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The impact of Information and Communication Technologies (ICTs) on Rural Livelihoods: The Case of Smallholder Farming in Zimbabwe.

By

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Declaration

I hereby make a declaration that this dissertation is a product of my original work that was built from literature that has been carefully acknowledged as required in the University's plagiarism policy. The work has not been submitted elsewhere for the purpose of obtaining another degree.

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Signature:  **Date…05…/…01…/2013**

Dedication

I dedicate this study to my husband Stephen and my children Hannah, Steve and Hope. I love you all.

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Firstly I would like to thank the Lord God Almighty for giving me strength and wisdom to accomplish this study. I would like to extend my gratitude to my husband, Stephen and children Hannah, Tinotenda Steve and Hope for their continued support and encouragement throughout my study. The acknowledgements would be incomplete without thanking my supervisor Dr P.B.Monyai who has made untiring efforts to the success of the study. Without her it would not have been possible to complete the study. Thanks are also due to my colleagues who supported me with ideas for the construction of the dissertation. I would also want to thank Mary and Angela for the support they gave me. When I was discouraged they always encouraged me not to give up.

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ABSTRACT

This study seeks to determine the impact of Information and Communication Technologies (ICTs) on livelihoods of smallholder farmers in Zimbabwe. The study was motivated by the fact that benefits of ICT development still need to be known among rural smallholder farmers in Zimbabwe. ICTs have been upheld as catalysts for the promotion of rural livelihoods the world over. The question that remains is whether ICTs in Zimbabwe promote livelihoods of smallholder farmers. Although the Government formulated the ICT policy in 2005, the benefits still need to be known among rural smallholder farmers in Zimbabwe. The challenges faced by smallholder farmers include limited access to ICTs, high costs in ICT services and lack of ICT infrastructural development in the country. The challenges hindered ICT benefits that are expected to accrue to smallholder farmers. This study is significant in the view that most studies on ICT have focused on the general roles of ICT on rural development without giving particular attention to smallholder farming that has a potential of reducing poverty and promoting food security. For a theoretical lens, the Sustainable Livelihood Approach was used with special attention to Chapman et al (2001)'s information wheel. Regarding methodological issues, the study followed a qualitative research methodology guided by a secondary analysis research design. Data were collected from published reports of government, reports from the Ministry of ICT, internet, journals, newspapers and periodicals. The study established that ICTs promote livelihoods of smallholder farmers through the dissemination of vital information for improvement of agricultural productivity. From the research findings, the study proposes four main recommendations. Firstly, strengthening of ICT policy for effective smallholder farmers. Secondly, the government to organise ICT

awareness campaigns directed towards rural people especially smallholder farmers. Thirdly, up scaling ICT Infrastructural development .Finally, a large-scale ICTs and livelihoods research must be commissioned in the country.

LIST OF ACRONYMS and ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
AREX	Agricultural Research Extension
CTA	Technical Centre for Agriculture and Rural Cooperation
DFID	British Department for International Development
FAO	Food and Agricultural Organisations
FTLRP	Fast Track Land Reform Programme
GNU	Government of National Unity
HIV	Human Immunodeficiency virus
ICT	information and communication technology
IDS	Institute of Development Studies
ITU	International Telecommunication Union
IMF	International Monetary Fund
KACE	Kenya Agricultural Commodity Exchange
LRMIS	Livestock Registration Marking and Information Systems
MICT	Ministry of Information and Communication Technology
MIPs	Market Information Points
MIS	Market Information Service

NUST	**N**ational University of Science and Technology
POTRAZ	Postal and Communications Regulatory Authority
REA	Rural Electrification Agent
SADC	Southern African development community
SL	sustainable livelihoods
SLA	Sustainable Livelihoods Approach
SMS	short message service
UNDP	United Nations Development Programme
WBG	World Bank Group
WSIS	World Summit on the Information Society
ZARNet	Zimbabwe Academic and Research Network

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Chapter 1

Overview and Background of the Study

1.1 Introduction

This study seeks to investigate the impact of information and communication technology (ICT) in the promotion of livelihoods in Zimbabwe taking a case of agriculture as a potential area where ICTs can be functional. As one of the developing countries, Zimbabwe has attempted to harness ICTs for development. As outlined in the World Summit on the Information Society (WSIS) Declaration of Principles and Plan of Action (Geneva in 2003 and Tunis in 2005), Heads of States and governments in developing countries were urged to adopt the use of ICTs in order to achieve developmental goals. Zimbabwe is one of the countries adhering to the activities outlined in the WSIS Plan of Action with regard to ICTs.

The idea of harnessing ICTs in Zimbabwe is meant to come up with improved solutions to issues like poverty reduction, economic growth, equity and social justice. Marker et al (2002) stress that poverty has multiple dimensions and that, being poor does not necessarily mean lack of basic resources, but lack of ICTs can also contribute to poverty. Therefore, rural farmers should have access to information vital to their livelihoods to bring them out of poverty. Through the use of ICTs, the rural poor can be noticed because ICTs can be a channel of communicating their voices. Further, access to ICTs can equip the poor with skills that can improve their well-being. The poor gain skills to access information through various channels that include the internet, radios and cellphones.

Having realised the potentials that can be brought about by ICTs, the government of Zimbabwe formulated the National ICT Policy Framework in 2005 and a review of the policy was prepared in May 2012.An amendment of the Policy in 2007 was put in place because the development of ICTs is rapidly changing and the ICT policy of 2012 reflects these adjustments. This policy framework was put in place in order to provide guidance and direction to the formulation and implementation of ICT strategies and programmes in all sectors of the economy. The sectors include health, education, agriculture, tourism and environment, mining and manufacturing, transport, among others (Government of Zimbabwe, 2005).The main functions of national ICT policy is to develop suitable policies and strategies that promote ICT advancement. The policy seeks to lead in the development of proper regulatory frameworks that assist ICT promotion. Another function of the ICT policy is to encourage literacy in the field of ICT and promote ICT usage in the country so that the citizens can be competitive in the region. At the same time, the country requires to reach the international standards in terms of ICT development. To achieve this requirement, there is need to support and coordinate national ICT research as well as promoting the development of software, hardware and ICT infrastructures. ICT infrastructures need to be achieved so that it can be accessed by all citizens including the rural communities. The policy also advocates for an enabling environment that can attract investment in the area of ICTs through Public Private Partnership in all sectors (Zimbabwe National ICT policy Framework 2005). However, the use of ICTs in Zimbabwe needs a concrete foundation to ensure stability. Since the inception of ICT policy in Zimbabwe, an assessment of ICT status on agriculture in rural areas needs to be rated.

According to the Government of Zimbabwe's National Information and Communication Technology Policy Framework (2005:21) "agriculture forms the backbone of Zimbabwe's economy and accounts for 17% of the GDP" and this in turn boosts economic growth. Agriculture also remains as the main source of livelihood. Most of the rural people in Zimbabwe engage in agriculture and various non-farm activities. The majority of the population live in the rural areas and are in poverty and have food insecurity. Stienen et al (2007) state that agriculture is the main source of income and employment in rural areas, hence can improve the rural livelihoods. The income that is realised from agriculture is low due to low agricultural productivity. In addition, the Land reform program of 2000 has been blamed for causing a decline in agricultural production and as a result food shortages and poverty increased in rural areas (Scoones et al, 2010). This took place in the context of HIV/AIDS pandemic which saw life expectancy falling to 34-35 years of people who form the back bone of the rural community.

Munyua (2007) asserts that agriculture plays a vital role in economic and social development in rural areas. It is important because improved agricultural production can provide the rural communities with food security and can also reduce poverty. Asenyo-Okyere and Mekonnen (2012) agree that, in order to reduce poverty attention should be focused on the transformation of the agricultural sector. This can be achieved through the improvement of land use, labour productivity and to access remunerative markets. Stienem et al (2007) agree that, ICTs can have a direct contribution on food security at both national and household levels. Further, the incorporation of ICTs in the development strategies for agricultural development has a potential to improve access to markets for agricultural produce thereby increasing

income. The absence of ICTs and market information has been identified as causing low productivity in agriculture in developing countries such as Zimbabwe.

Nevertheless, Zimbabwe has a lot to learn from other developing countries that have incorporated ICTs so as to promote agricultural rural livelihoods. Countries like Kenya, India, and Ghana have managed to introduce ICT projects that have promoted agriculture in the rural communities. Thus, ICTs can have an impact on the lives of the people through production in agriculture.

One of the functions of Zimbabwe ICT policy is to encourage and support the provision of ICT to all citizens including the rural farmers. This function encompasses the modernisation of agriculture to promote sustainability and growth in the agricultural sector. In order to promote agricultural growth, a policy statement that guides the operationalisation of the policy outlines its objectives as follows:

- "promote the development of, and access to ICTs in land and water utilisation, and management of national development systems.
- facilitate the development of software and provision of ICTs-enabled infrastructure in the production, processing and marketing of agricultural products.
- promote the use of ICTs in environmental forecasting and prediction in support of sustainable agricultural development" (Government of Zimbabwe, 2005:21).

Zimbabwe has embarked on ICTs development in the rural communities as a way of improving the rural livelihoods in the form of telephones, mobile phones, and radios television internet among others. This is done because the country would like to regain the missed opportunities that occurred during its national challenges in the

last decade which included poverty, hyperinflation, brain drain and political instability among others (Government of Zimbabwe, 2005).

As the Minister of Information and Technology has indicated, Zimbabwe is one of the poorest countries in sub-Saharan Africa that has the lowest access to information and communication resources (Government of Zimbabwe, 2005). In order to rectify this problem, the national ICT policy framework was implemented as a way to reduce social, political and economic inequalities.

The Zimbabwe national ICT policy framework of 2005has an ambition to modernise rural areas in terms of communication so as to improve the living standards of the rural people. The rural people in Zimbabwe need information relating to agriculture, health, politics, community development, and education. Furthermore, the rural people need socio-economic and environmental information. Through the ICT policy, the government seeks to encourage, promote and support the implementation of ICTs in the rural areas especially in the agricultural sector which forms the backbone of the economy. The aim of this policy is to narrow the digital divide through educating the people about ICTs, it also seeks to penetrate in all economic sectors as well as improving access to ICTs by all communities. The vision of this policy is to transform Zimbabwe into a knowledge-based society by 2020, while the mission is to accelerate the development and application of ICTs in support of sustainable socio-economic growth and development in the country (Government of Zimbabwe, 2005).

Developing countries that have harnessed the potential of ICTs have managed to emerge with better strategies aimed at poverty reduction, wealth creation, equity in the distribution of resources and social transformation (Government of Zimbabwe, 2005). Nwagu (2006) gives a striking example of the Asian Pacific economies that

managed to improve their economic growth and competitiveness through modernised production systems. Countries cited include Hong Kong, Singapore, and Taiwan. Such modernised systems have improved the capabilities of the countries to reduce poverty and increase wealth. The use of ICTs in developing countries, if properly managed, can benefit the rural people in various ways for the promotion of rural livelihoods.

However, Ramirez and Richardson (2005) share a different view that while the benefits of ICTs are generally seen as beneficial, the real impact is difficult to determine. The impact of ICTs in developing countries is difficult to ascertain because ICTs in other places are out of reach to the people in rural areas. ICTs are out of reach mainly because of lack ICT infrastructure and electricity. Moreover, the rural people cannot benefit from ICTs if they are not educated. Lack of education can be a challenge with ICTs such as internet which can only be accessed using English (Postnote, 2006).In Zimbabwe, infrastructural development is still poor and the rural areas roads are still very bad, communicating facilities are inadequate and electricity is not always available. This underdevelopment of the infrastructure hampers development in rural areas. As a result, rural development is realised at a slower rate than expected.

The focus of this study is a determination of the impact of Information and Communication technologies (ICTs) on rural livelihoods. Attention will be given to smallholder farming in Zimbabwe. Rural agriculture in Zimbabwe is mostly small-scale. At international level, Zhou (2010) observes that smallholder farming dominates the agricultural landscape of the developing world. Zhou (2010:3) further asserts that “Small farmers are the key group requiring attention in agricultural and

rural development. Increasing their productivity and incomes can make a major contribution to reducing hunger and poverty." Smallholder farming involves the production of crops and other agricultural products on a small piece (mostly family pieces) of land. Since the land is small, most of the production is subsistence and income earnings by smallholder farmers are generated through the sale of agricultural surpluses. Given the above scenario the following statement of the problem applies.

1.2 Statement of the Problem

The benefits of ICT development still need to be known among rural smallholder farmers in Zimbabwe. The question is whether ICT development in Zimbabwe promotes livelihoods for smallholder farmers. There are challenges faced by smallholder farmers with regards to limited access to ICTs which include high costs in ICT services and lack of ICT infrastructural development in the country. These challenges manifest themselves in form of "lack of access to agricultural information, lack of infrastructure, low productivity, weak institutional capacity and coordination, inadequate markets and market information" (Munyua, 2007:9). The farmers are not properly linked to the market, hence, the need to link them through ICTs. Currently, farmers travel long distances in search for markets and this has a negative impact on the livelihoods of the poor.

These challenges are constraining ICT benefits that are expected to accrue to smallholder farmers such as capacity building, infrastructure development and access to markets. Access to markets will boost the agricultural sales, hence, improve their living standards. The income realised can be used to meet household needs. Furthermore, small farmers lack farm equipment, seed, fertiliser and

herbicides. They lack financial resources to purchase inputs as a result; they are forced to indulge in traditional agricultural technologies that are associated with low yields. Moreover, drought has led to food shortages in the country. In 2002, Zimbabwe had lower agricultural output due to inadequate rains as a result food shortages were realised both in urban and rural areas. One of the most severe droughts in Zimbabwe was in 1991/1992 which led to shrinkage of the economy by 12% (Alwang et al, 2001). The drought deepened rural poverty through livestock sales, losses through death and serious crop failures. The death of livestock also affected productivity since cattle are an important source of draught power.

The argument of this study, therefore, is that though the Zimbabwean government has embarked on ICTs development, in the form of mobile, radio, telephone, televisions and internet as a way of improving the rural livelihoods, it remains unclear whether the rural people are benefiting and to what extent. The benefits that the rural people should expect are efficient and effective communication systems for socio-economic development and easy affordable and fast access to information for various purposes (Alemna and Sam, 2006).

It is therefore important and significant to determine the impact of ICT promotion in livelihoods of the rural smallholder farmers in Zimbabwe. The major questions that remain are whether ICTs could be a sustainable alternative for the livelihood challenges that smallholders are facing? Can ICT development benefit the rural poor who are involved in agriculture for their livelihoods? These questions beg some answers.

1.3Objectives of the study

The main objective of this study is to determine the impact of information and communication technology in the promotion of livelihoods in the agricultural sector in Zimbabwe. Literature shows that ICTs are beneficial to the livelihoods of the poor people. However, this view still needs to be established in Zimbabwe. Therefore, this study aims to bring together ICTs and rural livelihoods in order to understand the position of ICTs in support of rural livelihoods. The sub-objective of the study is to investigate whether ICTs can provide a sustainable solution for the livelihood challenges that rural people face.

