2	3

SECTION V INFORMATION NEEDS, SEARCH, ACCESS AND USE

29. Are there any problems that you face in your agricultural activities that you wish you had information and knowledge as to how they could be solved? e.g. frequent deaths of local chicken, poor harvests, wastage of crops during peak seasons, lack of markets for surplus harvests etc.
(i) Yes (----------)
(ii) No (----------)

30. If yes, which problems do you remember to have disturbed you most during three to five preceding farming seasons? Please mention them
---
---

31. Did you do anything or look for a solution?
    (i) Yes (----------)
    (ii) No (----------)

32. If yes, what did you do? Please briefly explain
    ---

33. There have been various modern methods, innovations, ideas or technologies meant for solving agricultural problems and improving agricultural practices, e.g. about prevention of diseases in animals and crops/plants, methods for improving crop yields, food preservation methods, irrigation practices etc. Are you aware of any of the above?
    (i) Yes (----------)
    (ii) No (----------)

34. Have you heard of any new methods/technologies or innovation that have existed for the past 10 years?
    (i) Yes (----------)
    (ii) No (----------)

35. If No, please go to number .
    If Yes, which ones are you aware/have you heard of?
    (i) <u>About Livestock</u> (ii) <u>About Crops</u>

    ---

36. Have you heard of chicken vaccination against common diseases that affect them?
    (i) Yes (----------)
    (ii) No (----------)

37. How did you get to know about the new methods mentioned above? (Tick which ever is applicable)
    (i) Through extension staff visits to my farm (----------)
    (ii) Read about them (----------)
    (iii) Attending farmer seminars at training centres/schools (----------)
    (iv) Attending Agricultural Exhibitions ("Nane nane") (----------)
    (iv) Listening to radio programmes (----------)
    (v) Watching TV programmes (----------)
    (vi) Through talking to relatives (----------)
    (vii) Through talking to neighbours and or friends (----------)
    (viii) Any other (please specify)_____

38. Have you ever practised or adopted any of these modern methods in your agricultural activities?

(i) Yes (----------)
(ii) No (----------)

39. If No, please give reasons why you have never practised any of them.

---

40. If Yes, mention the ones you have practised in your agricultural activities.

About Livestock	About Crops
----------	----------
----------	----------

41. Do you think you would like to have information and learn about improving your agricultural practices?

(i) Yes (----------)
(ii) No (----------)
(iii) Not sure (----------)

42. If yes, which subject areas would you like to know more about? Please mention.

---

43. If No, using the statements below indicate reasons why you think you don't need to know various innovations for your agricultural practices. Put a circle to numbers 1 if the reason is **Completely true**, 2 if it is **Sometimes true** 3 if you are **Not sure** and 4 if it is **Completely not true**

(i)	Are expensive to implement	1	2	3	4
(ii)	I know enough of agricultural practices	1	2	3	4
(iii)	Will not help to solve my agricultural problems	1	2	3	4
(iv)	Wouldn't like to change the way I do things	1	2	3	4
(v)	Modern methods are harmful to our health	1	2	3	4
(vi)	Modern methods are harmful to our soils	1	2	3	4
(vii)	Any other reason (please specify)_____	1	2	3	4
	_____	1	2	3	4

44. Do you normally seek information for gaining knowledge to improve agricultural practices or solve agricultural problems?

(i) Yes (----------)
(ii) No (----------)

45. If No, how do you normally get knowledge for solving agricultural problems?

---

46. If yes, where do you seek information from? Please mention sources of information you use starting with the most useful to you ending with the least useful.

1. _____ 2. _____
3. _____ 4. _____

47. How would you prefer to obtain agricultural information for improving agricultural practices? Please rank the means below according to your preference by assigning numbers 1 for the **Most preferred, 2 for Slightly preferred** and 3 for **Not preferred.**

(i)	Through extension staff visits/consultations	1	2	3
(ii)	Read about them	1	2	3
(iii)	Attending Agricultural Exhibitions ("Nane nane")	1	2	3
(iv)	Through radio programmes	1	2	3
(v)	Through TV and or farmer video programmes	1	2	3
(vi)	Through talking to relatives	1	2	3
(vii)	Through talking to neighbours and or friends	1	2	3
(viii)	Other means (please specify)_____			

48. Do you access and read information from printed agricultural materials at any particular time? (Please skip questions 54 to 57 if section 4 was not applicable to you).

(i) Yes, often (----------)
(ii) Yes, occasionally (----------)
(iii) No (----------)

49. If yes, please mention a few of the publications that you have read or the ones you know.

_____
_____

50. If No, would you like to access and read printed materials for getting agricultural information and knowledge?

(i) Yes (----------)
(ii) No (----------)
(iii) Not sure (----------)

51. If No, give reasons why you would not like to use printed materials as sources of information and knowledge in agricultural practices?

_____
_____

52. If the answers in 54 to 56 above are Yes, which type of printed sources do you prefer to access for learning and getting knowledge on agricultural practices? e.g. leaflets, booklets, posters, books, any useful materials etc. Give reasons for your preference

Type	Reason
----------	----------
----------	----------
----------	----------

53. Which language do you prefer to use most for your day-to-day communication?

(i) Local language (mention it) (----------)
(ii) Kiswahili (----------)
(iii) Any Other (Mention it) (----------)

54. How would you prefer to make use of printed materials available as sources of agricultural information? Circle 1 for **Most preferred**, 2, **Slightly preferred** and 3 **Not preferred**

(i)	Read them personally	1	2	3
(iii)	Use a child at home or a family member for reading them	1	2	3
(iii)	Group reading using a group leader	1	2	3
(iv)	Use extension/development agents	1	2	3
(v)	Any other, please specify_____	1	2	3

55. If you were to choose a place for accessing agricultural information, where would you prefer it to be? Circle 1 for **Most preferred** 2 for **Slightly preferred** and 3 for **Not preferred** places.

(i)	At the Village Executive Office	1	2	3
(ii)	At the Village Extension Office	1	2	3
(iii)	At the nearby school	1	2	3
(iv)	At the social club meeting place	1	2	3
(v)	At the agricultural research centre (where available)	1	2	3
(vi)	At the nearest information centre (where available, mention it) _____	1	2	3
(vii)	At the place of worship (mention)_____	1	2	3
(viii)	Any other place, please specify _____	1	2	3

SECTION VI ATTITUDE TOWARDS USING PRINTED INFORMATION MATERIALS

56. What is your opinion about printed materials as one of the sources of agricultural information and knowledge for farmers? For every opinion below, please circle number 1 if you **Agree,** 2 if it is **Sometimes true**, 3 for **Not sure** and 4 for **Disagree.**

(i)	Have useful information for knowledge	1	2	3	4

(ii)	Not useful for information and knowledge	1	2	3	4
(iii)	Are difficult to comprehend	1	2	3	4
(iv)	They use difficult language	1	2	3	4
(v)	Are not readable (small font)	1	2	3	4
(vi)	Are not attractive to read	1	2	3	4
(vii)	Cannot make any difference	1	2	3	4
(viii)	Any other, please specify_____	1	2	3	4

57. Do you think printed materials are useful to you as sources of agricultural information? Give reasons for your answer

(i) Yes (----------)

Reasons

(ii) No (----------)

Reasons

(iii) Not sure (----------)

Reason

SECTION VII IT AWARENESS AND FINAL GENERAL REMARKS

58. You are probably aware that we are in an era of science & technology and so tools such as computers, telephones etc. are being used to facilitate information access. Do you know anything about the use of computer?

(i) Yes (----------)

(ii) No (----------)

59. If yes, briefly explain what you know about the use of computers.

---

60. Have you ever seen a computer anywhere?

(i) Yes (----------)

(ii) No (----------)

61. Have you accessed a computer for any reason at any particular time (including demonstrations at short trainings courses/ seminars etc.)?

(i) Yes (----------)

(ii) No (----------)

62. Briefly explain what you know about cellular telephone.

---

63. Have you ever seen a cellular phone?

(I) Yes (----------) (ii) No (----------)

64. Do you or your relative or neighbour own a mobile phone here in the village?

(i) Yes (----------) (ii) No (----------)

65. Have you used a cellular phone before?

(i) Yes (----------) (ii) No (----------)

66. Briefly give any comments or your opinion regarding the use of modern technologies for accessing information

_____

_____

67. Please give your opinion or any suggestions about availability, access and use of agricultural information in rural areas.