1.4 Significance of the Study

This study is significant in the view that most studies on ICT have focused on the general roles of ICT on rural development. According to available literature, no study has been done to determine the impact of ICT development on livelihoods of smallholder farmers in Zimbabwe. A comprehensive understanding of the relationship between ICTs and the rural livelihoods is still lacking in Zimbabwe. This research is urgent and important because it will bring about knowledge and awareness of the concrete benefits derived from ICT for smallholder farmers. It is therefore, anticipated that this study will contribute to the body of knowledge on ICTs and rural livelihoods. It is hoped that the findings of the study will contribute towards the development and strengthening of ICTs related livelihoods strategies. This study was carried out to determine the benefits of the ICTs on rural livelihoods. The study is meant to highlight the gap that exists on the ICT development in agricultural sector in Zimbabwe. The study is expected to help policy makers to comprehend the

benefits of ICT in agriculture. The following section presents the ethical considerations

1.5 Ethical considerations

Firstly, ethics are about honesty in one's work. Walliman (2005) contends that honesty is an essential element of research that engenders a level of trust and credibility to promote knowledge generation. Further, Walliman laments that the worst offence against honesty is plagiarism, which involves direct copying of other people's ideas without acknowledging. He further asserts that even if one paraphrases without acknowledgement, it is considered unethical.

Ethical issues also refer to research concerns that guide the appropriateness of the researcher's behaviour in relation to the participants of the research or those who are affected by it (Gray, 2004:58). This study observes the ethical issues that arise during the course of the study. These cover issues pertaining to research problem statement, literature review, secondary data collection, data analysis and research dissemination (Creswell, 2003). This study did not anticipate any further risks since it was not directly dealing with humans.

1.6 Conclusion

This chapter gave an overview of the ICT and livelihoods in Zimbabwe. It also highlighted the problem statement, objectives and the significance of the study. The country managed to harness ICT to achieve developmental goals and to come up with solutions to issues such as poverty reduction, economic growth, equity and social justice. Farmers need information to promote livelihoods that will bring them

out of poverty. The potentials of ICTs motivated the government to come up with the ICT policy in order to provide guidance and direction of ICT strategies and programmes in all sectors.

Agriculture is the main source of livelihood among smallholder farmers. Though the rural people depend on agriculture, poverty and food insecurity persist due to challenges faced. Some of the challenges include lack of infrastructure, lack of agricultural information and lack of financial resources. ICT policy has the ambition to modernise rural areas and to narrow the digital divide. On the other hand the vision of the policy is to transform Zimbabwe into a knowledge-based society by 2020. Other developing countries such as Hong Kong, Singapore and Taiwan managed to harness ICTs with the aim to reduce poverty and to distribute resources equally.

Though the benefits of ICTs can be recognised, it is difficult to ascertain the impact of ICTs in developing countries. Many rural areas have no access to ICTs mainly because of lack of infrastructure development such as roads, electricity and ICT infrastructure. The benefits of ICTs need to be known among smallholder farmers. The question is whether ICT development in Zimbabwe promotes livelihoods in Zimbabwe. The objective of the study is to determine the impact of ICT in the promotion of livelihoods. The study is significant because no study has been done concerning the impact of ICTs on livelihoods of smallholder farmers in Zimbabwe.

The study consists of five chapters. Each chapter contains a synopsis of the main aspects of the discussion in order to maintain the flow of ideas from one chapter to the next. Chapter 1 is the introductory chapter that gives the background of the ICT regard to the promotion of rural livelihoods in agriculture. Other issues such as the statement of the problem, objectives of the study, significance of the study are

discussed in this chapter. Following the introductory chapter, there are five chapters that are organised as follows:

Chapter 2 deals with ICT and Agriculture including the conceptual and theoretical overview. This chapter discusses the literature regarding what other authors have articulated in the debate. It incorporates conceptual and theoretical framework and previous empirical evidence on Information communication technologies in regard to agriculture. The theoretical frameworks discussed are livelihood approach and capability approach. Later, livelihood approach was adopted as the framework that is relevant to the development of ICTs in the rural communities. Chapter 3 outlines the ICT development in Zimbabwe. Firstly this Chapter gives the background of Zimbabwe which is the study area. Secondly the ICT policy framework is discussed. It also expounds on the economic, social and political activities in the country and provides the ICT services provided in the country.

Chapter 4 gives a note on Research methodology. This chapter presents methodology, and data presentation. Chapter 5 analyses the impact of ICT on livelihoods in Zimbabwe with specific reference to smallholder farmers. The analysis is developed on the data collected from secondary sources of information. Chapter 6 provides a conclusion and recommendations. The chapter discusses key findings of the research. It also gives recommendations based on findings of the study. The recommendations are related to the policy evaluation issues that affect ICTs and agriculture. The following chapter narrates the theoretical elucidation that can be employed.

Chapter 2

ICTs and Agriculture: Conceptual and Theoretical Overview

2.1 Introduction

This section presents the review of literature that is related to Information and Communication Technologies (ICTs) and rural livelihoods. It incorporates literature on previous studies on the importance of ICTs on rural livelihoods and agriculture. It also covers the conceptual and theoretical frameworks that underpin the study. Under the conceptual framework, concepts pertaining to the study are discussed and theories that relate to the study are discussed under the theoretical framework. The main concepts underpinning the study include policy, ICTs, livelihoods, agriculture, and rural development. The conceptualisation therefore commences with Information and communication technologies (ICTs).

2.2Information and Communication Technologies (ICTs)

The concept of ICTs has received elaborate and in-depth definitions in literature (World Bank, 2002). The World Bank (2002:1) defines ICTs as “hardware, software, networks, and media collection, storage, processing, transmission, and presentation of information (voice, data, text, images)”. On the other hand, the Government of Zimbabwe, (2005:11) defines ICTs as a “generic term referring to technologies that are used for collecting, storing, editing, and disseminating information in various forms. These technologies include radios, computers, internet, geographical information services and cell phones among other communication devices”. These technologies can only function if sound infrastructural development is provided.

According to Zano et al (2008), information infrastructure refers to technological tools, methods and access models that are required to ease knowledge management and to transfer today's massive flow of information from various sources of information. Computers, software and other components of telecommunication infrastructure are examples of communication systems needed for the sharing of information. Mhlanga (2006) stresses that ICT infrastructure is grouped in three, that is information technology which is the use of computers, telecommunication technologies which includes the use of telephone and the broadcasting of radio and television and lastly networking technologies which involves the use of internet and mobile phones among others.

The Contemporary development of Information and Communication Technologies (ICTs) is seen as speedily becoming a dominant factor in eliminating poverty for the development of rural areas by authors such as Sreekumar (2007) and Alemna and Sam (2006). Developing countries that have fully embraced the ICTs are enjoying the benefits of the on-going technological revolution. Accordingly, a number of ICT-based development projects have been initiated in developing countries to harness social and economic opportunities for vulnerable groups in rural areas. For instance, the Msunduzi community network project in South Africa was designed to facilitate access to ICTs by organisations and communities with an aim to improve the environment around the Msunduzi River and to improve their decision making capacity (Thioune, 2003).This project is called the anti-crime network and it was established to co-ordinate anti-crime activities in the region. An efficient community model was established with points of access to link communities to an ICT network. Another example is the Grameen Bank which initiated village pay phones with the

aim of reducing poverty through the economic empowerment of women in rural Bangladesh. Gupta (2004) gives an example of Grameen phone in Bangladesh where mobile phone facilities were provided in remote and rural regions. As a result, the Grameen phone made a great change in social and economic spheres in the rural areas. The rural women in Bangladesh who were provided with mobile telephones to service the local village population were economically empowered. The women are popularly known as Grameen's telephone ladies. The ladies charge a small fee for the services they provide and as a result they can make a living.

Braund et al (2006:3) propound that ICTs are being "identified as a powerful enabler for economic growth and social development". Thus, ICTs can increase economic growth, enhance social inclusion (through closure of the digital divide), increase health and education services and to improve governance at all levels. The widening of the digital divide continues to hamper the means and ends of the livelihoods enhancement programmes in the rural areas of Zimbabwe. Digital divide refers to the gap that exists within the developing countries whereby the urban people, for instance in Zimbabwe, have a better access to ICTs than their rural counterparts hence inequality persists.

According to Sreekumar (2007:870), "ICTs are a unique technological intervention that challenges the traditional barriers to social change and economic development in rural areas". Thioune (2003) echoes the same sentiment by stating that developing countries have witnessed significant changes in rural development through information and communication technologies. Thioune further states that these changes have been noticed especially in education, health, economics, communications, leisure and travel.

Many developing countries have initiated the development of ICTs for the benefit of the rural poor. Tangible examples of these initiatives can be cited in Ghana, Kenya, Uganda, Bangladesh, and India. Alemna and Sam (2006) highlight the role of ICTs in Ghana in terms of ICT-related activities that are meant to promote rural livelihoods in the country. For instance, some rural micro-finance institutions in Ghana have adopted ICTs with the aim of reducing administrative costs and increasing service quality. ICTs reduce administrative costs for example, the cost effective way of sending money through mobile phones. At the same time, rural tourism is promoted through the use of web pages rather than the use of traditional advertising media. Distant learning has been introduced to the rural people in Ghana through ICT. ICTs have also improved health service delivery through the telemedicine delivery model. This means that a rural patient can be able to contact a specialist doctor through ICTs. In Kenya, village farmers have improved market efficiency through the use of ICTs (Alemna and Sam, 2006). For example, instead of farmers travelling in search of current market prices, they can easily access information using ICT tools such as radios, cellphones, telephones and the internet. Thus the introduction of ICTs reduced transaction costs and improved the communication between buyers and sellers. This also enabled the rural farmers to conduct their business effectively and efficiently.

According to the World Bank (2011), ICTs have been regarded as the driver of economic growth which has seen 10% of the world's population out of poverty and the numbers of ICT users have increased tremendously over the last decade. Comparing the figures obtained from the last ICT Sector Strategy of the World Bank Group (WBG) prepared in 2000 and the figures in 2010, it was noticed that there

was an increase of 3,7 billion from 200 million in the use of mobile phones in developing countries, also that the internet users have increased tenfold during the same period. Further, the World Bank (2011) agrees that, ICT is no longer a luxurious product, but an essential tool that can be exploited by the poor. The development of ICTs in developing countries can attract the construction of ICT infrastructures. As a result, it can attract investments opportunities which in turn create employment for the unemployed.

However, despite these possibilities, ICTs development is not a panacea for all development challenges. For instance, Braund et al (2006) argue that ICTs have opened a gate to new ways of fraud and corruption and if the technology is not used properly it can disrupt development outcomes. Contrary to the argument by Braun et al, a number of studies have established that ICTs play an important role in development and promotion of rural livelihoods, for example, Chapman and Slaymaker(2002), Grimshaw and Kala(2011), Thioune (2003), Duncombe (2007) and MacNamara(2008). The challenges highlighted by Braundet al, (2006) seem to fail to derail the perceptions of benefits accruing from ICTs development.

According to McNamara (2008), ICTs have been adapted in the rural communities so as to improve the livelihoods of the rural people and to increase their income opportunities, thereby improving their chances of escaping from persistent poverty. The underlying assumption is that ICTs have a positive impact on livelihoods. That is why the Government of Zimbabwe commenced a strategy document and a comprehensive policy in order to harness ICTs for development of the nation.

Policy describes what the government intends to achieve and it provides guidelines that direct the action towards achieving goals. According to Chowdhury (2003) policy

outlines the development of strategies, plans of action, legislation and other documents. Freeman (1989:147) on the other hand, defines policy as a “general guideline for decision making and it sets up boundaries around decisions”. Furthermore, a policy directs the thinking of government officials or organisational members so that the objectives of organisation remain consistent. There are different types of policy. These include substantive or vertical and administrative or horizontal policy. Substantive policy deals with legislation, programs and practices that govern the substantive aspects of community work (Torjman, 2005).Examples of substantive policy include income security, employment initiatives, childcare services and social exclusion. The administrative policy deals with the collection of statistical information on neighbourhoods and the evaluation of complex community programmes. Torjman (2005), mentions that, any given policy stands for the outcome of a conclusion and how best to achieve assigned objective

According to the Government of Zimbabwe (2005:4), “ICT policy is an integrated infrastructural, social, economic, environmental, legal and institutional framework that provides strategic direction and guidance for national sustainable development through the development and application of ICTs”. Therefore, ICT policy seeks to provide guidelines for the use of ICTs in sectors such as agriculture. ICT policy in Zimbabwe was adopted to ensure a universal access to affordable ICTs in all sectors. According to Ngoma (2008), the ICT policy stresses to improve the services that are already in existence and the same time improving the quality of the services provided and to develop new services. ICT policy sets a parameter on how to develop ICTs in agricultural sector so as to improve livelihoods. It goes without saying that the idea of improving rural livelihoods brings into purview the question of

rural development. The understanding of the concept of rural development is important in ICT development and is discussed below.

2.3 Rural Development

The concept of rural development remains multifaceted and multidimensional because of rural challenges that are also multifaceted and multidimensional in nature. However, comprehensive definitions have been developed in literature. The one below was developed by Chambers (1993) as follows:

> Rural development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they need and want. It involves helping the poorest among those who seek a livelihood in the rural areas to demand and control more of the benefits of development. The group includes small-scale farmers, tenants, and the landless (Chambers, 1993:147).

Transformation of the rural areas is central to the improvement of people's livelihoods in the rural areas. As indicated in Chambers' definition, people ought to have access to life's basic needs. In the majority of cases, the rural people are marginalised and excluded from most development efforts, hence, their failure to enhance their livelihoods. Since agriculture is the mainstay of livelihoods in the rural areas of developing countries, it is therefore imperative to find connections that can be explored between it and ICTs. Grimshaw and Kala (2011:33) assert that "rural poverty reduction is closely related to increase in agricultural growth and productivity". This centrality of agriculture in rural development and poverty reduction cannot be denied.

It is vital to note that one of the important challenges of rural agricultural development is the disconnection from markets. Smallholder farmers fail to have access to markets to sell their fresh farm produce for the realisation of economic

value. They can hardly engage with agricultural markets because of such a disconnection. As a result, their livelihood coping strategies are negatively affected. This is exacerbated by the absence of good roads for the transportation of goods to the markets. Grimshaw and Kala (2011:32) state that “research evidence suggests that accurate, real-time price information improves farmer livelihoods”.This assertion gives us an indicator that ICTs can be used effectively for rural development in developing countries. ICTs may have an important role in responding to the needs of the people who pursue livelihood strategies. Therefore, agriculture becomes an important focus for this study as outlined in the subsequent section.

2.4 Agriculture

Agriculture focuses on the production of crops and animals and it involves knowledge of the land, management of the animals and crops and marketing the products (Parson 1988). It is important to most rural people because it has contributed to the improvement of rural livelihoods. Munyua (2007:7) describes agriculture as a driver to “social, economic growth and poverty reduction and it is linked to food security and it remains a primary source of growth”. Furthermore, agriculture is the backbone of economies of most developing countries. Thus, agriculture is one of the major factors that can contribute to the growth of the nation’s economy especially Zimbabwe. It provides food for the people and, creates employment directly and indirectly. People can be employed as farm labourers or in the processing of agricultural products. Once employment is created for the local rural people, this prevents rural to urban migration in search of employment. Agriculture can bring in foreign currency after its products are exported. Munyua

(2007) states that agriculture can contribute to the Gross Domestic Product (GDP), creates employment as well as earning foreign currency. For Zimbabwe, the agricultural sector was the backbone of the economy before the controversial 'fast-track land reform programme'[1].

Before the crisis, Zimbabwe was known to be breadbasket of Africa. However, this turned out to be the reverse case because it is now the importer of food from other countries. People in Zimbabwe depend on agriculture, the majority of which live in rural areas. That is where most of the farming activities take place. There are various types of farming done in Zimbabwe, namely smallholder, commercial and urban farming. Smallholder farming involves farming done by the rural people. Commercial farming involves farming at a larger scale and urban agriculture is farming within the urban areas. Chisita (2010) highlights that the agricultural sector is central to the Zimbabwe's economy. The population directly or indirectly depends upon agriculture for employment and food security. Rural people in Zimbabwe have diverse livelihood strategies. Besides farming the people in Zimbabwe can indulge into informal activities such as gold panning, wood and stone carving, cross border trade, weaving, and many other activities. Through such activities people in the rural areas have managed to generate supplementary household income. Such non-farm activities help to close the gap that is left by agricultural economic activities.