_____

_____

_____

_____

Thank you very much for your cooperation

Appendix 2:

A QUESTIONNARE FOR ASSESSING THE VILLAGE INFORMATION CENTRES (VICs)

INTRODUCTION

This questionnaire is part of an on-going PhD study whose purpose is to explore and test an intervention approach that could encourage farmers to actively acquire information, become empowered, reduce poverty and improve livelihoods using existing information resources on agriculture. The questionnaire aims at assessing the awareness and acceptability of the VIC as a tool for facilitating proactive information acquisition by farmers. I kindly request your participation in this exercise, and assure you that the information you provide will be confidential and used strictly for the purpose of the study or academic reasons and not otherwise. Thank you very much for your cooperation.

Signature----------

SECTION 1 GENERAL INFORMATION

1. Name of the Village ____2. Name of the farmer (optional) _____

3. Gender
   (i) Male (----------)
   (ii) Female (----------)

4. Main activity (Please tick what is applicable)
   (i) Crops (----------)
   (ii) Livestock (----------)

5. Which is your age group? (Tick the applicable)
   (i) Below 18 years (----------)
   (ii) 18-27 years old (----------)
   (iii) 28-37 years old (----------)
   (iv) 38-47 years old (----------)
   (v) 48-57 years old (----------)
   (vi) 58 years old and above (----------)

6. What is your highest level of education?
   (i) No formal education (----------)
   (ii) Semi-formal (adult education, self-teaching, Memkwa, etc.)(----------)
   (iii) Class I- VI (----------)

(iv) Completed Primary education (----------)
(v) Secondary education ("O" or "A" level) (----------)
(vi) Post secondary education (college and above) (----------)

7. Are you able to read?
(i) Yes (----------)
(ii) No (----------)

8. How would you rank your reading abilities?
(i) Poor Can not read functionally (----------)
(ii) Average Can read basic and short instructions (----------)
(iii) Good Capable of reading simple books and instructions(--------)
(iv) Excellent Capable of reading very well (----------)

SECTION 2 ASSESSMENT OF THE VIC

9. Do you know about the VIC at the village government office?
(i) Yes (----------)
(ii) No (----------)

10. If Yes, what do you know about it? Briefly explain.

_____

_____

11. How did you know about it?

_____

12. Have you visited it?
(i) Yes (----------)
(ii) No (----------)

13. If No, please state why have you never visited the centre? Answer questions 22-24.

_____

14. If Yes, How often have you visited the centre?
(i) Only once (----------)
(ii) Once to twice a month (----------)
(iii) Three to four times a month (----------)
(ii) Frequently (----------)

15. Have you learnt any new ideas/innovations/ or information by visiting the centre?
(i) Yes (----------)

(ii) No (----------)

16. If yes, please briefly mention them

_____

_____

17. Are there other information materials that you would have wished to have at the centre?

(i) Yes (----------)
(ii) No (----------)

18. If yes, briefly mention them.

_____

_____

19. Were you satisfied with the time the centre was open for use?

(i) Yes (----------)
(ii) No (----------)

20. If No, give reasons and suggest what you think would have been the best opening time

_____

21. (i) What have you liked about the VIC and why?

_____

(ii) What have you not liked and why?

_____

22. If the centre becomes a permanent facility in your village, would you continue/start using it?

(i) Yes (----------)
(ii) No (----------)

23. What do you think are the deficiencies/problems of this facility in your village?

_____

24. Please give your opinion or suggestions on how best such a facility could be managed and improved.

_____

_____

Thank you very much for your cooperation

Appendix 3:

AGRICULTURAL INFORMATION KNOWLEDGE TEST

INTRODUCTION

The aim of this test is to assess farmers' level of knowledge concerning factual and practical information with respect to agricultural activities in the study area. The test is part of an on-going study whose purpose is to explore and test an intervention approach that could encourage farmers to actively acquire information, become empowered, reduce poverty and improve livelihoods using existing information resources on agriculture. I kindly request your participation in this exercise, I also assure you that the information you provide and the scores (marks) you get will be confidential and used strictly for the purpose of the study or academic reasons and not otherwise. Thank you very much for your cooperation.

Signature----------

I PERSONAL INFORMATION

1. Name of the village_____2. Name_____(Optional) 3 Male___Female__

4. Age_____5. Level of education _____ 6. Crops ____ Livestock keeper_____

II LOCAL CHICKEN PRODUCTION

7. List the names of local chicken diseases that you know (could be in local language)

_____

_____

8. Mention the methods you know for prevention of diseases in chickens

_____

10. What are the advantages of local chickens?

_____

III CONTROL OF RODENTS IN THE FIELDS AND HOUSEHOLDS

11. Mention methods used for controlling rodent infestation in general

_____

12. What are the methods for controlling rodents in grain stores?

13. List the problems caused by rodent infestation

IV PADDY/RICE PRODUCTION

14. List rice varieties that you know or you grow

15. List methods for prevention of diseases in rice fields

V MAIZE PRODUCTION

16. List maize varieties that you know

17. List the early-maturing maize varieties grown in your area (sometimes known as short rain variety)

18. List chemical fertilizers used for maize production

VI CATTLE KEEPING

19. Tick infestation is dangerous to cattle and other livestock. Mention methods for tick control

20. Mention the disease caused by ticks in cattle

21. Foot and mouth disease is also common in cattle. How is it prevented?

VII FOOD AND NUTRITION

22. List carbohydrate-based foodstuffs that are available in your village

23. Briefly explain what you understand by the term "balanced meal", what is it?

24. How many meals per day are recommended for adults and children above five years old?

_____

VIII FARMER GROUPS AND NETWOKING

25. Farmers are encouraged to form groups and networks to strengthen their voice and power for economic development. Mention the name of the union of farmer networks in Tanzania

_____

THANK YOU FOR YOUR COOPERATION

Appendix 4:

THE FGD DISCUSSION GUIDE

INTRODUCTION

This guide is one of the instruments for an on-going PhD study whose purpose is to explore and test an intervention approach that could encourage farmers to actively acquire information, become empowered, reduce poverty and improve livelihoods using existing information resources on agriculture. The guide contains a list of questions and items for guiding focus group discussions at the VIC in each of the four villages. I kindly request you to participate in the discussions. Please feel free to express your honest opinions during discussions. Participants are assured that the information they provide will be confidential and used strictly for the purpose of the study or academic reasons and not otherwise. Thank you very much for your cooperation.

Signature----------

I COMPOSITION OF THE GROUP

1. Date_____2. Name of the village_____3. Number of men_____Number of women____

4. Number of crop farmers____Number of livestock keepers_____5. Age categoroies_____

6. Education levels_____

II QUESTIONS GUIDING THE DISCUSSION

7. You have all attended and used the VIC regularly:
   a) What were the reasons for your regular attendance?
   b) To discuss what attracted them most
   c) To discuss what they think were the benefits of using the VIC
3. To mention new information, innovations, ideas or technologies they have learnt through the centre
4. To discuss the changes made or any adoption of innovations following knowledge acquired through the centre
5. To discuss continued attendance in case the centre becomes a permanent facility in the village
6. Some farmers either did not visit the centre or did not visit it regularly
   a) What are the possible reasons?
   b) What could be done to encourage more farmers to be more proactive in acquiring information?
7. What other information would they have wished to have at the centre?

9. Discuss deficiencies or problems (if any) regarding the VIC as it is now
10. It is known that there are not enough agricultural extension agents to cover the entire country.
    a) Suggest alternative means and methods of information acquisition in rural areas
    b) What do they think could possibly be done?
11. How do they think the centre could be improved?
12. Discuss viable and practical ways for sustaining the centre

---

Vote of thanks

Appendix 5:

MONITORING VISIT DISCUSSIONS AND OBSERVATIONS GUIDE

INTRODUCTION

This guide is one of the instruments for an on-going PhD study whose purpose is to explore and test an intervention approach that could encourage farmers to actively acquire information, become empowered, reduce poverty and improve livelihoods using existing information resources on agriculture. The guide contains a list of questions and items for guiding informal discussions at the VIC in each of the four villages. The guide is also used as a checklist for observing issues that require noting as farmers made use of the VIC. I kindly request the participation and cooperation of farmers in the discussions, and assure participants that the information they provide will be confidential and used strictly for the purpose of the study and not otherwise. Thank you very much for your cooperation.

Signature----------

I GENERAL INFORMATION

1. Date_____2. Name of the village_____3. Number of men present_____. Number of women present____

4. Number of crop farmers_____Number of livestock keepers_____

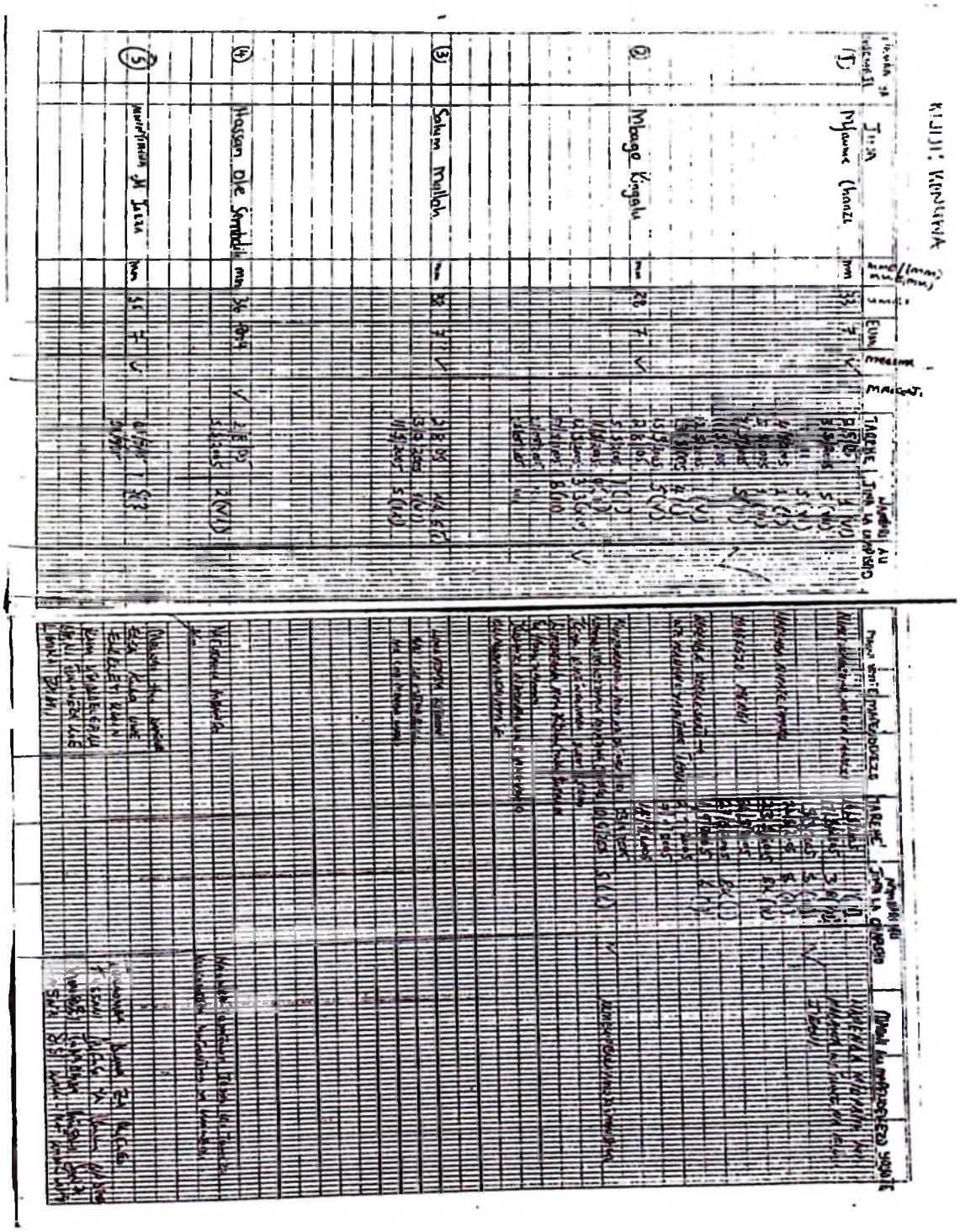
6. Education levels_____

II CHECK LIST TO GUIDE DISCUSSIONS AND OBSERVATIONS

1. What was the most motivating reason or attraction that made farmers visit the VIC?.
2. Most preferred information material available at the VIC and reasons for their preference.
3. Other information that they wished to have at the VIC.
4. Preferred method for accessing and using information materials at the VIC
5. Problems encountered in using the VIC.
6. Farmers' participation in discussions (enthusiasm and inquisitiveness, asking for clarification, etc.).
7. Actual methods used by farmers in making use of the materials at the VIC. (individual reading, group reading, discussion between users, consultations from time to time etc.).
8. General comments (how useful is the VIC, Suggestions and or modifications for improving it).

Appendix 6:

A copy of a page of the logbook: Kongwa village



Appendix 7:

Application for Research Clearance

Mrs D. S. Matovelo
Information Studies
University of Dar es Salaam
19/04/2005

The Vice Chancellor
University of Dar es Salaam

u. f. s. The Coordinator
Information Studies
Faculty of Arts and Social Sciences

forwarded and Recommended 22/4/2005

u. f. s. The Supervisor
Prof. J. Msuya

Recommended
J.H. Msuya. 20/4/2005.

Re: Application for Research Clearance

Kindly refer to the above subject.

I am a Ph. D. candidate registered in Information Studies with effect from December 2003, registration number HD/T. 521/2003. The topic of my research is on "*Developing strategies for optimizing farmers' access to and use of information on agricultural innovations in Morogoro region*". The research proposal was approved by the Senate Higher Degrees Committee on 21st March 2005.

In this respect, I am writing to ask your good office to kindly provide me with the Research Clearance, so as to facilitate my study work which will involve interviews and discussions as well as experimenting information research interventions with farmers in three districts (Morogoro, Mvomero and Ulanga) in Morogoro region.

Data collection work will be carried out in the period from June 2005 to December 2006.

Thanking you for your kind consideration.

Yours sincerely,

Matovelo

Doris Siima Matovelo
Ph. D. Candidate

c.c. Second Supervisor
Prof. E. de Smet
University of Antwerp
Belgium

Appendix 8:

University Staff and Student Research Clearance

UNIVERSITY OF DAR ES SALAAM
OFFICE OF THE VICE-CHANCELLOR
P.O. BOX 35091 • DAR ES SALAAM • TANZANIA

Ref. No: AB3/12(B)
Date: 20th April, 2005
To: The Regional Administrative Secretary,
Morogoro Region.

UNIVERSITY STAFF AND STUDENTS RESEARCH CLEARANCE

The purpose of this letter is to introduce to you **Mrs. Doris Siima Matovelo** who is a bonafide student of the University of Dar es Salaam and who is at the moment conducting research. Our staff members and students undertake research activities every year especially during the long vacation.

In accordance with a government circular letter Ref.No.MPEC/R/10/1 dated 4th July, 1980 the Vice-Chancellor was empowered to issue research clearances to the staff and students of the University of Dar es Salaam on behalf of the government and the Tanzania Commission for Science and Technology, a successor organization to UTAFITI.

I therefore request you to grant the above-mentioned member of our University community any help that may facilitate her to achieve research objectives. What is required is your permission for her to see and talk to the leaders and members of your institutions in connection with her research.

The title of the research in question is **"Developing strategies for optimizing farmers' access to and use of information on agricultural innovations in Morogoro Region".**

The period for which this permission has been granted is **June, 2005** to **December, 2006** and will cover the following areas/offices: **Morogoro, Mvomero and Ulanga Districts.**

Should some of these areas/offices be restricted, you are requested to kindly advise her as to which alternative areas/offices could be visited. In case you may require further information, please contact the Directorate of Research and Publications, Tel. 2410500-8 Ext. 2087 or 2410743.

Prof. M.L. Luhanga
VICE-CHANCELLOR
UNIVERSITY OF DAR ES SALAAM
P.O. BOX 35091
DAR ES SALAAM

Direct: + 255 22 2410700/2113654
Telephone: + 255 22 2410500-8 Ext.2001
Telefax: + 255 22 2410078/2410514
Telegraphic Address: UNIVERSITY DAR ES SALAAM
E-Mail: vc@admin.udsm.ac.tz
Website address: www.udsm.ac.tz

Appendix 9:

Letter of introduction from the Regional Administration

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

Telegraphic Address: "REGCOM"
Phones: 023 2 60 42 37/2 60 42 27

Fax No: 2 60 09 73
In Reply please quote:

Regional Commissioner's Office,
P.O. Box 650,
MOROGORO.

Ref. No: R.10/30 VOL.IX/165 **14/06/2005**

District Commissioner
P.O. Box 681,
MOROGORO.

District Commissioner,
MVOMERO.

District Commissioner,
P.O. Box 29.
ULANGA.