Having realised the importance of agriculture in Zimbabwe, the government has linked agricultural activities to ICTs in order to increase agricultural activities. Linking agricultural activities to ICTs is referred to as electronic agriculture (E-agriculture). E-

[1]The "Fast Track Land Reform Programme" was the Zimbabwean land reform programme that was started in 2000. It attracted world-wide attention because of its controversial nature and was regarded as chaotic. However, many people benefited from the land redistribution exercise (Scoones, 2011).

agriculture is defined by the Food and Agricultural Organisations (FAO) of the United Nations (FAO) as an:

> emerging field in the intersection of agriculture informatics, agricultural development and entrepreneurship referring to agricultural services, technology dissemination and information delivered or enhanced through the internet and related technologies. It involves the conceptualisation, design, development, evaluation and application of new innovative ways to use existing or emerging information and communication technologies (ICTs) (Munyua 2007:128).

According to Gakuru, Winter and Stepman (2009), agricultural informatics is a new notion that has emerged due to the development of ICTs. ICTs distribute information to farmers. Examples of traditional ICTs known to be providing advisory services include radios and TV. Gakuru et al (2009) point out that in developing countries; National Ministries of agriculture have included ICTs into the communicating of information. District information centres have been launched so as to achieve agriculture efficiency in countries like Kenya. Other stakeholders like non-governmental organisations (NGOs) and research organisations are facilitating technology transfer into the agricultural sector. This is likely to improve agricultural development for the promotion of food security and even food rights for the poor people in the rural areas

2.5 The importance of ICT in agriculture

Many people in rural communities rely on agriculture as a source of a livelihood strategy to sustain themselves. However, there are challenges that are being faced by smallholder farmers in developing countries. Firstly, smallholder farmers have small farms unlike those commercial farmers who possess farms at a large scale. This poses a disadvantage to the smallholder farmers to have low productivity. Some

of the challenges were highlighted by Munyua (2007) who agrees that, small farm sizes lead to a weak knowledge base. This implies that they do not have information that can help them in agricultural activities. Another challenge is that, most of the rural farmers practice smallholder farming and they do not have adequate tools necessary for farming. Usually, they use traditional methods and tools for farming which have resulted in the declining of agricultural output. Production in agriculture also becomes low since the farmers do not use adequate inputs such as fertilizers. The supply of inadequate inputs can result in low agricultural productivity and this promotes food insecurity. After harvesting their crops, farmers are faced with a problem of marketing their products. Farmers need marketing experience and infrastructure for the purpose of production.

Munyua (2007) agrees that farmers have poor market infrastructure and inadequate marketing experience. This happens because the farmers lack skills to bargain for their products and they often lack information about the real price on the market. The problem is that they can give away their products below cost price or at cost price. For example, the prices that are being offered to farmers are not favourable and at the same time these farmers do not have access to financial assistance such as credit from financial institutions. Smallholder farmers fail to raise enough capital because of unfavourable prices offered for their products. This cripples productivity because the farmers are deprived of agriculture and ICT resources to boost agriculture production. Lack of marketing experience can affect the prices of agricultural products. This means that prices of commodities can be underestimated in terms of pricing, as a result, low income can be realised and this can have a negative impact on the livelihoods of the people. Agricultural markets in developing

countries are characterised as inefficient (Grimshaw and Kala, 2011).This is a disadvantage to the farmers because they cannot engage effectively in agricultural markets without the provision of information. Mukhebi (2007) concurs that, agricultural markets have long chains of transactions between farmer and the consumer. This can be a problem because the middle man puts a mark-up on the products and at the end the transaction costs are increased. Usually, agricultural markets are competitive and poor farmers have to bear with high transaction cost (Grimshaw and Kala, 2011). Furthermore, if the farmers lack effective engagement in the transmission of information it leads into the inability of farmers to utilise market information in their livelihood decisions.

However, if the farmers are engaged in market information systems, this would lead to better informed decisions. Through ICTs farmers can have up-to-date information concerning prices for commodities, inputs and consumer behaviour. This can improve farmers' livelihood in that the farmer would be in a position to make decisions about the crops that are grown in a certain season and at the same time the farmer can have information on where to sell and buy the commodities. Stienen et al (2007) posit that price information can be published on a website that is accessible to farmers via information centres, rural radios, TV, or mobile phone. Mobile phones can be a good example of ICT that increase price transparencies as a result higher incomes are generated for farmers. They gave an example in Sri Lanka. Another example worth noting is the GoviGnana project in Ghana that displays prices on light boards at major markets for farmers to have free access to information.

Another challenge beyond the farmers' control is the climate change which has led to food insecurity at global level. Munyua (2007:9) highlights some of the challenges as: "inadequate security in land tenure, poor water resources management, low irrigation infrastructure, poor access to agricultural knowledge, no access to information and technologies, inappropriate technologies for circumstances of farmers, poor rural infrastructure such as (roads, electricity), HIV/AIDs, illiteracy and high poverty". Furthermore, she posits that improved technologies do not reach down to farmers and that the farmers experience unfair trade practices. Thus, they are exploited by middlemen and they lack subsidies. However, the importance in the use of ICTs in rural development has been recognised by governments in developing countries (Stienem et al, 2007).

ICTs can play an important role in the development of developing countries. What is needed is to identify the importance and the impact of these technologies on the social and economic well-being of rural farmers (Grimshaw and Kala 2011, Stienen et al, 2007). According to Grimshaw and Kala (2011), ICTs connect people to more accurate and up-to-date information thereby equipping them with new skills and connecting them to local and international markets. Furthermore, information is the resource that can be transmitted and ICT is a way of delivering that information. Hence, ICTs can help poor people comprehend and improve their agricultural activities in rural areas.

Stienen et al (2007) identify the function of ICT in agriculture as enhancing agricultural production, improving market access and capacity building and empowerment. Agricultural production activities that are technologically enhanced have an impact on improving the productivity for farmers. Smallholder farmers face

challenges when it comes to marketing because they are not linked to markets. Some of their fresh produce rots after the harvest because of lack of marketing avenues. ICTs have a potential of providing a link between the farmers and the market and this link empowers them, their bargaining positions are also improved and they can look for their markets and reduce reliance on powerful buyers. These powerful buyers are usually rich individuals or organisations that dupe farmers of their produce.

According to USAID (2010), using ICTs can help farmers find out about market prices and this helps them to make decisions regarding when to harvest and to solve common agricultural problems. In India, the role of ICTs has helped to bridge the information gap between farmers and markets. As a result, farmers have managed to come up with informed choices and at the same time improve efficiency in farming. Through ICTs farmers in India receive daily information on farming techniques, weather forecast, input availability and the way they should improve their operations. Whilst in Kenya, ICTs have reached the rural poor with market information and market linkage services (Mukhebi, 2007). Farmers need market information in order to choose what commodities to produce at a particular time and also to have market prices and where to sell their produce. Alemna and Sam (2006) highlight that the important role played by ICTs in Ghana is that of gathering and updating information from rural areas and helping the government to build databases on issues such as climate pollution, food production and deforestation.

Chapman and Slaymaker (2002:6) posit that “ICTs are a fundamental element of any rural development. They argue that rural areas are often characterised by poor information and the rural people often lack information vital to their livelihoods” This

notion is by and large true since the rural areas lack adequate infrastructure such as roads, ICT infrastructure, ICT network and electricity. Most of rural areas in Zimbabwe have poor road networks, lack of electricity and ICT infrastructure. According to Huggins (2002), the population in the rural areas is dispersed and have poor transportation. Consequently, they do not have opportunities for accessing new and beneficial technologies. On the other hand, the illiteracy rate is very high among the rural people and the introduction of ICTs would be a challenge. Even if the ICTs are introduced in rural communities, language barrier could be an impediment because ICTs are delivered using English. This brings to the fore the question of capacity building in order to enhance production.

2.5.1 Capacity Building and Empowerment for production

According to Stienem et al (2007), the use of ICT can help farmers strengthen their capacities, present their constituencies when negotiating input and output prices, land claims, resource rights and infrastructure projects. Furthermore, ICTs will enable rural communities to interact with stakeholders thereby reducing social isolation, and new business opportunities are developed. The idea behind interaction between the rural farmers is to enable them to share ideas and solve problems that they encounter in agriculture.

Stienen et al (2007), posit that ICTs can increase efficiency, productivity and sustainability of small farms. Thus, ICTs can make a significant contribution to small scale farmers by increasing efficiency and productivity. Further, farmers face risks and uncertainties and threats such as poor soils, drought, erosion, diseases and pests, therefore, the use of ICTs bring awareness on how to deal with these

uncertainties and threats. Moreover, farmers can be warned in advance of the coming disaster and how it can be prevented.

According to Munyua (2007), ICTs can play a major role in communicating knowledge and information to rural agricultural communities, delivering education modules, accessing inputs, markets and market prices, credit, facilitating net workings and increasing productivity. The spread of ICTs in developing countries brought about success stories. The success story of India can be a good example of what ICT has achieved in the rural communities. Farmers in India formed an agri-business group that commenced a project known as E-choupal business. With this programme, the farmers can be connected to the internet to get information on prices of the local market and abroad. Farmers can have knowledge of the prices available at the market whilst they are still at the farm. This E-choupal project was initiated to help farmers in many ways. Mahonar (2005) propounds that E-choupal projects give farmers information on the local weather condition, soil testing techniques and other information necessary to boost productivity. This project aims to transform the Indian farmer into knowledge seeking citizen. Furthermore, this project helps the farmers to make correct options about farm inputs and to reduce costs when sourcing for farming equipment. These farmers get connected by logging in to E-choupal website. When they are connected, they are in a position to order inputs required for farming, get information about best farming practices, market prices and the weather forecast in their language. Accordingly, E-choupal has created a direct marketing channel, thus eliminating wasteful intermediation and multiple handling and thereby reducing transaction costs and making logistics efficient. This implies that a farmer can be relieved of getting the middle man when

selling or buying his products, hence, connected directly to the consumer in the local or global markets. KACE program in Kenya is another success story that has experienced the effects of ICTs in agriculture.

The Kenya Agricultural Commodity Exchange (KACE) supports farmers to access markets through ICTs. KACE empowers farmers by making it possible to access information that improves their bargaining power and marketing experiences. The objective of the programme is to link farmers to market information at the right time and at the right place. According to Karugu (2011), KACE was established in 1997. It aims to link the farmers and traders for business in agricultural commodities and at the same time the staff members gather information daily on prices of different commodities from markets in various districts in Kenya. Gakuru et al (2009), state that KACE collects, processes, updates and broadcasts market information daily to farmers. The information is processed at the KACE headquarters and it is made available through Market Information Service (MIS), KACE website, notice boards and mobile phone short message service (SMS). The results obtained from the use of KACE are positive. Evidence from Bangoma District in Kenya can be noticed in that farmers under the KACE programme realised 22% increase on the sale of maize in 2005 which is higher than the sale of those who had middleman.

Market information refers to information on prices of commodities in different markets. This information includes commodity offers to buy or sell. Farmers can have an opportunity to advertise their products on sale as well as source inputs such as fertilizers and seed through the use of MIS. Rural farmers in Kenya get information from rural based Market Information Points (MIPs) known as information kiosks, mobile phone Short Messaging Services (SMS Sokoni), and SokoHewani.

The use of SMS Sokoni implies that a farmer who is connected to the network can access market information on prices in different markets. This facility also enables the farmer to have knowledge on the availability of commodities on the market. Mukhebi (2007) highlights that SokoHewani involves the use of West FM radio that offers to sell and buy agricultural commodities for smallholder farmers in Western Kenya. Munyua (2007) also states that radio stations in Kenya have become a handy tool in the improvement of small-scale agriculture in rural areas. The radio stations are being used to facilitate access to markets, electronic trading and accessing up-to-date and timely agricultural and market information (Munyua, 2007 and Grimshaw and Kala, 2011).The following section presents the theoretical framework.

2.6 Theoretical Framework

This section provides a theoretical framework underpinning the study. The selected theories to be discussed that are relevant to ICTs and rural livelihoods are sustainable livelihoods approach (SLA) and Sen's capability approach (CA). Both approaches seek to deal with poverty reduction. According to Heeks (2010), the role of ICTs can be explained using sustainable livelihoods, capability approach and economic growth theories. This section will discuss two selected theoretical frameworks.

2.6.1Sustainable Livelihoods Approach (SLA)

This study is informed by the Sustainable Livelihood Approach (SLA). Dirwai (2008) defines livelihoods as the social means necessary to make a living. In a rural setting, this refers to how the rural people get their employment income and how they share

resources. The rural people engage in various livelihood activities in order to get food, and income to satisfy their needs. Rural livelihood activities include agriculture and non-farm activities that include hunting, trading and hawking, artisan work, weaving and many others. A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. “A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the resource base” (Chapman and Conway, 1992:6). Cahn (2002:1) posits that the basis of life free from poverty is access and entitlement to a range of assets and livelihood strategies that can sustain households and individuals through the stresses and shocks of life. Whilst Krantz (2001), share the same view that rural people aim at achieving positive livelihood outcomes. This is a way of improving and increasing livelihood assets and reducing vulnerability. According to Carney (1999), the rural people are vulnerable to stresses and shocks that include seasonal shortages, droughts, declining resources, cyclones and epidemics. Therefore, it is the function of livelihoods approach to help people to evade such stresses and shocks.

Furthermore, a tentative framework to analyse sustainable livelihoods was outlined by the Institute of Development Studies (IDS) at University of Sussex, Brighton in the UK in 1992. The framework has three notable elements that include, Livelihood resources, livelihood strategies and institutional processes and organisational structure. Krantz (2001) mentions livelihood resources as the basic material or assets that are used by people to construct their livelihoods. The people need to achieve livelihood goals, therefore livelihood strategies are applied. Livelihood

strategies depend on what people have in terms of assets. People always choose livelihood strategies that will best provide them with livelihood outcomes. The livelihood strategies are composed of activities that generate the means of household survival. These livelihood strategies and activities include farming, labour, non-farm income enterprises and household maintenance activities meant to achieve better livelihood outcomes. According to Komair and Gamper (2002:8), “processes and structures represent institutions, organisations policies and legislation that shape livelihood”. Private and public organisations are examples of structures that have a mandate to implement legislation, policy and perform other duties that affect livelihoods. Furthermore, in the absence of these structures, sustainable development can be hindered and livelihood strategies cannot be applied. On the other hand, “processes determine the way in which structures and individual operate and interact” (Komair and Gamper, 2002:8). In the same vein, these processes can provide motivation for people to make choices and they are responsible for assets to be accessed. Turton (2000:15) highlights that “people’s livelihoods are largely affected by critical trends and shocks over which they have little control”. Trends and shocks can be positive or negative Kollmair and Gamper (2002) stress that, positive trends such as the construction of roads and ICT infrastructure can be used as opportunities to secure livelihoods.

The Sustainable livelihoods approach is a lens used to understand poverty and its causes and this approach has influenced thinking and practice throughout the development gamut (Carney, 1991).Ashley and Carney (1991) refer to sustainable livelihoods (SL) as a way of thinking about the objectives, scope and priorities for development in order to enhance progress in eliminating poverty. In the same vein,

Krantz (2001:1) explains that the SLA is an attempt to go beyond the conventional definitions and approaches to poverty elimination. Furthermore, Ashley and Carney stress that, SLA aims to help poor people achieve lasting improvements against the indicators of poverty that they define. Thus, the SLA is a way to improve understanding of the livelihoods of the poor people. According to International Fund for Agricultural Development (IFAD, 2012), sustainable livelihoods approach can be used to plan new development activities and in assessing the contribution that existing activities have made to sustaining livelihoods.