RE: DEVELOPING STRATEGIES FOR OPTIMIZING FARMERS' ACCESS TO AND USE OF INFORMATION ON AGRICULTURAL INNOVATIONS IN MOROGORO REGION

Please refer to the above captioned subject .

I have the honor to introduce to you **Mrs. Doris Siima Matovelo** who is a bonafide member of staff of the University of Dar es Salaam and who is at the moment conducting research.

We therefore request the above mentioned Researcher to conduct her research titled **"Developing Strategies for Optimizing Farmers' Access to and use of Information on Agricultural Innovations in Morogoro Region".**

The permit of research is granted **from June, 2005 to December, 2006 and will cover Morogoro, Mvomero and Ulanga Districts.** Please accord her with all necessary assistance to enable accomplish this important research finding.

H.J. Uledi Mwaluwinga
For REGIONALF ADMINISTRATIVE SECRETARY
MOROGORO.

REGIONAL ADMINISTRATIVE SECRETARY

Copy to: Prof. M. L. Luhanga,
VICE-CHANCELLOR,
UNIVERSITY OF DAR ES SALAAM.

" Mrs. Doris Siima Matovelo.
RESEARCHER.

Appendix 10:

Letter of introduction from Mvomero District Administration

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Telegram" MKUU WILAYA"
Tel: 2601670
Fax: 023-2600973

Ofisi ya Mkuu Wilaya
Wilaya ya Mvomero
S.L.P. 59
MOROGORO

Unapojibu tafadhali taja:

Kumb. Na. MVD/P.10/16/97: **14/06/2005**

KATIBU TARAFA
TURIANI, MLALI.

Yah: MRS. DORIS SIIMA MATOVELO

Tafadhali husika na mtajwa hapo juu.

Napenda kumtambulisha kwenu **Mrs. DORIS SIIMA MTOVELO** ambaye ni Mtafiti kutoka **CHUO KIKUU CHA DAR ES SALAAM.**

Utafiti wake unahusu **"DEVELOPING STRATEGIES FOR OPTIMIZING FARMER'S ACCESS TO AND USE OF INFORMATION ON AGRICULTURAL INNOVATIONS IN MOROGORO REGION"**

Mnaombwa kumpa ushirikiano unaostahili.

Utafiti huu unaanzia mwezi **"Juni" 2005** mpaka **"Desemba" 2006**

Wako katika Ujenzi wa Taifa.

KERA Z. I.
KAIMU KATIBU TAWALA WILAYA
MVOMERO.

KATIBU TAWALA WILAYA
MVOMERO

Nakala:
Mrs. DORIS SIIMA MATOVELO
MOROGORO

Appendix 11:

Letter of introduction to Morogoro Rural District Administration

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Anuani ya Simu: MKUU WA WILAYA
SIMU NAMBARI: 4096
FAX NAMBARI:2600973

OFISI YA MKUU WA WILAYA
WILAYA YA MOROGORO
S.L.P. 681,
MOROGORO.

Unapojibu Tafadhali taja:

Kumb: Na. MD/P.10/11/210; 23/6/2005

Katibu Tarafa,
Tarafa ya Mkuyuni,
S.L.P. 681,
MOROGORO.

Katibu Tarafa,
Tarafa ya Mvuha,
S.L.P. 681,
MOROGORO.

YAH; KIBALI CHA UTAFITI – MRS DORIS SIIMA MATOVELO

Mtajwa hapo juu ni mwanafunzi kutoka Chuo Kikuu cha Dar es Salaam. Amepata kibali cha kufanya utafiti juuya Developing Strategies for optimizing Farmers Access to and use of information on Agricultural Innovation in Morogoro Region.

Kibali hiki kimeanzia 23/6/2005 hadi Decemba, 2006.

Apewe msaada unaohitajika

G.P. Munishi
Kny; KATIBU TAWALA WILAYA
MOROGORO
KATIBU TAWALA WILAYA
MOROGORO.

Nakala kwa;- Doris Siima Matovela,
MOROGORO.

Appendix 12:

Letter of introduction to Divisional and Ward Administration

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Telegram" MKUU WILAYA"
Tel: 2601670
Fax: 023-2600973

Ofisi ya Mkuu Wilaya
Wilaya ya Mvomero
S.L.P. 59
MOROGORO

Unapojibu tafadhali taja:

Kumb. Na. MVD/P.10/16/97: **14/06/2005**

KATIBU TARAFA
TURIANI, MLALI.

Yah: MRS. DORIS SIIMA MATOVELO

Tafadhali husika na mtajwa hapo juu.

Napenda kumtambulisha kwenu Mrs. DORIS SIIMA MTOVELO ambaye ni Mtafiti kutoka CHUO KIKUU CHA DAR ES SALAAM.

Utafiti wake unahusu "DEVELOPING STRATEGIES FOR OPTIMIZING FARMER'S ACCESS TO AND USE OF INFORMATION ON AGRICULTURAL INNOVATIONS IN MOROGORO REGION"

Mnaombwa kumpa ushirikiano unaostahili.

Utafiti huu unaanzia mwezi "Juni" 2005 mpaka "Desemba" 2006

Wako katika Ujenzi wa Taifa,

KERA Z. I.
KAIMU KATIBU TAWALA WILAYA
MVOMERO.

KATIBU TAWALA WILAYA
MVOMERO

Nakala:
Mrs. DORIS SIIMA MATOVELO
MOROGORO

Appendix 13:

PRINTED MATERIALS COLLECTED FROM VARIOUS INSTIUTIONS

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
1	Booklet	Kilimo cha mahindi	Maize production	INADES	4	1992
2	Boooklet	Kulinda mimea shambani Na.1	Cop protection	INADES	4	1993
3	Booklet	Kilimo cha matunda	Fruit production	INADES	4	1994
4	Booklet	Kuongeza mavuno na kuhifadhi mazao	Food harvest & storage	INADES	4	1993
5	Booklet	Kilimo cha karanga	Groundnuts/legumes	INADES	4	1994
6	Booklet	Malisho ya ng'ombe katika sehemu kame	Pasture growing	INADES	4	-
7	Booklet	Kilimo cha mpunga	Rice production	INADES	4	-
8	Booklet	Kufuga na kuboresha kuku wa kienyeji	Local chicken production	INADES	4	1992
9	Booklet	Wakulima tuelimishane	Farmers education	INADES	4	-
10	Booklet	Shuhuli za uchumi vijijini	Rural economic activities	INADES	4	-
11	Booklet	Matumizi madawa asili kutibu magonjwa ya mifugo Na.1	Traditional medicines for livestock treatment	INADES	4	-
12	Pamphlet	Punda afe mzigo ufike:safari za mzee kijuvujivu	Farmer stories/recreation	INADES	4	1997
13	Booklet	Kufuga wanyama wadogowadogo	Keep. small animals	INADES	4	1997
14	Pamphlet	Mbolea ya kijani	Green manure	INADES	4	1992
15	Leaflet	Athari ya kiduha katika mtama na udhibiti wake	Weed control	INADES	4	1994
16	Leaflet	Aina za wadudu na magonjwa ya vitunguu na udhibiti –kanda ya kati	Plant Pest management	INADES	1	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
17	Leaflet	Udhibiti wa dumuzi kwa hifadhi bora ya mahindi-kanda ya kati	Plant Pest management	INADES	1	-
18	Leaflet	Kumdhibiti dumuzi	Plant Pest management	INADES	1	-
19	Leaflet	Ukusanyaji bora wa mbegu za Allanblackia stuhlmannii (masambu/Mkimbo)	Seed multiplication	INADES	4	-
20	Leaflet	Hifadhi bora ya nafaka	Proper crop storage	INADES	2	-
21	Leaflet	Aina ya maghala ya kuhifadhi nafaka	Grain storage facilities	FEPU	2	-
22	Leaflet	Magonjwa ya Fugwe katika mtama	Sorghum diseases control	FEPU	2	-
23	Leaflet	Kuzuia magonjwa ya vitunguu	Onion diseases control	FEPU	1	-
24	Leaflet	Uzalishaji wa mbegu bora za mtama	Sorghum seed production	FEPU	1	-
25	Leaflet	Udhibiti wa panzi kunuka	Crop protection	FEPU	2	-
26	Leaflet	Kuzuia wadudu wa nyanya	Tomato pest control	FEPU	4	-
27	Leaflet	Kuzuia wadudu wa vitunguu	Onion pest control	FEPU	4	-
28	Booklet	Innovative extension education in Africa	Extension education	CIMMYT/ MAFS	1	-
29	Booklet	Kilimo bora cha mboga	Vegetable growing	FEPU	4	-
30	Booklet	Ufugaji bora wa kuku	Chicken production	FEPU	4	-
31	Booklet	Ufugaji bora wa nguruwe	Pig production	FEPU	4	-
32	Boolet	Ufugaji bora wa ng'ombe wa maziwa	Dairy farming	FEPU	4	-
33	Booklet	Tekinolojia sahihi kwa matumizi ya jamii	Appropriate technology for the community	FEPU	1	-
34	Leaflet	Ujenzi wa banda bora la mbuzi	Construction of goat		4	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
			shed			
35	Leaflet	Utunzaji wa nguruwe jike	Pig production	FEPU	10	-
36	Leaflet	Kiduha gugu hatari kwa mimea	Weeds control	FEPU	54	-
37	Leaflet	Banda bora la ng'ombe wa maziwa	Improved diary cattle shed	FEPU	4	-
38	Leaflet	Banda bora la kustawisha uyoga	Mushroom growing shed	FEPU	76	-
39	Booklet	Ukulima wa kisasa	Modern farming	FEPU	1	-
40	Leaflet	Jinsi ya kuandaa mikutano ya wakulima	Farmer meetings	MAFS	2	-
41	Leaflet	Dalili za baa la panya shambani:ushauri Na 1.kwaBw./Bibi shamba	Rodent control	Rodent Control Unit	20	-
42	Leaflet	Epukana na baa la panya shambani: ushauri Na. 2 kwa wakulima.	Rodent control	Rodent Control Unit	4	-
43	Leaflet	Kupambana na adui panya jinsi ya kutumia sumu ya Zinki (Zinc Phospide)	Rodent control	Rodent Control Unit	14	-
44	Leaflet	Kupambana na adui panya wakati wa kupanda	Rodent control	Rodent Control Unit	12	-
45	leaflet	Kudhibiti panya na viroboto	Rodent control	MAFS	1	-
46	Leaflet	Kituo cha utafiti na udhibiti wa viumbe waharibifu	Pest management	MAFS	1	-
47	Leaflet	Matumizi ya kokwa za Mwarobaini kwa kudhibiti viroboto wa mifugo	Pest management	MAFS	14	-
48	Booklet	Jarida la uenezi wa ufugaji samaki kwa wakulima	Fish farming	SUA-TU	10	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
49	Booklet	Uboreshaji wa vihenge, hifadhi bora na udhibiti wa viumbe waharibifu wa mazao ghalani	Food storage	SUA FOCAL	20	-
50	Booklet	Kudhibiti panya katika makazi ya watu na mashambani	Rodent control	SUA-TU	5	-
51	Booklet	Mbinu za uvunaji wa maji ya mvua	Rain water harvesting	SUA-SWMRG	11	2002
52	Booklet	Ujenzi wa malambo	Water harvesting	As above	10	2002
53	Booklet	Usanifu wa maumbo ya UMM	Water harvesting	SWMRG	10	2002
54	Booklet	Masuala ya kijamii na kiuchumi	Community development	SWMRG	10	2002
55	Booklet	Ujenzi wa matangi ya kuhifadhia maji ya mvua	Rain water harvesting	SWMRG	10	2002
56	Booklet	Sheria katika maswala ya mazingira, ardhi na UMM	Policy issues/environment	SUA-TU	10	2002
57	Booklet	Sera za nchi juu ya UMM	Policy issues	SUA-TU	10	2002
58	Leaflet	Kilimo bora cha viazi vitamu	Crop production	SUA -TARP II	15	-
59	Leaflet	Ushauri kuhusu lishe kwa watu wenye UKIMWI	Health and Nutrition	SUA -TARP II	40	-
60	Leaflet	Sifa za mlo kamili	Food and Nutrition	SUA -TARP II	25	-
61	Leaflet	Ufugaji bora wa nguruwe	Pig production	SUA -TARP II	21	-
62	Leaflet	Usindikaji rahisi wa muhogo	Food processing	SUA -TARP II	20	-
63	Leaflet	UKIMWI unavyoathiri kilimo na uhakika wa chakula	Health and Food security-AIDS	SUA -TARP II	40	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
64	Leaflet	Kilimo bora cha mihogo na usindikaji kwa ajili ya matumizi ya mifugo	Modern cassava production and processing as livestock feed	SUA -TARP II	20	-
65	Leaflet	Utunzaji rahisi wa viazi vitamu kwa ongezeko la uhakika wa chakula na pato la kaya	Food storage and Procesing	SUA -TARP II	6	-
66	Leaflet	Udhibiti wa Vidua	Weed control	SUA-TARP II	20	-
67	Booklet	Utunzaji wa ng'ombe wa maziwa wakati wa kiangazi:nyanda za juu kusini	Diary production	SUA -TARP II	3	2003
68	Booklet	Kuku wa kienyeji:je uzalishaji unakidhi soko?	Local chicken production	SUA -TARP II	10	2002
69	Booklet	Kichaa cha mbwa:dalili za ugonjwa,madhara madhara yake na jinsi ya kujikinga	Rabies control	SUA -TARP II	10	2004
70	Booklet	Uzalishaji wa uyoga wa Mamama	Mushroom growing	SUA -TARP II	10	2004
71	Booklet	Usindikaji na matumizi ya muhogo:muhogo ni chakula;ni pesa	Food processing	SUA -TARP II	6	2004
72	Booklet	Athari za uharibifu wa mazingira katika uhakika wa chakula na pato la kaya	Environmental protection	SUA -TARP II	13	2003
73	Booklet	Mapishi:vyakula vinavyozalishwa katika mkoa wa Morogoro	Food and Nutrition	SUA -TARP II	10	2005
74	Booklet	Uendelezaji wa vikundi vya wakulima kanda ya mashariki	Farmer groups	SUA -TARP II	10	2004
75	Booklet	Uboreshaji wa vikundi vya wakulima	Farmer groups	SUA -TARP II	10	2003
76	Booklet	Magugu katika kilimo cha mpunga	Weed control	SUA -TARP II	10	2003

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
77	Booklet	Kilimo cha mpunga	Paddy production	SUA -TARP II	10	2004
78	Booklet	Mazao ya mikunde:umuhimu wake katika chakula na pato la kaya	Legumes production	SUA -TARP II	10	2003
79	Booklet	Usindikaji wa pest ya nyanya:kanuni za msingi	Food processing-tomatoes	SUA -TARP II	10	2003
80	Booklet	Uhusiano wa uhakika wa chakula,UKIMWI nalishe bora	Health and nutrition-HIV	SUA -TARP II	10	2005
81	Booklet	Mwongozo wa chakula kwa mikoa ya Morogoro na Iringa	Dietary guideline	SUA -TARP II	10	2004
82	Booklet	Dietary guidelines for Morogoro and Iringa regions	Dietary guideline	SUA -TARP II	2	2004
83	Booklet	Uzalishaji bora wa kondoo wa nyama	Animal production, sheep	SUA -TARP II	11	2003
84	Pamphlet	Malisho ya kupandwa kwa wafugaji wadogowadogo	Pasture management	SUA -TARP II	10	2004
87	Booklet	Ufugaji boro wa ng'ombe wa maziwa na samaki:Masomo kutoka kwa wakulima – wafugaji wa Ibumila, Njombe	Dairy farming and fish farming	SUA -TARP II	10	2004
88	Pamphlet	Uhifadhi wa nyama kwa njia ya kukausha kwa kutumia mionzi ya jua na moshi wa kuni	Meat storage by drying	SUA -TARP II	10	2003
89	Booklet	Uzalishaji bora wa mazao usambazaji wa teknolojia :juzuu Namba 1	Crop production and technological innovation	SUA -TARP II	10	2004
90	Pamphlet	Ugonjwa wa kiwele katika ng'ombe wa maziwa	Diary management	SUA -TARP II	11	2002
91	Booklet	Uzalishaji bora wa mifugo:juzuu Namba 2	Animal production	SUA -TARP II	10	2004