The discourse above, demonstrates the significance of the SLA in general development, eradication of poverty, social transformation and promotion of livelihoods, among other things. The importance of adopting the sustainable livelihoods approach is to reduce poverty and to unlock opportunities for the poor cannot be denied. However, the SL approach does not give sufficient emphasis on the need to empower the poor. It is important to empower the rural people in order to attain a sustainable solution to poverty. Empowering the people can enable the people to have productive resources that are necessary to them so that their income is increased.

The Sustainable Livelihoods approach is listed as an idea of the mid-1980s to 2000s because this is the period when it was widely deployed as a guiding principle for rural development practice (Ellis and Biggs, 2001). According to Solesbury (2003) the Sustainable Livelihoods approach came at a time when previous dominant theories and practices especially those associated with integrated rural development were losing their intellectual and political attraction. Agencies such as staff at Oxfam, CARE, and the UNDP have adopted the SLA in their work. Krantz (2001)

highlights that SLA was introduced first by the Brundtland Commission and the concept was expand by the United Nations Conference in 1992. The agenda was to achieve sustainable livelihoods as a broad goal to eradicate poverty. The Institute for Development Studies (IDS) and the British Department for International Development (DFID) adopted the Sustainable Livelihood concept and approach at the University of Sussex, Brighton in UK and a tentative framework was outlined to analyse sustainable rural livelihoods. The goal of SLA can be understood in the principles outlined in DFID's Sustainable Livelihood approach.

2.6.2 Sustainable Livelihoods (SL) Principles

There are a set of Sustainable Livelihood principles that help guide action to address and to overcome poverty. However, these guiding principles do not prescribe solutions or dictate methods. According to IFAD (2012) these principles are flexible and adaptable to diverse local conditions. Firstly, the Sustainable Livelihoods approach is people centred, it is designed to be participatory and it has an emphasis on sustainability (Ashley and Carney, 1999). Since the approach incorporates participation, it makes people to have ownership of their development ideas. The approach encourages people to be innovative and to indulge in various projects which are sustainable. At the end, the poor people must be responsive and participatory. In development, poor people must be the main actors in identifying and addressing livelihood priorities (Chambers, 1983). Chambers' idea of 'putting the last first' strongly suggests the need to have the poor people in the forefront of development efforts. This idea also helps them to have a voice and getting power to make decisions that affect their development. Secondly, Sustainable Livelihoods approach is recognised as holistic in nature. This means that it acknowledges that

people adopt many strategies to secure their livelihoods and that many actors are involved, for example the private sector, various ministries, community based organisations and others (Ashley and Carney, 1991).

Another principle is that SLA needs to be dynamic. According to Ashley and Carney (1991) the SL approach seeks to understand the dynamic nature of livelihoods and what influences them. It also builds on people's perceived strengths and opportunities rather than focusing on their problems and needs. The approach supports existing livelihood strategies. It promotes micro-macro links (IFAD, 2012) that allow the articulation between grassroots and national policy frameworks for holistic development. The influence of policies and institutions on livelihood options are examined by SLA and it also highlights the need for policies to be informed by insights from the local level and by the priorities of the poor (IFAD, 2012).

The Sustainable Livelihoods approach helps to understand the cases of poverty by looking at a number of constraints that reduce the poor's access to resources. It also promotes decision making by the poor thus enabling them to influence their own livelihoods. It is a useful tool for evaluating poverty reduction projects or programmes.

2.6.3Sustainable Livelihoods Approach Framework

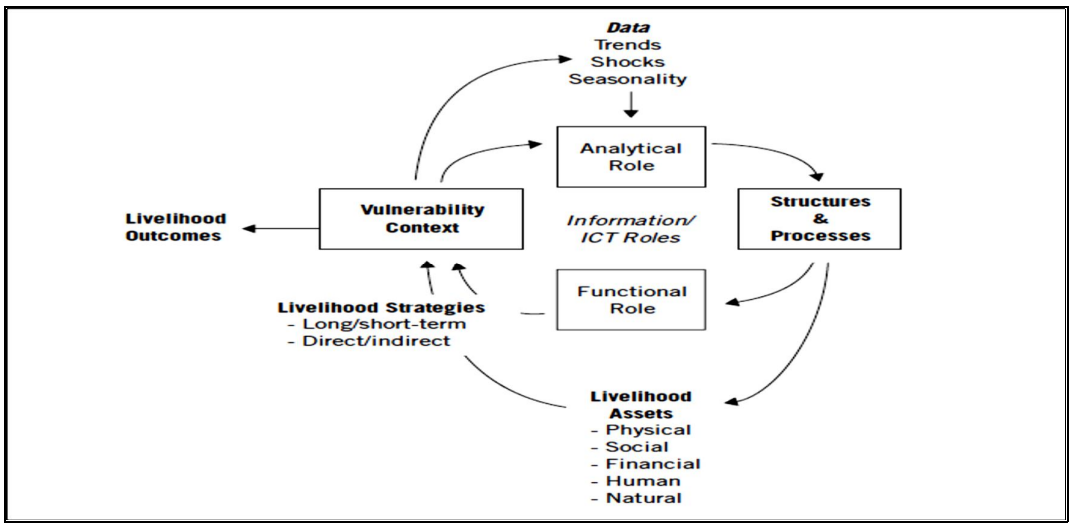
The Sustainable livelihoods framework helps in understanding the complexities of poverty. According to Soussan et al (2000) the Sustainable Livelihoods framework helps practitioners to understand the reality of the poor and the complexity of rural life. The asset vulnerability framework is the centre of the sustainable livelihoods approach that is meant to empower the poor to control their own lives. The

Sustainable Livelihoods framework helps SLA to utilize existing and new instruments and tools which are used to analyse the dynamics of poverty. The framework helps the voices of the poor to be heard as they make their choices.

2.6.4 ICTs and the Sustainable Livelihoods Framework

Figure 1 below outlines a model that explains an analytical view on the application of the role of information in relation to livelihoods framework. Duncombe's model clearly shows the role of information in the livelihood framework. The model has two categories of the role of information, namely, the analytical role and the functional role. The analytical role refers to information that can be used in an applied research capacity to assess vulnerability, identity and measure assets and investigate structures and processes. Whilst the functional role refers to how information and ICTs can be applied within livelihood strategies, the reason being to create livelihood outcomes (Duncombe, 2007:8). The arrows indicate participative and communicative processes that include research and action.

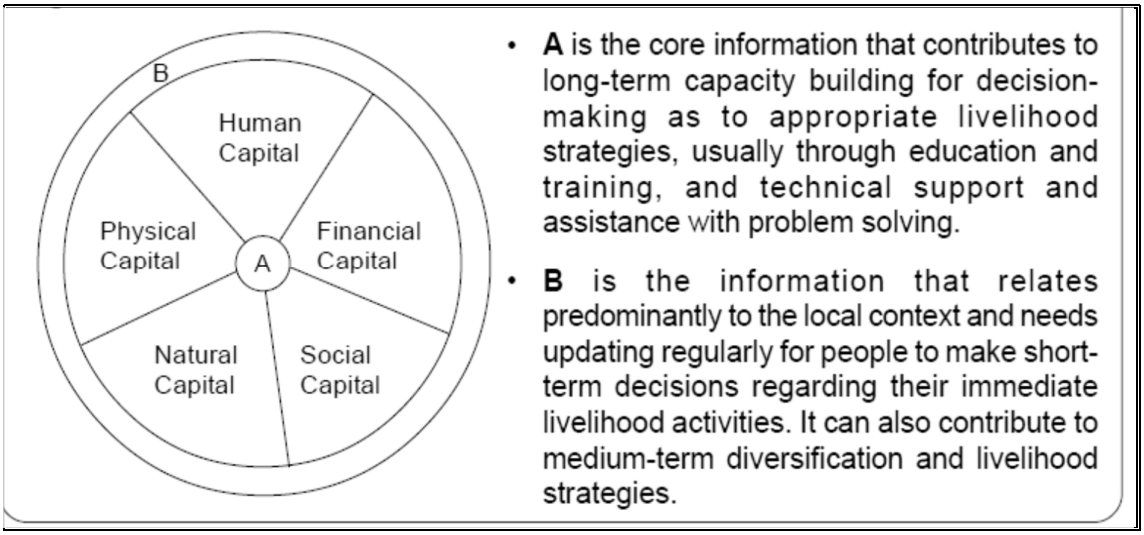
Figure 1: ICTs within the Livelihoods Framework



Source: Duncombe(2007:9)

Put differently, Chapman et al (2001) posit that, the role of ICT at the livelihood level can be usefully conceptualised using the livelihood information wheel in the diagram in figure 2.

Figure 2: Livelihoods Information Wheel.



Source: Chapman et al(2001:4)

Figure 2 gives a lucid picture of the role of information in support of sustainable livelihoods. In this case information is grouped into A and B in the wheel. These groups represent the dual role that information can play in support of sustainable livelihoods(SL). Chapman et al (2001) illustrates that circle A, represents information for long term capacity building and it includes education , training, and technical support suitable for the livelihood development of individuals or groups. Further, this core information contributes to improvement of the individual's knowlegde. It also enhances understanding of the systems and processes that can affect the way that assets are used in the longer-term and assists in the planning of livelihood strategies. Group B represents short-term decision making information. The information is meant to maximise the potential of a particular asset at any time

and it helps to reduce vulnerability to shocks and respond to immediate needs(Chapman et al, 2001).

Therefore, Chapman et al conclude that, information that is linked to sustainable livelihoods has two functions. Firstly, information is needed to be accessed by the poor for them to affect sustainable livelihood strategies so as to have livelihood outcomes. Secondly, information is needed by the decision makers such as institutions to execute strategic livelihood options. Generally, it is expected that for ICT to improve livelihoods of the people it should be directed towards achieving outcomes such as:

- increases in household income through improved agricultural productivity
- improvement in family savings. Family savings can be enhanced through developing of banking technologies that promote financial inclusion.
- Improves health facilities. More income facilitates better health facilities.
- Improves investment in education and training for children.
- Reduces vulnerability and sustain management of natural resources (Richardson2006).

However, there are many challenges that hinder livelihood outcomes. These include lack of effective and efficient financial service organisations that serve the agricultural producers and rural people. The rural people have no access to financial services which is a barrier to improve livelihoods.

2.6.5 The role of ICT in decision making

ICTs are essential in the area of development. Chapman et al (2001) contends that information needs to be harnessed effectively to assist those making decisions that

affect the sustainability, productivity and profitability of peoples' livelihoods. Thus, correct and updated information can be needed by farmers and institutions so that they have ample time to make decisions on issues of agriculture at household and other levels. However, improved information systems can help decision making at all levels so as to achieve effective livelihood strategies. That is why the provision of information, for example in agriculture, is important because it informs livelihood strategies to the poor, policy makers, agencies and institutions that are liable in the process of reducing poverty. The availability of information to the rural people can encourage them to participate in decision making. This allows the rural people to have an influence in decision making. Through information, the poor can defend their interests as well as presenting their needs to the top authorities. Improved ICTs can enable individuals to organise themselves, use information to hold institutions accountable and put pressure on relevant authorities to deal with their problems.

Further, Krantz(2001:26)highlights that, "SL approach facilitates an understanding of the linkages between people's livelihood strategies, their assets status, and their way of using available natural resources, and it is therefore a useful approach for understanding both the problem and the scope for promoting sustainable development at the local level". Decision making among rural farmers is improved by having access to information. Another important factor to take note of is that the rural people have coping strategies to develop certain outcomes and the poor of the poorest are not left out in decision making in shaping their own livelihoods. According to Krantz (2001) the concept of livelihood offers a more appropriate platform for evaluating the socio-economic impact of projects or programmes which

have poverty alleviation. The sustainable livelihoods approach has its strength and weaknesses.

According to Krantz (2001), the strength of sustainable livelihoods approach looks at a variety of activities to make a living. This is important to the poor because they have an opportunity to engage on different types of economic activities for their livelihoods. Furthermore, rural people have an access to different kinds of assets for their livelihoods. Krantz (2001) opines that sustainable livelihoods approach produces a more holistic view on the combination of the poor's resources. This approach also helps to understand the causes of poverty by looking at different factors at different levels that determine or hinder rural people to have access to livelihoods. Sustainable livelihoods approach gives an outline for assessing the direct and indirect effects on people's living conditions.

However, the weakness of the sustainable livelihoods approach is that the framework does not provide a direct answer to who the poor are since poverty is multi-dimensional and evasive" (Krantz, 2001:8). It is difficult to identify the poor who really need to be assisted. The resources and other livelihood opportunities are distributed locally and this is done by those who have power within the communities. The rural elites are the ones that benefit from the distribution of the resources. At the end, the rural poor remain with the same scenario because the benefits don't reach them.

Notwithstanding weaknesses stated above, the strengths of sustainable livelihoods approach looks at a variety of activities and it produces a more holistic view on the combination of the poor's resources to make a living as pointed out by (Krantz2001), it allows this study to bring the aspect of ICTs into the SLA framework. In that case,

in order to understand how ICTs can promote rural development, it is essential to consider the existing role of ICTs in people's livelihoods. Meanwhile, Chapman et al (2001) highlight that SL thinking shows many different livelihood strategies that can be developed by working with the assets, policies, principles and institutions in each context to influence positive change. The rural people benefit from information provided to them, it is therefore, imperative to understand the information that is needed by the rural poor in the development of projects, programmes, and policies in support of their sustainable livelihoods.

Many people who live in the rural areas depend on agriculture for their livelihood. Therefore, agriculture provides the rural with income from the agricultural products. Hence, the need of information by the rural poor and organisations is a necessity because it is used in pursuing livelihood activities and strategies. Farmers, for instance, need to have an increase in agricultural productivity. They experience low productivity due to weak extension services, lack of competitive markets, and lack of inputs such as seed, fertilisers and financial services because of lack of appropriate information. Chapman et al (2001) contend that agricultural extension, education, and training can help many farmers to maximise the potential of their productive assets. Furthermore, farmers need up-to-date information on sources available and the costs of agricultural inputs and techniques and technologies used for production. Farmers need to get information pertaining to livelihood needs and the options available for them to diversify. This means that the provision of ICTs to the rural communities can help the rural people to facilitate livelihoods.

As was discussed earlier on, the sustainable livelihoods approach consists of livelihood assets, namely human capital, natural capital, financial capital, social

capital and physical capital. Therefore, ICT has an important role to play in the livelihoods of the poor through improving their access to assets. Improved systems of the management and communication of agricultural information can help poor farmers make informal choices about opportunities and constraints associated with agricultural development strategies. It is noted that the provision of ICTs to the rural people can help the poor to pursue sustainable livelihood strategies and also can help decision makers to provide strategic livelihood options. The importance of ICTs can also be explained using Sen's capability approach.

2.6.6 The Capability Approach

Amartya Sen, a Nobel Prize winner, developed the popular theoretical explanation of the conditions of people and called it the "Capability Approach". Sen's Capability Approach is a framework used to evaluate a wide variety of aspects of peoples' well-being such as individual well-being, inequality and poverty (Alampay, 2003).The capability approach speaks to capabilities and 'functionings' (Sen, 1999). 'Functionings', according to Amartya Sen (1999), refer to a person's state of beings and doings which include a broad range of individual actions and conditions that a person has reason to value, including being healthy and avoiding premature mortality among others. Sen (1999) opines that capabilities can be analysed as all states of being and doing available to a person. Sen argues that all individuals have capabilities and it is a matter of realising these capabilities so that the people will be in a position to come out of poverty and to escape from the state of 'unfreedom' (Zheng and Stahl, 2011).