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
92	Booklet	Uhifadhi na usindikaji wa maziwa kwa lishe na pato la familia	Milk processing and family income	SUA -TARP II	10	2002
93	Leaflet	Usindikaji.masoko na matumizi ya mazao ya kilimo: Usambazaji wa teknolojia juzuu namba 3	Food processing and marketing	SUA -TARP II	10	2004
94	Leaflet	Kilimo cha paprika	Spice growing-paprika	MAFS	2	-
95	Leaflet	Kilimo cha vanilla	Spice growing-Vanilla	MAFS	2	2004
96	Leaflet	Kilimo cha tangawizi	Spice growing, ginger	MAFS	2	2004
97	Leaflet	Tofali la kuiamba ng'ombe lenye urea bila molasesi	Diary management	MAFS	1	2003
98	Leaflet	Trekta la mkono(power tiller)	Simple technology	MAFS	1	-
99	Leaflet	Kilimo hifadhi (conservation agriculture)	Agriculture and environmental conservation	MAFS	1	-
100	Leaflet	Funza mwekundu na madhara yake	Pest management	MAFS	1	-
101	Leaflet	Kanuni kumi za kilimo cha pamba	Cotton production	MAFS	1	-
102	Leaflet	Mbung'o ni hatari	Tsetse fly control	MAFS	1	-
103	Leaflet	Ufugaji na uboreshaji wa shamba la korosho	Cashewnut production	NALIENDELE	1	2003
104	Leaflet	Kutengeneza nira / joki za maksai	Animal power	SUA -TARP II	20	-
105	Leaflet	Usindikaji rahisi wa muhogo: njia ya kuongeza uhakika wa chakula na pato la kaya	Cassava processing	SUA -TARP II	20	-
106	Leaflet	Ugonjwa wa mafua ya ndege ni hatari kwa kuku	Animal health	ARI-Uyole	1	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
107	Leaflet	Mbegu za mpunga aina ya TXD 220 N na TX306	Seed, Paddy	ARI-Uyole	1	2003
108	Leaflet	Uzalishaji wa maua aina ya kanesheni	Floriculture	SUA-FOCAL	26	2005
109	Leaflet	Utunzaji wa maua baada ya kuvuna	Floriculture	SUA-FOCAL	21	2005
110	Leaflet	Mapishi ya vyakula vitokanavyo na soya	Food preparations	SUA-FOCAL	1	2003
111	Leaflet	Kilimo bora cha soya	Crop production	MAFS, Ilonga	1	2004
112	Leaflet	Punguza gharama za kulisha mifugo kwa kutumia masalia ya mazao	Animal production	MAFS/ DFID	1	-
113	Leaflet	Kilimo cha mpunga	Paddy production	MAFS	1	-
114	Booklet	Uboreshaji wa vihenge, hifadhi bora na udhibiti wa viumbe waharibifu wa mazao ghalani	Food storage	SUA-FOCAL	20	2005
115	Leaflet	Tomato	Food processing	MAFS	1	-
116	Leaflet	Dalili za kulipuka kwa panya shamba.ushauri Na.1kwa Bw/Bibi shamba	Rodent control	MAFS		-
117	Leaflet	Kilimo bora cha nyanya:magonjwa ya nyanya	Tomato production	MAFS	3	-
118	Leaflet	Kilimo cha viazi mviringo	Potato production	MAFS	2	2003
119	Leaflet	Homa ya mapafu ya ng'ombe:(Contagious Bovine Pleuro Pneumonia-CBPP)	Animal health	MAFS	2	2001
120	Leaflet	Kilimo bora cha ngano nyanda za juu kusini	Wheat production	MAFS	1	
121	Leaflet	Ugonjwa wa kunyong'onyea kwa minazi na athari zake	Coconut production	MAFS	1	2003
122	Leaflet	Kilimo bora cha matunda	Fruit production		1	
123	Leaflet	Ustawishaji wa malisho kwa ulishaji wa ndani	Pasture production	MAFS	1	2002

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
124	Leaflet	Usindikaji rahisi wa muhogo:njia ya kuongeza uhahika wa chakula na pato la kaya	Cassava processing, food security	MAFS	1	-
125	Leaflet	Kilimo bora cha muhogo	Cassava production	MAFS	1	2003
126	Leaflet	Uboreshaji wa shamba la korosho	Cashew nut production	MAFS	1	2003
127	Leaflet	Tumia mbegu bora kuboresha kilimo	Better seeds promotion	MAFS	1	2003
128	Leaflet	Kukausha na kuhifadhi mboga za majani:ongeza lishe epukana na njaa	Food processing	MAFS, Uyole	1	2003
129	Leaflet	Kuzuia magonjwa ya mifugo	Animal disease control	MAFS, Uyole	2	-
130	Leaflet	Kilimo bora cha maharage nyanda za juu kusini	Bean cultivation	MAFS, Uyole	2	2003
131	Leaflet	Mbegu bora za maharage aina-Uyole 94	Bean seed	MAFS, Uyole	1	-
132	Leaflet	Mbegu bora ya maharage aina-Uyole98	Bean seed	MAFS, Uyole	1	-
133	Leaflet	Mbegu za maharage kutoka Uyole	Bean seed	MAFS, Uyole	1	-
134	Leaflet	Kilimo cha pilipili mtama	Pepper growing	MAFS	1	2003
135	Leaflet	Kilimo bora cha mtama	Sorghum production	ILONGA	1	2003
136	Leaflet	Hatamu za punda	Animal power	TARP II SUA	1	
137	Booklet	Umwagiliaji njia ya kudondosha matone ya maji kwenye shina la mmea:mtandao wa ndoo (Bucket kit)	Irrigation agriculture	SUA, TARP II	5	2003
138	Leaflet	Umwagiliaji wa matone	Irrigation agriculture	MAFS	2	2004
139	Leaflet	Kanuni kumi za kilimo bora cha mahindi	Maize production	MAFS,	2	2003

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
		kanda ya mashariki		Uyole		
140	Leaflet	Kilimo bora cha mahindi	Maize production	MAFS, Katrin	2	2004
141	Leaflet	Jihadhari na ugonjwa wa kichaa cha mbwa	Rabies control	MAFS	2	-
142	Leaflet	Kupe ni adui wa mifugo	Ticks	MAFS	1	-
143	Leaflet	Kideri ni hatari	Chicken diseases	MAFS	1	-
144	Leaflet	Zuia ugonjwa wa bacteria mnyauko katika viazi mviringo	Plant protection-round potato	MAFS	1	-
145	Leaflet	Utayarishaji wa mboga za majani	Vegetable preparation	MAFS	1	-
146	Leaflet	Uhamasishaji wa kilimo cha maua	Floriculture	MAFS	2	-
147	Leaflet	Usindikaji	Food processing	MAFS	3	-
148	Leaflet	Vanilla	Spice-vanilla	MAFS	2	-
149	Leaflet	Eggyplant	Vegetables	MAFS	1	-
150	Leaflet	TB ya mifugo	Animal health	MAFS	2	-
151	Leaflet	Utengenezaji wa mvinyo	Brewing, wine	MAFS	1	-
152	Leaflet	Kilimo bora cha iliki	Spice-cardamom	MAFS	2	-
153	Leaflet	Hifadhi ya nafaka	Grain storage	MAFS	2	-
154	Leaflet	Kilimo na matumizi bora ya alizeti	Crop production and processing	MAFS	2	-
155	Leaflet	Tangawizi	Spice, ginger	MAFS	3	-
156	Leaflet	Kuvuna maji ya mvua kwa matumizi ya shambani	Rain water harvesting	MAFS	1	2003
157	Leaflet	Kukausha na kuhifadhi mboga za majani	Food processing and storage, vegetables	MAFS	1	2003
158	Leaflet	Uzalishaji wa maparachichi kwa njia ya kubebesha	Grafting, avocado	MAFS	1	-
159	Leaflet	Kichaa cha mbwa tishio kwa nguvu kazi	Rabies control	MAFS	1	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
160	Leaflet	Utengenezaji kimea (kiumulio), mgando salama na hifadhi ya kimea	Fermented foods1	-	1	-
161	Leaflet	Kilimo cha maksai	Drought animals	MAFS	1	-
162	Leaflet	Aina za mbegu za mahindi	Improved seed-maize	MAFS	1	-
163	Leaflet	Rutubisha udongo na dhibiti viduha kwa marejea	Soil fertility/wed control	MAFS	2	-
164	Leaflet	Zao la ndizi	Banana production	MAFS	2	-
165	Leaflet	Kukausha na kuhifadhi mboga za majani:ongeza lishe epukana na njaa	Food process and preservation	MAFS	2	2003
166	Leaflet	Kuhifadhi kwa kukausha vyakula vyenye wanga	Food process and preservation	MAFS	1	2004
167	Leaflet	Ufugaji bora wa nguruwe	Pig Production	MAFS	1	-
168	Leaflet	Kilimo bora cha uyoga	Mashroom Production	MAFS	1	-
169	Leaflet	Mapishi ya vyakula kutokana na muhongo	Food processing	MAFS	2	2003
170	Leaflet	Kuku wa kienyeji:Mkombozi wa mkulima mdogo (lishe bora na ongezeko la pato	Local Chicken	MAFS	2	-
171	Leaflet	Kilimo bora cha soya nyanda za juu kusini	Soybean production	MAFS	3	-
172	Pamphlet	Mwongozo wa magonjwa ya kuku vijijini:uboreshaji afya na uzalishaji wa kuku kwa njia ya kudhibiti magonjwa muhimu ya kuku	Local Chicken	SUA-TARP II	12	2002
173	Booklet	Kilimo cha bustani:mafunzo kwa wakulima	Horticulture	SUA-TARP II	10	2004
174	Booklet	Sauti ya Mkulima	Farmer Stories		20	-
175		Usindikaji, masoko na matumizi ya mazao ya	Processing and	SUA-TARP	10	2004

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
		kilimo: Usambazaji wa teknolojia juzuu namba 3	Marketing	II		
176	Leaflet	Kuzuia magonjwa ya mifugo	Prevention Livestock Disease	MAFS	2	-
177	Leaflet	Udhibiti husishi wa panya kwenye mpunga	Participatory Rodent Control	MAFS	1	-
178	Leaflet	Pata mavuno mengi kwa kupanda aina mpya ya maharage ROJO	Bean Production	SUA	4	2000
179	Leaflet	SUA 90 Chaguo la mkulima	Bean Production	SUA	4	2000
180	Booklet	Pesti ya Nyanya; Kanuni za usindikaji	Food Processing and Preservation	SUA-TARP II		2003
181	Booklet	Ufugaji bora wa Sungura	Small Animal Production	SUA, TU		-
182	Booklet	Jarida la Uenezi wa Samaki kwa wakulima	Fish Farming	SUA, TU	10	-
183	Booklet	Uvunaji wa maji ya mvua kwa matumizi mbali mbali (UMM)	Rain Water Harvesting	SUA,SWMRG	8	-
184	Leaflet	Kilimo bora cha Bilinganya	Vegetable Growing	MAFS-Ilonga	2	2004
185	Pamphlet	Matumizi ya madawa asili kulinda mimeo shambani Na. 1 ujuzi wa wakulima	Plant Protection	INADES	4	1997
186	Leaflet	Kilimo cha Ufuta	Simsim Production	MAFS-Ilonga	2	2003
187	Leaflet	Maktaba ya Taifa ya Kilimo ya Sokoine (SNAL)	Library Awareness	SUA, SNAL	10	-
188	Booklet	Soya kwa Lishe Bora, virutubishi na matayarisho yake kwa mapishi mbali mbali	Food Preparation	SUA, FOCAL	4	2005
189	Booklet	Mwongozo wa kudhibiti ugonjwa wa njano ya mpunga	Paddy Production	SUA, TARP II	10	2005

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
190	Booklet	Chakula Ukimwi na Lishe	Environmental Protection	SUA, TARP II	4	2003
191	Leaflet	Kilimo bora cha Kunde na Choroko	Legumes Production	MAFS, Ilonga	2	2003
192	Leaflet	Kuzuia kideri mikoa ya Dar, Pwani, Morogoro na Tanga	Control of chicken diseases	FEPU	4	
193	Booklet	Kupe na magonjwa makuu wanayoeneza kwa mifugo: Uboreshaji wa mbinu za kudhibiti kupe na magonjwa wanayoeneza	Tick borne diseases	SUA, TARP II	12	2002
194	Leaflet	Sifa za mlo kamili: Elimu ya chakula na lishe	Food and Nutrition	SUA, TARP II	30	-
195	Booklet	Mapishi ya Vyakula vinavyozalishwa katika mkoa wa Morogoro	Food Preparation	SUA, TARP II	20	2005
196	Booklet	Uhusiano wa Chakula, Ukimwi na Lishe	Health and Nutrition	SUA, TARP II	20	2005
197	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 003	Farmer Groups	MVIWATA	8	1996
198	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 005	Farmer Groups	MVIWATA	8	1997
199	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 008	Farmer Groups	MVIWATA	8	2001
200	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 011	Farmer Groups	MVIWATA	8	2003
201	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 012	Farmer Groups	MVIWATA	8	2003
202	Newsletter	Pambazuko; Sauti ya Wakulima, Toleo Na. 013	Farmer Groups	MVIWATA	8	2003
203	Leaflet	Mtandao wa vikundi vya Wakulima Tanzania	Farmer Groups	MVIWATA	7	-

S/N	DOCUMENT TYPE	TITLE	SUBJECT	SOURCE	NO. OF COPIES	YEAR OF PUBLICATION
204	Leaflet	Jinsi ya kuandaa mikutano ya wakulima. Ushauri Na.1	Farmer Groups	SUA, AEE	2	-
205	Booklet	Kuongeza mavuno na kuhifadhi mazao; mafunzo ya kilimo	Food Preservation	INADES	4	1992
206	Booklet	Kilimo cha Mpunga; Mpunga wa bondeni,Mafunzo ya kilimo	Paddy Production	INADES	4	1991

Appendix 14:

Selected printed materials for use at the VIC

No.	Subject	Title	Type	Publisher/source	Date
	I				
1	Chicken	Kufuga na kuboresha kuku wa kienyeji	Booklet	INADES	1992
2		Ufugaji bora wa kuku: Toleo la nne	Booklet	MAFS-FEPU	2002
3		Kufuga wanyama wadogo wadogo. Kijitabu cha michoro	Booklet	INADES	-
4		Mwongozo wa magonjwa ya kuku vijijini: uboreshaji afya na uzalishaji wa kuku kwa njia ya kudhibiti magonjwa muhimu ya kuku	Pamphlet	SUA-TARP II	2002
5		Ufugaji bora wa kuku wa kienyeji	Booklet	SUA/TU/IHE-PRUCA	2000
6		Kuzuia Kideri: mikoa ya Dar es Salaam, Pwani, Morogoro na Tanga	Leaflet	MAFS-NAEP II	1997
	II				
7	Cattle	Malisho ya ng'ombe katika schemu kame		INADES	1995
8		Kupe na magojwa makuu wanayoeneza kwa mifugo: uboreshaji wa mbinu za kudhibiti kupe na magonjwa wanayoeneza	Pamphlet	SUA-TARP II	2002
9		Ufugaji bora wa ng'ombe wa maziwa		MAFS-FEPU	1990
10		Ugonjwa wa kiwele katika ng'ombe wa maziwa: mwongozo wa kutambua na kukinga		SUA-TARP II	2002
11		Banda bora la ng'ombe wa maziwa		MAFS-NAEP	1998
12		Ufugaji bora wa ng'ombe wa kienyeji	Booklet	SUA-TU	1997
13		Matumizi ya madawa asili kutibu magonjwa ya mifugo	Pamphlet	INADES	1997

No.	Subject	Title	Type	Publisher/source	Date
14		Malisho ya kupandwa kwa wafugaji wadogowadogo	Booklet	SUA-TARP II	2004
15		Utunzaji wa ng'ombe wa maziwa wakati wa kiangazi nyanda za juu	Booklet	SUA-TARP II	2003
	III				
16	Paddy	Kilimo cha mpunga	Booklet	SUA-TARP II	2004
17		Magugu katika kilimo cha mpunga: mfumo wa kilimo cha kutegemea mvua ukanda wa chini	Booklet	SUA-TARP II	2004
18		Kilimo cha mpunga: mpunga wa bondeni	Booklet	INADES	1991
19		Mwongozo wa kuthibiti ugonjwa wa njano kwa mpunga	Booklet	SUA-TARP II	2005
	IV				
20	Maize	Kilimo cha mahindi	Booklet	INADES	1992
21		Kilimo bora cha mahindi	Leaflet	MAFS-ARI, Ilonga	2003
22		Kilimo cha mtama	Leaflet	MAFS-ARI, Ilonga	2003
	V				
23	Rodent control	Uboreshaji wa vihenge, hifadhi bora na udhibiti wa vlumbe waharibigu wa mazao ghalani	Booklet	SUA-FOCAL	2005
24		Kuongeza mavuno na kuhifadhi mazao	Booklet	INADES	1992
25		Kudhibiti panya katika makazi ya watu na mashambani	Booklet	SUA-Rodent Research	2003
26		Panya: Ushauri Namba 4	Leaflet	SUA-Extension	
27		Kupambana na adui panya wakati wa kupanda	Leaflet	SUA-Rodent control	
28		Dalili za kulipuka kwa panya shamba: Ushauri Na. 1 kwa bwana ana bibi shamba	Leaflet	SUA-Rodent control	
29		Epukana na baa la panya shamba: Ushauri Na. 2 kwa Mkulima	Leaflet	SUA-Rodent control	
30		Kudhibiti panya na viroboto kwa pamoja	Leaflet	SUA-Rodent Control	