The rural people's capabilities can be enhanced if ICTs are developed. This can also help the individuals to make strategic choices and to improve the lifestyle they value (Alampay, 2003). According to Zheng and Stahl (2011), it is imperative to look at what people can or cannot do with the ICT applications offered and how effectively people benefit from them. For instance, ICTs can provide relevant agricultural information helping farmers to increase yields and to realise better price for the produce. Heeks (2010) opines that ICTs are increasing both capabilities and realised functionings in developing countries. However it is not clear how capabilities can be measured or translate policy that analyses the well-being of the individual (Zheng and Stahl, 2011).

This study will adopt the sustainable livelihoods approach because it is people centred, promotes empowerment, participation and it has an emphasis on sustainability among the rural communities. This can be evidenced in Bangladesh where mobile phone facilities were provided in remote and rural regions. The rural women in Bangladesh have been given mobile telephones to service the local village population. The women are called Grameen's telephone ladies. The ladies charge a small fee for the services they provide and as a result they can make a comfortable living. As a result the Grameen phone has made a great change in social and economic realms in the rural areas. If there is a provision of information and communication systems to the rural poor, they can pursue sustainable livelihood strategies. However, the question still remains whether ICTs are promoting livelihoods of the poor in the Zimbabwean rural communities.

2.7 Conclusion

There is growing literature on the use of ICT in agriculture in the rural communities. ICTs are being identified as a powerful enabler for economic growth and social development. The World Bank (2002:1) defines ICTs as “hardware, software, networks, and media collection, storage, processing, transmission, and presentation of information (voice, data, text, images)”. ICTs can only function if sound infrastructural development is provided. Information and Communication Technologies (ICTs) are becoming a dominant factor in eliminating poverty for the development of rural areas. A number of ICT-based development projects have been initiated in developing countries to harness social and economic opportunities for vulnerable groups in rural areas. The government in Zimbabwe commenced a strategy document and a comprehensive policy in order to harness ICTs for development of the nation. Policy describes what the government intends to achieve and it provides guidelines that direct the action towards achieving goals. According to Government of Zimbabwe (2005:4), “ICT policy is an integrated infrastructural, social, economic, environmental, legal and institutional framework that provides strategic direction and guidance for national sustainable development through the development and application of ICTs”. Therefore, ICT policy seeks to provide guidelines for the use of ICTs in sectors such as agriculture. Zimbabwe realised the importance of agriculture and it has linked agricultural activities to ICTs in order to increase agricultural activities. Stienen et al (2007) identify the function of ICT in agriculture as enhancing agricultural production, improving market access and capacity building and empowerment.

ICTs have been adapted in developing countries so as to improve the livelihoods of the rural poor, to increase their income opportunities as well as to escape from poverty. The study is underpinned by the Sustainable Livelihoods Approach (SLA). This SLA is a way of improving understanding on the livelihoods of the people. The livelihoods approach looks at a variety of activities and produces a more holistic view on the combination of the poor's resources to make a living. That is why the study has to bring in the aspect of ICTs in the SLA framework.

It is essential to consider the impact of ICTs in people's livelihoods as ICTs are a fundamental element of any rural development activity. The role of ICTs have been conceptualised using the livelihoods information wheel. The rural people need information to pursue their livelihoods strategies and to make correct decisions. ICTs have an important role to play in the livelihoods of the poor through improving their access to assets. In agriculture, the role of ICTs has been recognised. The farmers can have easy access to markets, enhance agricultural productivity and build capacity to empower the farmers. The following chapter is about backdrop of the state of ICT development in Zimbabwe.

Chapter 3

The state of ICT development in Zimbabwe

3.1Introduction

After the economic turmoil in 2008, Zimbabwe noted a considerable advancement in the development and application of ICTs in all Sectors. Zimbabwe embraced ICTs for development with the anticipation that it will promote social and economic growth. The diffusion of ICTs became one of the hopes to solve economic and social problems as well as promoting development. The government allowed the erection of boosters (transmitters) in various rural areas, even in the remotest areas for the accessibility of networks. Private companies that include Net One and Econet erected boosters to place ICTs within reach of the disadvantaged in rural Zimbabwe. According to Chisita (2010) Econet launched 3G technology that allows subscribers to access internet on their mobile phones. This technology can assist farmers to employ e-agriculture and e-business. Benefits from ICTs can promote social and economic growth as well as promoting development.

A study carried out by Bowora and Chagovachii (2010) demonstrates the benefits from ICTs in Zimbabwe. Accordingly, ICTs can facilitate remittance from outside countries like South Africa, US and UK. People working in South Africa or United Kingdom can send money home through Mukuru.com. Mukuru.com is an online remittances company that offers the opportunity to its customers who are working outside the country to send money, goods and services to relatives in Zimbabwe. These remittances can improve the status of the people in Zimbabwe. Business operators can benefit from ICTs by way of contacting suppliers in connection with

raw materials and can communicate with debtors for payment through cell phones. Another benefit is that the people can be aware of issues unknown to them. For example, the use of radios and television has improved the standards of living through improved information reception. Some programs on television allow Zimbabweans to be aware of issues such as HIV/AIDs, Malaria and TB. To embrace the benefits presented by ICTs, the government of Zimbabwe formulated a National ICT policy that provides direction and guidance for the development and application of ICTs.

3.2 The ICT Policy Environment in Zimbabwe

The Zimbabwean government established a National ICT policy in 2005. This policy has not been fully implemented to benefit the citizens of Zimbabwe especially those in the agricultural sector. Honourable Minister Nelson Chamisa (2012)(The Ministry of Information and Communication Technology-MICT)bemoaned that government policies face the risk of gathering dust after a lot of money and time is invested in the crafting process. In his address he encouraged stakeholders to ensure that the ICT policy is implemented to fully benefit the country (Gondo, 2012). The ICT policy was formed with the view to help bridge the digital divide through education and bringing an understanding on ICTs to the citizens. The policy states that ICTs need to facilitate the reduction of social, political and economic inequalities and increase national productivity and wealth creation (Government of Zimbabwe, 2005). The formulation of the policy supported the availability of basic communication infrastructures pledging to provide information to the people using local languages. The government noted that the ICT sector comprises fragmented policies and programmes which need coordination and that will enable the sector to implement

harmonised systems and standards to avoid the duplication of efforts. Information and Technology policy activities were implemented by different government ministries such as the Ministry of Science and Technology, the Ministry of Media, the Ministry of Transport and Communication and the Ministry of Media, Information and Publicity. All these Ministries had a part to play in the ICT sector and there was no proper coordination. The differences motivated the government to call for a sturdy and consistent national policy framework in order to harness ICTs for sustainable national development. Matters addressed in the policy framework include the following aspects:

- "Key challenges that are faced by the Government and the social and economic sectors of the nation.
- Policy directions for implementation by each sector. This provides the foundation for the development of activity programmes and action plans by relevant ministries and their stakeholders.
- To address the use of ICTs by women, youths, the disabled. There is need to develop and use local languages in the application of ICTs in all sectors of the economy.
- The policy proposes the establishment of a National Information and Communication Technology Authority. This agent will be responsible for ensuring coherence of policies across sectors in the country" (Government of Zimbabwe, 2005:9).

The view of the study is that Zimbabwe, like other African countries, ought to be part of the IST-Africa. IST-Africa Initiative is a program partly funded by the European Union to reduce the Digital Divide. The programme fights the Digital Divide through

sharing of knowledge, and experiences. The lessons learnt from partner countries and best practices are discussed to facilitate ICT policy formulation and implementation. The map appendix A shows the geographical distribution of IST-Africa member countries but Zimbabwe is not a partner. This has affected the regional focus of ICT formulation in the country. The program provides a guide [IST-Africa Guide to National ICT Policies] to the current status of partner countries' ICT policies. For example, the 2012 Report looked at the "National ICT policies in Botswana, Burundi, Cameroon, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Senegal, South Africa, Tanzania and Uganda" (http://www.ist-africa.org). Zimbabwe is not part of IST-Africa an organization which is likely to support ICT policy framework (refer to appendix A for geographical distribution of IST-Africa Partner countries).

3.3 ICT Services in Zimbabwe

The report on Information and Communication Technology in Zimbabwe (2012) emphasises that ICT services in Zimbabwe have been interrupted by the political and economic turmoil in the country in the past decade. Further, the challenges that the country experienced almost brought ICT sector to a halt. The major element that has contributed to the stagnation of ICT was shortage of foreign currency. Hence, the efforts to expand and to modernise ICT became fruitless. Besides that the benefits that accrued to other countries, that have embraced ICT could not be enjoyed by Zimbabweans. The benefits enjoyed include employment creation, social interaction, access to information and knowledge and many others.

Following a little historical background of ICTs in Zimbabwe, the government adopted a sector reform policy that allowed a worldwide access to inexpensive

Telecommunication and postal services. The policy put in place the need for improvements in service availability and quality and development of new services through de-monopolisation and privatisation (Government of Zimbabwe, 2012). The Postal and Telecommunication Act of 2000 highlighted the implementation of policy objectives. By that time the government operated the Postal and Telecommunication sector. The government decided to privatise the sector. As a result PTC was divided into three commercial units, namely, the fixed telephone provider (Tel-one), the mobile cellular company (Net-one) and the Public postal operator (Zimpost). After all these changes, the birth of Postal and Communications Regulatory Authority (POTRAZ) came into view. According to the report of ICT in Zimbabwe (Government of Zimbabwe, 2012:2), the mandate was to ensure a level playing field in the Posts and Telecommunication sector. Its duty was to license operators and to ensure that the services provided meet the acceptable standard. For POTRAZ to function properly it collects levy and licensing fee from the operators in the ICT sector. This body is an agent of the government which was formed to make sure that the services provided are in line with the ICT policy.

The privatisation of Tel-one was proposed in 2001, with the majority of shares belonging to the government which amounted to 70%and the remainder 30% shares belonging to a Strategic Partner who was supposed to accept the shares. There was no willing partner to take-up the shares and the government has a full control in operating Tel-one. In 2008, POTRAZ allowed ICT operators to offer all types of services that can be supported by their networks (African Development Bank, 2012:2). However, the government has full control of ICT agencies such as POTRAZ BAZ, MIC and a number of service providers that include Tel-one, Net-one,

Powertel/Zesa and the Zimbabwe Broadcasting Authority. A number of ministries were responsible for information and technology policy and activities in Zimbabwe before the creation of the Ministry of Information and Communication Technology (MICT) in 2004. The ministries include Ministry of Science and Technology, Ministry of Media, Ministry of Transport and Communications and the Ministry of Finance. In the ICT Zimbabwe report, POTRAZ should have achieved the following access targets:

- Increasing tele-density in urban areas to 10% in 2006 from 6, 3% in 2003.
- Increasing rural tele-density to 3% in 2006 from 0, 4% in 2003.
- Doubling internet access to 500000 in 2006 from 206,078 in 2003 (Government of Zimbabwe, 2012).

Furthermore, the aspect of privatisation opened doors to other mobile operators which created an environment for competition in the ICT sector. In 1996 government established its mobile telephony called Net-one. Similarly, Econet wireless and Telecel operators came into the market in 1998. However due to economic problems faced by the country in the last decade, the services provided by mobile telephony were lower than other countries in Southern African Development Community (SADC) region. This can be illustrated by Chiumbu and Nyamanhindi (2009) who pinpoint that the mobile penetration rate was 10% against 40% of Sub-Saharan Africa in the crisis period. However, mobile usage has been increasing by an average of 52%for other countries in the SADC since 1998(African Development Bank, 2012:5). In 2007-2009 the number of mobile phones increased to 60% per annum in Zimbabwe. The country recorded a remarkable increase in the number of

mobile subscribers to 28% in 2009 (African Development Bank, 2012). Meanwhile the increase in the use of mobile phones has accelerated as compared to land line users. During the crisis from 2007 to 2008, the market situation of all the ICT operators suffered a considerable capacity difficulty. This was noticed in the demand of ICT services which was larger than the supply. Consequently, this catalysed the flourishing of black markets, where one could purchase a line at unimaginable prices at informal markets. On the other hand, network problems emerged resulting in network congestion.

ICT driven projects were put in place by the government in order to promote agriculture. These agricultural programmes were earmarked to integrate ICTs in agriculture to improve agriculture in the country. Farmers in Zimbabwe have a number of ways of getting information. Information can be obtained through the use of primary and secondary sources of information such as census reports, farmers' magazines, community profiles and other data from statistical office. In Zimbabwe agricultural information can be made accessible through The Herald, Sunday Mail, and Farmers weekly among others. Furthermore, information can be accessed through libraries, agricultural extension officers, NGOs, national radio and television. The Government can relay agricultural information to various stakeholders and the public in the local language. The following section represents major ICT services in the country.

3.3.1 Agricultural Research Extension (AREX)

AREX assists farmers with updated information on market situation and similarly the buyer can be assisted with information concerning the availability of goods. AREX is operated by the Ministry of Lands and Agriculture. Its main objective is to provide

with agricultural professional services, research, extension and farmer training, advisory and technical support to farmers (Chisita 2010:3). According to Mangena (2011), farmers can use mobiles information systems to record and upload information about the farmers produce and what is expected on yields. Further, Mangena states that the information can be communicated through the internet or SMS or screens that would be connected located at the public market places. Agriculture Extension officers avail information to farmers by handing out brochures, posters, and pamphlets. Though the department is providing information to farmers, it is still struggling to make a break through on how to exploit ICTs to improve rural livelihoods. There are issues that need to be addressed such as connectivity, electricity and for small farmers themselves to know how to access such services (Chisita, 2010).

The services provided by AREX need to be supported by ICTs. For instance, a research carried out by Marimira (2010) shows that AREX deals with a number of farmers who need ICTs to access agricultural information. From the study, Marimira (2010) established that “An AREX officer resident at Dunstan farm indicated that he is responsible for about 187 farmers spread in five A1 and seven A2 farms. A2 farmer extension was indicated as only upon request. Interviews with the settlers at Dunstan farm revealed a high level of extension worker contact”(p 1). AREX officers are deployed to many parts of the country so as to help farmers. The officers confirmed that the use of ICTs is making it easier for them to help a bigger number of farmers in a short space of time.

3.3.2 Zimbabwe Academic and Research Network (ZARNet)

The programme was introduced in 1997 by the Research Council of Zimbabwe and it is funded by the government. This programme was commenced during the time when the government realised the potential benefits of ICTs. This project was initiated to facilitate access to information and to electronic communication facilities. The beneficiaries of this project are academic and research institutions, schools, NGOs, farmers and rural communities who cannot afford high connectivity rates that are provided by the commercial ICT service providers. ZARNet is a leading internet service provider that specialises in providing a variety of ICT services. These services include the development of websites and other related ICT solutions. Other services that are being offered at ZARNet include ICT seminars, technical training programmes. Smallholder farmers get information through seminars and technical training programmes. According to Chisita (2010:4-5), “ZARNet has helped to provide affordable access to Internet to small-scale farmers”. On the other hand, ZARNet seeks to empower farmers through the provision of internet services. These services enable farmers to search for potential markets for their produce. Farmers can be informed about weather patterns through the internet. The ZARNet programme received funding form UNDP after realising that farmers need cheaper and faster information to improve their productive capacities. Zimbabwe’s high literacy rate of 92% (Musingafi and Chiwanza, 2012:1, Chisita, 2010) makes it easier and faster for the farmers to use ICTs. Another beneficial programme is known as e-Hurudza.

3.3.3 e-Hurudza programme

e-Hurudza is an agricultural planning software package designed by a local private company to help support government agrarian reform. The software package provides agricultural information for all regions in the country. The programme presents tutorials on how to grow crops, planting methods, information on inputs, farming equipments and is concerned with livestock (Nleya et al 2010 and Kundishora, 2005). e-Hurudza permits the farmers to plan their work and to realise the full potential of their investment. The e-Hurudza program works hand in hand with AREX.

Farmers in Zimbabwe can have an access to ICTs through public facilities such as private cybercafés, telecentres and libraries among others. The advantage of these public facilities is that they provide with low cost services, ranging from radio and television, phone calls, internet and other facilities. Farmers can use cell phones to get information about market prices of agricultural products.

3.3.4 Agro-meteorological services

This is about the Meteorological department that deals with weather forecasting. The department informs farmers about the weather forecasts and give advice to local farmers on how to handle situations like drought or other serious climate conditions. Chisita (2010:6) states that the department informs the farmers about seasonal forecasts, weather updates, crop yields, analysis, timing of planting operations and many more. The Metrological Service Department relays information about weather in print form or via electronic media (radio and Television). Extension services can be offered to farmers through this department. The department has managed to computerise its systems to provide farmers with updated information. The University Of Zimbabwe is another institute that provides individual farmers with relevant

information regarding agricultural issues. It has launched online resources to be accessible by farmers and institutions that practice agriculture.

The African Conservation Tillage Network (2009) supports the acceleration of ICT driven meteorological services to boost productivity in the region. At the 2009 conference in Swaziland, they agreed that ICT up scaling is urgent in the region. The network argues that agro-metrological services can be effectively integrated with ICTs for effective agricultural strategies meant to promote productivity. Radio and television services are also widely used in Zimbabwe.

3.3.5 Radio and Television

Radio is widely used for the purpose of reaching the majority in Zimbabwe. The majority of the people can have access radio networks. As a result, people can be equipped with relevant information and it can encourage debates and participation in decision making in a local community (Gester, 2008). Further, Gester(2008:12) expounds that “sharing information and participation by the rural farmers augments transparency and empowerment”. Agricultural information can be broadcasted via radio and television which are important for the agricultural sector. In Zimbabwe there is a programme where farmers are allowed to phone in and pose questions on various topics concerning agriculture. The questions would be discussed and the farmer can get relevant information through the radio. The programme can benefit new farmers who are settled under the land reform program.

In Zimbabwe, the radio listening group (RLG) approach is very popular. The RLG approach involves farmers gathering together at a convenient place to listen to agricultural radio programs (Hanyani-Mlambo, 2002). Farmers then discuss the

agricultural issues raised in the program. This helps them to learn better farming methods from other farmers in the country. As a result the people can be equipped with relevant information. The program encourages debates and participation in decision making in a local community (Africa Partnership Forum, 2008). Further, Africa Partnership Forum (2008:12) expounds that “sharing information and participation by the rural farmers augments transparency and empowerment”. Agricultural information can be broadcasted via radio and television which are important for the agricultural sector. Mobile phones are also benefiting farmers.

3.3.6 Mobile phones

Mobile phones are seen as cheaper, compared with landlines. The number of subscribers is swelling in Africa. This is due to affordability of handsets, convenience and penetration. People in the rural areas, the old included, are now using cellphones for a number of business and social transactions. Mobile phones have become ubiquitous. They are found from shantytowns, cities and remote rural villages. Etzo and Collender (2010) point out that mobile phones are being used to do a number of things by people from all walks of life. Notwithstanding the positive uses, we also encounter some negative uses-the unwanted such as crime. On the positive side, they are used for basic communication (phone calls, messaging (SMSs), money transfers, such as EcoCash in Zimbabwe and M-Pesa in Kenya), telemedicine (collection and transfer of medical data), and sending of agricultural information are some of the uses of mobile phones. The dramatic penetration of mobile phones in Africa has made it to be termed a ‘cellphone revolution’.

Mobile phones have changed people’s lives in Zimbabwe especially in the rural areas. Economic opportunities can be harnessed by the mobile phone users. With

mobile phones the user can be contacted easily and can carry out business easily and advertisements of services can be facilitated. Mobile phone users can allow those without phones to make a call and are charged for a fee. People can also make a living in selling airtime vouchers to mobile phone users. Thus, ICTs have created employment for the locals and increase income to meet the household needs**.**

Apart from easily accessing market information using mobile phones, they can also get information about prices of inputs and equipment. This has reduced costs since they do not need to always travel to the market. Podcasts are also benefiting smallholder farmers in the rural areas.

3.3.7 Podcasts

According to Mark (2007:60), podcasting is a “low cost, low barrier technology that allows audio content to be downloaded automatically to one’s computer and later transferred to an iPod or other portable MP3 playback device for listening at a convenient time and place”. Podcasts are used in Zimbabwe mainly for the purpose of disseminating agricultural information amongst rural farmers. This is a cheaper way of distributing agricultural information in the form of audios and video on the internet. According to Chisita (2010) the podcasts are played on MP3 player to deliver information to the people. This is used for the sharing of knowledge and can be comfortably used with people who have no education. The advantage of podcasting is that it can be readily available, can be used in local languages and easy to use suitably for the rural set-up. For example, podcasting is being implemented in Mbire rural district in Zimbabwe where rural agricultural activities are predominant. During the rainy season the area cannot be reached easily and

infrastructure like electricity, mobile networks and telecommunications are not available. However, with the use of podcasts, agricultural activities increased.

Podcasts have advantaged many farmers in that knowledge can be passed to the farmers and at the same time they can share knowledge that improves agricultural productivity. Further, information provided through podcasting combines local and scientific knowledge. The information is available on demand. In addition, information dissemination to the rural small-scale farmers is “unaffected by events such as flooding, or poor communications infrastructure”(Gudza,2010:1). The Mbire podcasting project by Practical Action was funded by HIVOS (an International Development Organisation with Head offices in the Netherlands) and it has demonstrated that ICTs are powerful in complimenting traditional farming extension methodologies. Podcasts are very effective even in areas where communities lack access to facilities such as roads, telecommunications and electricity.

According to Gudza (2010) of *Practical Action Southern Africa, Zimbabwe*, the podcast project in Mbire has had an impact in terms of improved agricultural production. In quantitative terms, milk production increased from 0.5 litres to 2 litres per cow per day. He further indicates that livestock birth rates have also increased by a remarkable figure of 18 per cent. People in the area have also witnessed better management of livestock feed and consequently new crop varieties and productivity took an upward trend.

Empirical evidence shows that the Mbire podcast project helped the majority of farmers. For example Practical Action states that 75 per cent of the Mbire local population were reached and they benefited immensely. They are reaping a lot of

benefits through improved farmer-to-farmer knowledge exchange. Spill-over effects also benefited a large proportion of neighbouring communities. However, follow-up information is lacking to ascertain the current state of affairs. Telecentres are also benefiting the farmers.

3.3.8 Telecentres

Telecentres have been established to offer services the rural areas. The services offered include typing, fax, internet, printing and scanning. Centres with computers can be connected to online agricultural databases (Mangena 2011). Agricultural databases connect farmers from different areas and this makes it possible to share information on what they produce and the market prices. According to Chisita (2010) Telecentres are projects that are attached to a combination of telecommunication services, including telecommunication, internet, e-mail, office equipment radio and television. Telecentres can be a platform for buyers and sellers to get agricultural information in regard to agricultural produce. The first Telecenter was established in 1999 and it was named GUTU World Link telecenter project. Initially, this project was funded by the World Bank. This facility assists the rural communities to improve their livelihood. Telecenters provide locals with affordable communication systems. After its inception the project became popular with farmers, teachers and others. Chisita (2010) highlights that there are eleven telecentres in Zimbabwe and are changing the lives of the people in rural areas. However, lack of continual financial support is making some telecenters 'white elephants'. Web 2.0 technologies are also becoming popular.

3.3.9 Web 2.0 Technologies in Zimbabwe

Technological advancement in the field of communication is continuously presenting advantages that can be embraced by farmers. Chisita (2012) observes that Zimbabwean farmers are already using Web 2.0 technologies to enhance their productivity. Web 2.0 or social networks have penetrated many countries including Zimbabwe. Farmers are using cheaper communication platforms such as Mxit, 2Go, WhatsApp, Nimbuzz to share agricultural information. Chisita (2012) also indicated that a snap internet survey shows that Zimbabwean farmers are using social media to circulate agricultural Information. The same was observed by Nleya et al (2010). Examples are the “Potato Farming in Zimbabwe Group” and “Aquaculture ZimbabweTrust” that are promoting community-based web-based agricultural systems. These have improved productivity in the areas of potato production, freshwater aquaculture and fisheries. Furthermore, the New Zimbabwe Forum for Soya Bean Farming is promoting web-based innovative ideas in various parts of Zimbabwe to enhance productivity. Village to Village Networks have been facilitated by the use of Web 2.0 technologies. The current challenge is the poor uptake of the technology by the rural farmers. Another project that is worthy discussing is the freedom Fone.

3.3.10 Freedom Fone Project

Freedom Fone (Dial-up Radio) project was conceived and developed by Kubatana Trust of Zimbabwe in 2008. The project was funded jointly by Knight Foundation, Internews Europe and Hivos(an International Development Organisation with Head offices in the Netherlands). According to USAID (2012:1),

> “Freedom Fone is an open source, interactive voice-based communications platform that enables users to engage with their audiences across literacy, language, and

> connectivity barriers. Interactive voice menus can be programmed to provide localized and multi-language agricultural information on demand. Callers can navigate via keypad or voice, and Freedom Fone also has a voicemail feature for providing quick audience feedback for future evaluation and/or playback. The software does not require the caller or user to have internet access."

The project is benefiting a large number of farmers because it is cheaper and flexible. USAID (2012:1) confirms that the project "has been deployed nearly 100 times to date, with confirmed usage by 23 projects in 15 countries." Results show that farmers are benefiting from the project. The same project was replicated by the Agriculture Research Institute at Makerere University in Uganda. Results show that to provide farmers with market prices and agriculture extension information.

3.4 Conclusion

In recognising the importance of ICTs,the government came up with ICT policy framework that enables the provision of ICTs in all sectors including agriculture. The policy meant to bridge the digital divide between the rural people and the urban people through providing education of ICTs to Zimbabwe citizens. ICTs are meant to help in the reduction of social and economic inequalities. Boosters were erected in various rural areas by the private companies such as Econet and Netone to allow accessibility of networks. From the study carried out by Bowora and Chagovachii (2010) some of the benefits that accrued from ICTs comprise of remittance from outside the country through Mukuru.com and business people can contact their suppliers and customers effectively.

Information and technology policy activities were implemented by different government ministries which resulted in duplication of efforts and there was no

coordination. Therefore, the government implemented harmonised systems and standards to avoid duplication of efforts. ICT services have been interrupted by the political and economic disaster in the last decade. The ICT sector faced challenges of inadequate infrastructure, inadequate ICT facilities and lack of financial resources to mention a few. The shortage of foreign currency was cited as the major element that made ICT sector to decline. As a result, telecommunication services were privatised and this allowed other ICT service providers such as Econet, Telecel and Netone to participate in the provision of ICT services. This helped farmers to be able to access information through mobile phones, podcasting, and telecentres among others. Projects such as ZARNet, AREX, e-Hurudza, Poadcasting, Web 2.0 Technologies and others assist farmers to have relevant agricultural information. The next chapter will discuss the methodology used. Data presentation and analysis of the ICT will also be incorporated in the chapter.

Chapter 4

A note on Methodology; ICT strategies, benefits and challenges

4.1Introduction

This study follows a qualitative research methodology guided by a secondary analysis research design. Qualitative research method is an appropriate approach for this study because it seeks to understand the research problem from the perspectives of the local population it involves (Neuman, 2000). Thus it is aimed at determining the impact of ICTs in promoting rural livelihoods. Mack et al, (2005) opine that qualitative research methodology is effective in obtaining culturally specific information about the values, opinions, behaviours, and social contexts of particular populations. The strength of qualitative research is its ability to provide complex textual descriptions of how people experience a given research issue.

4.2 Research Design

The study used secondary data to collect information. Secondary data are data that are already collected by others. Since the study attempted to cover the whole of Zimbabwe, secondary data collection methods were seen as appropriate and effective. A number of secondary data sources had been identified. According to Neuman (2007:239), “secondary data analysis involves the re-analysis of previously collected data”. Furthermore, secondary data allows the researcher to compare data from different groups and nations and it facilitates replication. Secondary data also allows the researcher to delve into the issues that were not dealt with by the original researcher. The data can be obtained from government records, journals, newspapers, library textbooks and the world-wide-web. This form of collecting

information is cost-effective. It is less expensive because data are easily accessed by the researcher and this saves time. Secondary data collection methods are inexpensive and the information is readily available. It is also time saving since the data is already available. The other advantage is that there is no need to access the subjects or respondents. In most cases, the data would have been collected by experts hence the analysis will be based on expert or professional information. This means that the researcher reduces the cost of travelling to the field and giving allowances for research assistance. However, data that are made available can be unsuitable for the researcher. The information sometimes cannot tally with the research questions and at the same time the researcher can make wrong assumptions and results can be falsely interpreted. To overcome the shortcomings of secondary data, the researcher focused much attention on the validity and reliability of the gathered data.

This method of collecting data was used because it allowed the researcher to analyse the impact of ICT with reference to agricultural productivity for livelihoods improvement. The researcher ascertained whether ICTs are of benefit to farmers in agricultural activities.

4.3 Data Collection

Data collection involves obtaining useful information. The study collected data from published reports of government, reports from the Ministry of ICT sector, internet, journals, newspapers and periodicals. In order to address the objectives of the study the research questions are as follows:

- Could the ICT programme of the government be a suitable solution to smallholder farmers?
- How do the ICTs impact on the livelihoods of smallholder farmers?
- What are challenges of smallholder farmers in accessing ICTs?

These questions were addressed in the data analysis section using secondary data.

4.4 Data Analysis

The data was organised into themes in order to determine the relationship between ICT development and livelihoods. Data analysis involves examining, sorting categorising, evaluating, comparing, synthesising and reviewing recorded data (Neuman, 2000). Data analysis is a scientific process of gathering, modeling and converting data into information. In simple terms, information is processed data. The data analysis stage allowed the researcher to get meaning from the collected data. In this study the data collected was examined and analysed. Since the study used secondary data, report was generated from the journals government reports and the internet. This provided a meaning on whether ICT development has improved the rural livelihoods of the farmers in Zimbabwe. An analysis was carried out in order to obtain information on how the implementation of the ICT policy promoted the livelihoods of smallholder farmers

4.5 ICT Policy Implementation

Zimbabwe has recognised the importance of applying ICTs in the agricultural sector and this prompted the formulation of ICT policy in 2005. The ICT policy refers to agriculture as an important sector in Zimbabwe that contributes directly to food security at both national and household levels. The policy implies that the application of ICTs in the agricultural sector increases agricultural production and promotes effective land management as well as creating national wealth. The policy therefore advocates for the following objectives:

- "Ensure provision and maintenance of infrastructural facilities necessary for ICTs development, such as reliable supply of electricity, communications and transport.
- Promote and support the systematic, relevant and sustainable development of ICTs.
- Embark on extensive educational and training programmes to provide adequate supply of qualified ICTs personnel and knowledge workers in all sectors.
- Establish structures for effective implementation of ICTs strategies.
- Establish institutional mechanisms and procedures for determining sectoral application priorities; and
- Encourage the development and use of, and ensure equitable access to benefits offered by ICTs across gender, youths, the disabled and the elderly". (Government of Zimbabwe 2005:15).