No.	Subject	Title	Type	Publisher/source	Date
31		Kupambana na adui panya: jinsi ya kutumia sumu ya Zinki (Zinc phosphide)	Leaflet	SUA-Rodent control/MAFS	
	VI				
32	Fruit. Vegetables	Kilimo cha mboga	Booklet	MAFS	2002
33	and Spices	Kilimo cha matunda	Booklet	INADES	
34		Kilimo cha bustani: mafunzo kwa wakulima	Booklet	SUA-TU	2001
35		Tangawizi	Leaflet	MAFS	
36		Kilimo cha ufuta	Leaflet	MAFS-ARI, Ilonga	2003
37		Uzalishaji wa Uyoga wa mamama	Booklet	SUA-TARP II	2004
38		Uzalishaji wa Uyoga	Leaflet	MAFS	
39		Kilimo bora cha kunde na choroko	Leaflets	MAFS-ARI, Ilonga	
40		Usindikaji	Leaflet	MOA	
41		Mafunzo ya kilimo: kilimo cha matunda	Booklet	INADES	1996
42		Kilimo bora cha nyanya: magonjwa ya nyanya	Leaflet	MAFS-ARI, Uyole	
43		Kilimo bora cha bilinganya	Leaflet	MAFS-ARI, Ilonga	2004
44		Kilimo bora cha nyanya: uzalishaji, usindikaji na upatikanaji masoko ya nyanya unaotilia mkazo kupunguza umasikini kwa wakulima wadogowadogo	Booklet	SUA-FOCAL	2005
	VII				
45	Food, Nutrition & Health	Mwongozo wa chakula kwa mikoa ya Morogoro na Iringa	Booklet	SUA-TARP II	2004
46		Sifa za mlo kamili	Leaflet	SUA-TARP II	
47		Mapishi: Vyakula vinavyozalishwa matika mkoa wa Morogoro	Booklet	SUA-TARP II	2005
48		Uhusiano wa Chakula, Ukimwi na Lishe	Leaflet	SUA-TARP II	2005
49		Ushauri kuhusu lishe kwa wenye UKIMWI	Leaflet	SUA-TARP II	
50		Mapishi ya vyakula kutokana na mbaazi kavu	Leaflet	MAFS-ARI, Ilonga	2001

No.	Subject	Title	Type	Publisher/source	Date
51		Mapishi bora vyakula vinavyozalishwa mkoa wa iringa	Booklet	SUA-TARP II	2004
	VIII				
52	Farmer groups	Wakulima tuelimishane	Pamphlet	INADES/PELUM	1998
53		Uboreshaji wa vikundi vya wakulima: Utafiti juu ya mbinu za uboreshaji wa vikundi vya wakulima	Booklet	SUA-TARP II	2003
54		Punda afe mzigo ufike: safari za mzee kijivujivu	Pamphlet	INADES	1997
55		Pambazuko: Sauti ya Wakulima. Toleo Na. 005	Magazine	MVIWATA	1997
56		Pambazuko: Sauti ya Wakulima. Toleo Na. 003	Magazine	MVIWATA	1996
57		Pambazuko: Sauti ya Wakulima. Toleo Na.008	Magazine	MVIWATA	2001
58		Pambazuko: Sauti ya Wakulima. Toleo Na. 011	Magazine	MVIWATA	2003
59		Pambazuko: Sauti ya Wakulima. Toleo Na. 013	Magazine	MVIWATA	2003
60		Pambazuko: Sauti ya Wakulima. Toleo Na. 012	Magazine	MVIWATA	2003
61		Mtandao wa Vikundi vya Wakulima Tanzania (National Network of Farmers' groups in Tanzania)	Brochure	MVIWATA	
62		Jinsi ya kuandaa mikutano ya wakulima: ushauri Na. 1	Booklet	SUA-Extension	
	IX Others				
63		Ukulima wa kisasa, Toleo Na. 463	Newsletter	MAFS-FEPU	2002
64	Small animals	Ufugagaji bora wa sungura	Booklet	SUA-TU	2000
65		Ujenzi wa banda bora la mbuzi mikoa ya dar es Salaam, Pwani, Tanga na Morogoro	Leaflet	MAFS	1998
66		Ujenzi wa banda bora la mbuzi	Leaflet	MAFS	1998
	Food processing				
67		Usindikaji na matumizi ya muhogo: muhogo ni chakula, muhogo ni pesa	Booklet	SUA-TARP II	2004
68		Utunzaji rahisi wa viazi vitamu kwa ongezeko la pato la kaya	Leaflet	SUA-TARP II	
69		Usindikaji rahisi wa mhogo	Leaflet	SUA-TARP II	
70		Kilimo bora cha mihogo na usindikaji kwa ajili ya matumizi ya mifugo			

No.	Subject	Title	Type	Publisher/source	Date
71		Soya kwa lishe bora: virutubisho na matayarisho yakekwa mapishi mbalimbali	Booklet	SUA-FOCAL	2005
72		Pest ya nyanya: kanuni za usindikaji	Booklet	SUA-TARP II	2003
73	Rabies control	Kichaa cha mbwa: Dalili, madhara na kinga	Booklet	SUA	2004
74	Food storage	Kilimo bora cha viazi vitamu	Leaflet	MAFS	
75		Uhifadhi wa nyama kwa njia ya kukausha kwa kutumia mionzi ya juana moshi wa kuni	Booklet	SUA-TARP II	2003
76		Udhibiti wa dumuzi kwa hifadhi bora ya mahindi-kanda ya kati	leaflet	INADES	
77		Kumdhibiti dumuzi	Leaflet	INADES	
78		Uhifadhi na usindikaji wa maziwa kwa lishe na pato la familia	Booklet	SUA-TARP II	2002
79		Hifadhi bora ya nafaka	Booklet	INADES	
80	Plant protection	Kulinda mimea shambani	Booklet	INADES	
81		Mbolea ya kijani	Booklet	INADES	
82		Kuzuia wadudu wa vitunguu	Leaflet	INADES	
83		Athari ya kiduha katika mtama na udhibiti wake	Leaflet	INADES	
84	Dairy goats	Utunzaji bora wa mbuzi wa maziwa	Booklet	SUA-TARP II	2003
85	Environmental	Uharibifu wa mazingira: athari katika uhakika wa chakula na pato la kayaBooklet		SUA-TARP II	2003
86	protection	Sheria katika maswala ya mazingira, ardhi na umm			
87	Traditional plants protection	Matumizi ya madawa asili kulinda mimea shambani Na. 1: ujuzi wa wakulima	Pamphlet	INADES	1997
88	Marketing	Masoko: shughuli za uchumi vijijini	Pamphlet	INADES	1999
89	Spices	Kilimo cha iliki	Leaflet	MAFS	
90		Mbinu za kilimo cha vanilla	Booklet	SUA-FOCAL	2005
91	Fish farming	Jarida la uenezaji ufugaji samaki kwa wakulima	Booklet	SUA-TU	
92	Water harvesting and	Uvunaji wa maji ya mvua (UMM)	Pamphlet	SUA-SWMRG	2003
93	Irrigation	Uvunaji wa maji ya mvua kwa matumizi mbalimbali	Pamphlet	SUA-SWMRG	2002
94		Ujenzi wa malambo	Booklet	SUA-SWMRG	2002
95		Ujenzi wa matangi ya kuhifadhia maji	Booklet		2002
96		Sera ya nchi juu ya umm: kijitabu cha mafunzo Na. 5	Pamphlet	SUA-SWMRG	2002
97	Beans/legumes	Rojo: Chaguo la mkulima	Leaflet	SUA	2000

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98		SUA 90: chaguo la mkulima	Leaflet	SUA	2000
99		Pata mavuno mengi kwa kupanda aina mpya ya maharage, ROJO	Leaflet	SUA	2000
100		Kilimo cha karanga	Booklet	INADES	
101	Flower growing	Uzalishaji wa maua aina ya kanesheni	Leaflet	SUA-FOCAL	2005
102		Utunzaji wa maua baada ya kuvuna	Leaflet	SUA-FOCAL	2005