So far, there are some targeted developments that have been achieved in the process of harnessing ICTs. Firstly, the government had a target to connect all villages with ICTs and establish community access points (Zimbabwe National

Statistics Agency, 2012). Areas such as Mubaira, Murambinda, Maphisa, Ngundu and Mutoko were selected to kick start the establishment of such community access points. The reason for developing these access points was to bring awareness to the rural communities on the role that ICTs play in people's everyday lives.

Another target was to connect all secondary and primary schools with ICTs. This was achieved when the Ministry of Information and Communication Technology and the Zimbabwe Academic Research Network (ZARnet) formed a programme that would link all schools to the internet. Statistics show that 80 schools have been included to be the beneficiaries of the project. On the other hand, the government purchased 1300 computers and 60 projectors and other ICT equipment to help facilitate the programme. An outstanding achievement with regard to this target was the introduction of a 40-seater lab model for schools which was put into practice at Chogugudza Primary school in Mashonaland West in 2011. The aspect of computerisation in schools is to promote computer literacy and e-learning. Manqe Secondary school in Matebeleland also received 42 computers, 2 printers, 1 projector, 7 adaptors and internet setup. The Zimbabwe National Statistics Agency (2012), also shows that a wireless internet connection was setup and the people leaving around the school have access to internet using wireless devices.

The third target was to connect all scientific and research centres with ICTs. Inthis regard, Zimbabwe is about to complete the installation of a fibre optic cable that links the country with the outside world. The fibre optic cable stretches from the sea via Mozambique and South Africa to Zimbabwe. The project ensures reliable and speedy internet connectivity (Ngoma, 2008).

The fourth target was to connect the health sector with ICTs. According to the Zimbabwe National Statistics Agency (2012), the health sector received 1200 cell phones which were delivered to rural clinics in Zimbabwe. This was done to improve the delivery of information on health data between clinics, hospitals and the Ministry of Health. On the other hand, the Ministry of Health would identify and respond in time to epidemics such as Malaria, cholera, HIV/AIDs and TB. Furthermore, radio service is connected to all provincial health offices and the programme to connect district health centres is about to be implemented (Zimbabwe National Statistics Agency, 2012).

The fifth target was to connect all central governments departments and establish websites. All the government ministries have websites and all the head offices are connected to the internet. However, all government offices are yet to be connected to the internet. Within the government departments, two hundred and five civil servants were trained on the use ICTs (Zimbabwe National Statistics Agency, 2012). Already, the Ministry of ICT and the Ministry of Public Service have established units of capacity building in different centres. This was to ensure that more civil servants receive training in the area of ICT. Currently 36 ICT trainers are already in the Public Service.

The sixth target was to make sure that all the citizens have access to radio and television services. Currently, the government is working on upgrading the existing television and radio services transmission grid as well as constructing new sites in the country (Zimbabwe National Statistics Agency, 2012).

Lastly, the target was to ensure that majority of the population has access and can use ICTs. The Zimbabwe National Statistics Agency (2012) shows that the

government is promoting ICT access by all citizens. Statistics show that there was an increase in the mobile penetration rate from 9% in 2008 to more than 60% in 2010. At the same time internet penetration rate increased from 1.5% in 2008 to 11% and 20% in 2010 (Zimbabwe National Statistics Agency 2012).Fortunately, the government has put some mechanisms in place to support the use of ICTs among the rural farmers.

4.6 Government Support

According Chamboko (2007), the government has agreed to support and provide foreign currency to the ICT sector so that the question of ICT expansion to the rural agricultural farmers will be solved. There is reasonable support from the government in the use of ICTs for the benefit of the rural people. In supporting the use of ICTs, the government introduced the National Rural Electrification Program in 2002. The main aim of the program was to supply electricity to the rural areas with the belief that the provision of electricity will facilitates the use of ICT gadgets. The Rural Electrification Agent (REA) was formed to take up this initiative. However, the on-going power cuts in Zimbabwe act as a barrier to the use of ICT gadgets, hence the government has introduced other forms of power generation that include solar systems, generators and batteries.

Another point to note is that the government deregulated the telecommunication sector, paving a way to other mobile service providers that include Econet, and Telecel. These mobile service providers managed to erect boosters/transmitters in rural areas to extend the coverage of the wireless communication network. Rural farmers are now using mobile phones effectively in contacting their farming business

activities. Where there are no physical telephone lines, mobile phones have closed the communication gap thus closing the ‘digital divide’ (Chamboko 2007).

The government further took a stance of supporting ICT by scrapping import duty on all ICT gadgets to allow affordability of ICTs to the populace including farmers. According to Mushonga (2012), the scrapping of duty has seen tele-density rising from 77.4% to 89.8% in 2012. Tele-density refers to the number of landline telephones in use for every 100 individuals living within an area. The motive behind removing import duty on ICT products was to promote development in the ICT sector. The products that are on the free duty list include computers, laptops, mobile phones and radar equipment among others. Such initiative has had impact on agriculture and people’s livelihoods.

4.7 Strategies employed by the government

The implementation of ICT strategies helped the government to introduce strategies to ensure access of agricultural enhancing information by rural farmers. The research found that the government employed strategies for the promotion of ICT in agriculture. To achieve the provision of ICT for smallholder farmers, the government put in place programmes that facilitate the flow of agricultural information. For example the provision of information through Podcasts in Mbire district is a strategy that was implemented as an appropriate alternative for areas with poor road infrastructure. The results show that podcasting is used to disseminate agricultural information in rural areas. The government in collaboration with a non-governmental organisation called Practical Action initiated the programme. Podcasts are developed in local languages and farmers obtain information concerning livestock production and crop management. This project motivated the farmers to produce more and

share knowledge through the use of ICTs. According to Mika (2009) and Gudza (2010) podcasting reached 75% of the farmers who are benefiting from animal and crop production. However, lack of electricity is a challenge since the batteries need to be re-charged. The advantage of podcastings is that they are user-friendly. This enables the rural farmers to understand the meaning of the agricultural information. This suggests that podcasting is a useful tool in improving rural livelihoods.

The study shows that radio broadcasting is a strategy for a mass media that has benefited the rural farmers in particular. It has helped farmers to know about weather changes, pests and disease control. Farmers are educated on how to implement farming practices and activities. The use of radio has benefited the rural farmers because the broadcastings are done in the local language which is an advantage to the smallholder farmers especially those who are uneducated. Findings also show that traditional ICTs such as radio and television are used for programs that have attracted participation among farmers throughout the country in Zimbabwe. For example, in areas such as Chimhanda and Nswasivillages, agricultural extension officers use the Radio Listening Approach (RLA). The Radio Listening Approach is widely used and it involves farmers gathering together to listen to agricultural programmes and later discuss agricultural issues (Hanyani-Mlambo, 2002). According to Nyareza and Dick (2012), the advantages of using radio to promote agricultural production are listed as follows:

- “It overcomes distance, and thus has immediate effect.
- It is the only medium of mass communication that the rural population is very familiar with because a radio set is cheap to obtain and is widely owned in

the rural areas. This is made possible by the advent of the battery-operated transistorized sets and the invention of wind-up radio.

- Radio's power contributes to mass education because it is easier to attend to than print, and it is more accessible. Listening is easier than reading, and if people of low cultural levels are interested in serious subjects, then radio is a more effective way to communicate than print.
- The use of radio to disseminate agricultural information is relatively cheap when compared with other media. In Malawi, one project evaluation found that radio-trained farmers in new agricultural techniques cost 3,000 times less per hour than face-to-face extension services" (Nyareza and Dick, 2012:497).

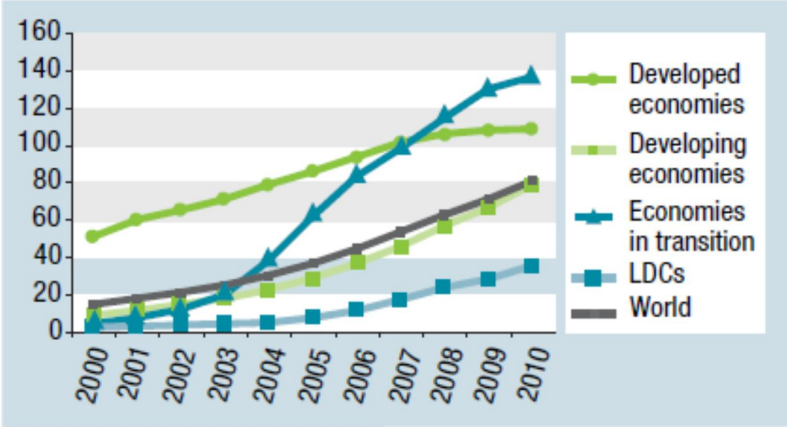
Another example of ICT strategy is the introduction of the community information centres in rural areas so as to provide one stop ICT access points. The program ensures that farmers get information necessary for agricultural activities since all the ICT gadgets are placed in one place for easy accessibility. Generally people in Zimbabwe are exposed to ICTs in one way or the other. For example, the rural farmers use radios, mobile phones, telecenters, podcastings and others.

Telecenters are used to provide ICTs and information to rural farmers. These are placed at convenient places so that the people have easy access to information. The first telecenters project was introduced at Gutu growth point in Masvingo province of Zimbabwe. The project was initiated by the government, local communities, non-governmental organisations and other stakeholders and it was funded by the World Bank. Chisita (2010) confirms that telecentrers facilitated the improvement of the lives of the local people because they access information through ICTs.

Furthermore, seven telecenters have been established throughout the country and it is changing the lives of the people.

The provision of affordable mobile services in Zimbabwe is benefiting the rural people particularly smallholder farmers. Network expansion has greatly improved. Almost every area in Zimbabwe has network coverage through three service providers namely Econet, Telone and Telecel. The use of mobile phones is now widespread in Zimbabwe. The recent cell phone revolution has seen an increase in the usage of cellphones the world over. Mobile telephony is gaining momentum on a daily basis with developing countries also witnessing increases in subscriptions. Figure 3 below illustrates the trend in world mobile telephony until year 2010.

Figure: 3 Mobile Cellular Subscriptions Per 100 inhabitants, by Country group, 2000-2010



Source: United Nations' Information Economy Report (2011:19)

Generally, mobile telephone usage is on the increase. The United Nations' Information Economy Report (2011:19) states that "the mobile telephone has become the most prevalent ICT tool among the poor, among rural habitants and among micro-enterprises in low income countries". Most African countries are also reaping the benefits of ICT development. Figure 3 shows an upward trend in the

usage of cell phones. Recently, cell phone manufacturers are supplying “smart phones” on the market and this has improved the access of ICT services on the mobile phones. The internet, e-mail and other services that were traditionally available on computers in offices and internet cafes can be accessed from the mobile phone. This is immensely improving access to information by the previously marginalised or excluded thus closing the ‘digital divide’. According to Mangena (2007) mobile phones are used to notify farmers on the latest market prices. This enables farmers to make choices on the selling patterns. However, the network problems hinder the use of mobile phones in Zimbabwe.

According to Zimbabwe Broadcasting Corporation(ZBC) (2012:1) the Postal and Communications Regulatory Authority (POTRAZ) states that mobile subscribers increased by 74% over the past 10 years and tele-density also increased from 314000 mobile subscribers to over nine million subscribers in 2012. With this development, POTRAZ budgeted $20 million dollars for the expansion of ICT. The purpose of using different ICT gadgets and ICT projects and programmes is to help rural farmers to access agricultural information and at the same time improving their livelihoods. For example, the introduction of telecentres in areas such as Gutu help farmers get information and this project is meant to be self-sustaining. The income generated from the project should keep it as a going concern and at the same time providing ICT services to the local communities.

Internet in Zimbabwe is growing gradually. The government is focusing on the improved use of ICT to provide information to farmers and to promote rural development. Both conventional and modern ICTs can be useful for the dissemination of cheaper and reliable information to farmers. Information systems

are built with the aid of agencies from Agricultural Research Extension (AREX). These information systems train farmers online. Farmers are taught how to plant and to access markets. However, this is most suitable for literate farmers who happen to be commercial farmers.

Information in Zimbabwe is disseminated through electronic and print media. Examples are newspapers such as the Herald, the Sunday Mail, and Kwayedza among others. The papers have a section on agricultural information. Kwayedza is published in the local language for easy understanding by semi-literate farmers.

The Ministry of Agriculture, Mechanisation and Irrigation Development (MoAMID) was mandated by the government to support smallholder farmers through the e-voucher systems. FAO (2012) states that electronic vouchers (e-vouchers) are mechanism used to ensure speedy access of agricultural inputs by smallholder farmers. Furthermore, it states that e-vouchers empower smallholder farmers to easily select agricultural inputs in line with cropping seasonal requirements.

Findings show that initiatives such as e-Mkambo need to be supported by the ICT policy for livelihood enhancement. The notion of e-Mkambo came up as result of challenges that are plaguing agriculture. Knowledge transfer Africa (Pvt) and Afro soft Holding Ltd developed a mobile web-based facility called e-Mkambo. The platform is used by farmers to share information and knowledge. Agro-focused transactions are also conducted using the facility. Findings show that farmers are happy because they use e-Mkambo to get reliable and timely agricultural information that assists them to make effective decisions. According to the Newsday (2012:1) “e-Mkambo is an integrated platform on which we are gathering and making sense of information and knowledge from diverse sources in agriculture and rural

development. It is designed to be an experiential service in which farmers and other agriculture value chain actors can receive and send information on their mobile phones or through email,"

E-Mkambo programme is important because it allows all policy makers and other agriculture stakeholders to come up with better strategies for the implementation of ICTs for the benefit of farmers. According to Chapman et al (2001) information is needed to assist those that make decisions that affect sustainability, productivity and profitability of agriculture for promotion of people's livelihoods. The e-Mkambo programme uses mobile phone and internet for the sharing of agricultural information. Because of access to, and availability of, mobile phones in rural Zimbabwe, rural people are getting connected with the outside world hence their lives are changed. Many people can afford cheaper mobile phones that come from China hence cellphones are no longer a preserve for the rich. This has allowed many people in Zimbabwe, including those in rural areas, to have an access to mobile phones.

Through these programmes the Government managed to provide agricultural information that includes computerisation of all agricultural management records, providing online access to relevant data (techniques, weather forecasting, pricing and market information) to national and district level stakeholders, developing and maintaining a national GIS system and to monitor agricultural land use and manage national resources. The above strategies can only be effected if proper infrastructure is made available.

4.7.1 Infrastructure supporting Strategies

The policy advocates for the development of supportive and enabling infrastructure to ensure equitable access to ICTs by all citizens including disadvantaged groups and rural communities who derive their livelihood from agriculture (Government of Zimbabwe, 2005).The findings show that the government is working towards infrastructure development.Without these infrastructures it will be impossible for the farmers to access ICTs. For example, the construction of transmitters has improved network coverage hence promoting the cell phone revolution in the rural areas. The government has also developed the national broadcasting transmission grid to improve television and radio coverage in the country. The development of the transmission grid is a necessity for the rural areas. This will ensure that all those in the remote rural areas receive radio and television services. Results show that the construction of the optic fibre cables have been seen as a great achievement and this will help ease problems of lack of access to ICTs in the country. Consequently, this development is expected to improve the livelihoods of the people. The optic fibre technology has advantages of creating better and affordable ICT services in the country. The government also anticipates that ICT costs will be lowered thereby creating an opportunity for all citizens to have access to ICTs. Since ICT infrastructures plays a vital role in the development of the country, education and training is needed to enhance ICT benefits.

4.7.2 Education and Training

ICT policy advocates for educational and training programmes so that ICTs are used effectively in all sectors, for capacity building. The government is involved in extensive educational and training programmes to provide an adequate supply of qualified ICT personnel and knowledge workers in all sectors (National ICT Policy

2005).This is done through farmer education and training on how to implement ICTs for their benefit. In Zimbabwe, agricultural information is provided through the Agricultural Research Extension Services (AREX) which falls under the Ministry of Agriculture. A program called e-Hurudza was established by the government to support agriculture. E-Hurudza is a software package that provides agricultural information to farmers in the country. The programme provides information that educates farmers on how to grow crops, inputs information and how to keep livestock. ZARNet offers internet and other ICT services to farmers. The services provided enable farmers to search for markets. AREX has a mandate to educate and train farmers on how to access agricultural information. This agent deals with agricultural information production, analysis and promotion. During the crisis period AREX had a serious shortage of manpower, transport and minimal financial resources. As a result, the AREX worked below capacity and the government closed the gap by providing agricultural information through newspapers and radios. Though the government tried to provide agricultural educational information through newspapers and radio it proved to be fruitless because the majority of rural farmers had no access to radio transmission and newspapers.

Farmers receive training through radios, television, newspapers and the internet. As a result farmers learn about crop planting, keeping livestock and harvesting techniques among others. However internet is available to those who are connected and are literate. The government needs to increase the number of ICT skilled workers in order to help in the interpretation of agricultural information through the internet and other ICT gadgets. The findings show that the number of trained ICT skilled workers was 205 people in 2010. The number of ICT skilled workers needs to

be increased so as to promote ICT development among the citizens. The process of educating farmers and other citizens promotes effective use of ICT for agricultural productivity. This is in line with the ICT policy statement which encourages the training of farmers to use ICTs for the promotion of agriculture. Meanwhile educating farmers equips them with skills that will enhance production and at the same time improve livelihoods. The benefits that accrue from ICTs show that there is positive impact on livelihoods of smallholder farmers.

4.7.3 Benefits

Enough evidence of the benefits of ICTs in agriculture has been acknowledged. Munyua (2007) propounds that farmers need to use their farms effectively and efficiently especially when the farmers adopt better agricultural practices, high value crops, and improved technologies. If the farmers use their farms effectively and efficiently they are bound to benefit from increased agricultural productivity and eventually improved livelihoods. According to Chisita (2010), ICTs have a potential to improve livelihoods as farmers benefit from rising incomes and increasing productive efficiency.

Research findings show that rural people need information to improve their livelihoods through ICT enhanced agricultural production (McNamara, 2008). Gunasekera and Miranda (2011) show that ICT support livelihood by providing information that is needed by the smallholder farmers for them to come up with livelihood strategies. Availability of information also enables them to improve the quality of their products. For example, Zimbabwe is divided into 6 ecological regions, thus farmers need to have adequate information regarding the crops that can be planted in their respective areas. Information is disseminated to and accessed by

farmers through the use of radios, televisions, computers, the internet, and mobile phones, among others. Farmers use different ways of accessing the information because of uneven development in the country. Appendix B shows the map of six ecological regions.

ICT has enormous potential to increase efficiencies within the agricultural sector and improve food security by improving information flows between farmers, consumers and agriculturalists. This offers the potential to increase market access for farmers, respond to consumer needs and through better practices, increase crop yields and profitability.The CTA (2008) Report states that farmers have a potential of improving their marketing strategies. Improvement of market strategies will help them earn more income through improved and profitable sales. Therefore, the use of information and communication technologies such as radio, mobile phones, internet and many others provides farmers with market information. The use of these tools is a good strategy for farmers to obtain information concerning current prices in different markets. The tools enable farmers to be in a position to access markets for their products. According to Grimshaw and Kala (2011), farmers can be connected to accurate and up-to-date information concerning buyers at the local and international markets. The availability of markets helps farmers to sell their products directly to the buyers thus avoiding middlemen who tend to deflate prices of the agricultural products in their favour. Furthermore, there are a number of organisations that are assisting farmers to access markets and promoting transparency. For example, in Kenya farmers have a programme that assists them to access markets which is called Kenya Agricultural Commodity Exchange (KACE). Reports show that farmers from Bangoma District in Kenya had an increase on the sale of maize by 22% in

2005 (Mukhebi, 2007). Farmers know what crop to grow, when to grow, how to grow it and where to sell their products. Without wasting time travelling in search for markets, the farmer saves money by gathering information using ICTs such as mobile phones, radio, and the internet. Mobile phones are transforming marketing systems in countries like Kenya. Internet is used to collect and distribute information about market prices. The KACE programme communicates market information though ICT web site, SMS, radio and through network of rural information. The availability of information on agricultural markets is essential to farmers. This helps farmers to increase standard of living in rural areas. The standard of living is increased because increase in income. The use of ICTs also helps farmers to interact with other farmers. The farmers gather and share market information amongst them.

Further, ICTs provide information to inform policies and other stakeholders and processes that influence their livelihood options. Findings show that Information and communication technologies help farmers to make better decisions about when and what to grow. According to McNamara (2008), radio interventions form a platform for the rural people to contribute to the decision making process. Farmers are informed with timely and relevant information that helps them to decide on how to use resources effectively. In addition, radio broadcasts give farmers an opportunity to implement methods of farming extended to them. The rural farmers also share their experiences through radio-based debates and this increases learning capacity through information transfer.

A report from the Technical Centre for Agriculture and Rural Development (CTA) of 2008 shows that farmers establish the trend of demand for certain crops. With the

increasing use of ICTs, farmers and buyers are dealing using the telephone or SMS or internet. For instance, the CTA report shows that, an extension officer in Bikita rural district in Masvingo province uses information disseminating radio programme as a platform that enables local farmers to listen, discuss and ask questions on farming practices, markets and weather patterns. The villagers take an advantage of using toll free numbers to call the extension officer and then discuss about farming practices, markets and discuss about agricultural policy issues and programs. Another farmer in Masvingo is using mobile technology to contact suppliers, clients and to link with other farmers in the area. He uses the mobile phones to call agricultural extension officer and to know what best variety to use in the drought prone area. The farmer also gets information on foreign exchange rates and the weather reports through the use of mobile phones.

Infrastructure developments have created job opportunities for the rural people. The people in the rural areas were engaged during the construction of transmitters/boosters. The availability of better infrastructure has an advantage of providing an enabling environment for economic activities to take place. For example, the erection of transmitters has helped farmers use ICTs to obtain market information and to sell their products easily. Accessing information, for example, the use of mobile phones by farmers helps to increase productivity and eventually livelihoods are improved. From the findings, it was established that ICTs contribute to decision making processes and also promotes social capital development among farmers. If farmers are equipped with relevant and accurate information it motivates them to participate in decision making processes hence boosting social development. The government of Zimbabwe supports the provision of agricultural

information to farmers. In this regard social capital is improved because there is an interaction between the government and the rural farmers. Through ICTs farmers interact amongst themselves thus gathering and sharing experiences. For example, the use of radio allows farmers to ask questions about matters that affect them during the agricultural season. Access to information technologies also enables workers to perform better and they can work even if they are not in office especially when using mobile phones. The time that is spent in decision making is reduced because there is free flow of information.

Many households are benefiting from e-voucher and e-Mkambo programme. For example FAO (2012:6) states that 339000 households received agricultural input during the 2010/11 cropping season through e-voucher system. It is anticipated that the program will be up-scaled to reach a further 18000 households for the 2012/13 cropping season. The inputs strategy involves issuing electronic cards to smallholder farmers for them to purchase seeds, fertilisers, agrochemicals, farm implements and spare parts. Purchases are done through registered agro-dealers and this has the access of agricultural inputs by smallholder farmers.

4.7.4 Challenges

According to Munyua (2007), smallholder farmers are facing a lot of challenges in developing countries such as Zimbabwe. Initially, smallholder farmers have small farms and these are insufficient for them to exhaust agricultural activities. Due to climate change smallholder farmers are facing a decline in crop production as a result of drought conditions. Zimbabwe experienced drought in the year 2001/2002. This reduced the standard of living of the farmers in the rural areas through food shortages that threatened food security in the country.

According to May et al (2007), ICTs may not be accessed by many rural farmers, simply because of the geographic location. Rural farmers are situated in remote areas that lack infrastructural development in the form of roads, telecommunication facilities and network coverage. To avail ICTs in these areas is a challenge that affects both the service providers and the farmers. For example in Zimbabwe, most rural areas have poorly developed infrastructures and this study found that the rural farmers are thus not linked with markets. May et al (2007) further state that the lack of skills, confidence and motivation can affect the agricultural sector. This means that farmers face capacity constraints that disassociate the users from engaging technology.

Zimbabwe's economy is coming from a decade of crisis, hence, it does not have enough foreign currency to acquire state of the art ICT equipment. Another challenge is that farmers do not have access to credit from banks because they do not have collateral security. The land that they possess is communal with no title deeds. That is why the farmers cannot use the land as collateral security. Because of lack of funding, farmers find it difficult to purchase adequate inputs; as a result their productivity is negatively affected. In other situations farmers are forced to enter into arrangements with companies that offer restrictive and exploitative contract farming arrangements who pose as middlemen. The middlemen take advantage of farmers who do not have transport to ferry their agricultural products to the market. Most middlemen buy farm products at duplicitous prices. The middlemen negotiate prices to their advantage. For example, cotton farmers in Zimbabwe complained about the unfavourable prices offered by buyers in the 2011/2012 agricultural season. Buyers set the price of cotton at $0.40c per kg instead of $1.00 per kg which was offered in

2010/2011 season (Zimbabwe Independent The, 2012). This left farmers with no choice but to sell their cotton at the low price since buyers enjoy a monopolistic position in the cotton market. Monopsonies are buyers with monopoly buying power. Farmers need to have information and experience in marketing agricultural products.

Chisita (2010) shows that in Zimbabwe farmers face a number of challenges with reference to the use of ICTs. First, there is a problem of low connectivity density throughout the country. Due to connectivity constraints, most rural areas do not have basic ICTs like fixed telephone lines. This is caused by lack of infrastructure that is the base for all ICT services in the country (Government of Zimbabwe, 2005). The efforts of government to build ICT infrastructure were hampered by lack of foreign currency. Infrastructure services deteriorated during the crisis period from 2000 to 2009 and Zimbabwe is still lagging behind other countries in the region in infrastructural development. During the crisis period the country lacked resources necessary for the maintenance of Infrastructure. At the same time the country did not manage to attract new investments so as to promote ICT infrastructure. This means that for ICT to be accessed by the rural people there must be good roads and electricity. There are areas in Zimbabwe that have very bad roads and the rural people are not reached easily especially during the rainy seasons. Electricity is an important component for the effective use and accessibility of ICTs. Though the government has initiated the provision of rural electrification, there is a shortage of power in the country. The challenges include low connectivity density and slow rate networks.

The supply of energy in the country remains a barrier to economic activity. Though the government initiated the supply of electricity in rural areas, constant power cuts

hinder ICT development in the rural areas. Also, financial resources are scarce and this has an impact on infrastructure development and ICT facilities. Another problem is that, there are no synergies between private and public institutions in the development of ICT. There is need to promote coordination between stakeholders in the development of ICTs in agriculture. Farmers need to be educated and trained on how to use improved technologies.

Furthermore, agricultural livelihoods are vulnerable to climatic changes, change in market systems and the unexpected and unforeseen disasters. The purpose of ICTs is to provide awareness and information in relation to the disasters. This means that farmers will be equipped with measures to apply when the misfortunes happen. What is necessary is timely information to be used as a measure to prevent agricultural livelihoods vulnerabilities. For example, there was a situation in Zimbabwe where cotton smallholder farmers planted cotton in anticipation to sell at a higher price. Then the unforeseen that happened was that the prices that were offered were not to their expectations. The decrease of cotton prices has negatively affected the livelihoods of thousands of smallholder cotton farmers. The farmers failed to repay the funds they had borrowed for agricultural inputs. In this scenario timely information was needed to help farmers to decide on what to grow thereby avoiding this predicament. In Zimbabwe it is difficult for the rural farmers to access markets for their products. Agricultural markets are controlled by the government and the prices offered are regulated. Price regulation is a barrier to competition. Other countries like Kenya have programmes and projects that facilitate access to markets. For example the KACE programme. The government in Zimbabwe needs to learn what other countries are doing in terms of e-agriculture. It is equally important to

make available the literature that promotes training so as to improve productivity by farmers. The government should allow smallholder farmers to explore different markets for their products.

4.7.5 Some Weakness of the ICT Policy

According to Prato and Longo (2012) policy development in agriculture is influenced by the existing structures. Elites have full control in influencing policy. Smallholder farmers suffer effects of marginalisation. The voices of the rural smallholder farmers are rarely heard even if they have a representative in policy making. Munyua et al (2008) posits that the needs of the smallholder farmers are not adequately addressed in the process of policy formulation. There is no commitment by the government policy to listen to the smallholder farmers' needs. Decisions are made by the government rather than by elected representatives. Even if the government includes the poor in decision making there are not fully engaged to participate in decision making processes. For example the ICT policy in Zimbabwe was reviewed in May 2012. Zimbabweans were given an opportunity to give comments and feedback through the Ministry of Information and communication technology website. Only those who were connected to the internet had the opportunity to raise their views. The rural people have little access to ICTs such as internet and they cannot participate in policy development. Another factor is that the document was written in English and only those who are capable to read English could participate in the review of the policy leaving out the poor. Smallholder farmers can make their views known through radios and television. Another weakness in the policy is inconsistency and lack of coordination among ministries. For example, the government scrapped duty on all ICT products. Nevertheless, the authorities in the Ministry of Zimbabwe

Revenue Authority claimed that they were not aware of the government scrapping duty on all ICT products (Mushonga, 2012). Mhlanga (2006) agrees that while ICT policy formulation is controlled by the government, other stakeholders should be fully involved in the policy formulation to make sure that the development of ICT will not be hindered.

4.9 Conclusion

This study used a qualitative research methodology guided by a secondary analysis research design. The qualitative research was used to determine the impact of ICT development in promoting livelihoods in Zimbabwe. Data was obtained through the use of government reports, internet, newspapers and academic journals. From these documents the study managed to discuss ICT policy in Zimbabwe. There are targets that need to be achieved for the promotion of ICTs. The targets are mainly to connect all sectors of the economy including rural villages and government departments. The government has introduced the supply of rural electrification. This was also followed by the deregulation of telecommunication sector allowing other ICT stakeholders to participate. In order to ensure the expansion of ICTs in rural areas, the government employed ICT strategies. Research findings show that ICTs improve the livelihoods of the rural people by way of getting access to markets, to make better decisions and increase agricultural productivity. Information is disseminated through the use of radios, television, internet, telecenters, podcastings and mobile phones among others. Participation is promoted especially with the use of radio.

While there are some benefits that have accrued to farmers, they still face difficulties in obtaining information through ICT due to the lack of ICT infrastructure and lack of

awareness of ICT. Farmer challenges are different in nature in Zimbabwe; they include climate change, drought, insufficient financial resources and natural resources, low connectivity density, lack of infrastructure. These challenges impact heavily on rural livelihoods. One can conclude here by stating that evidence on how ICTs are benefiting the rural farmers in Zimbabwe is still scanty. The next chapter discusses the impact of ICT related challenges on livelihoods.

Chapter 5

Information and Communication Technologies (ICTs) and Livelihoods

5.1 Introduction

The focus of this chapter is to analyse the impact of ICTs on livelihoods of smallholder farmers. Zimbabwe is lagging behind of other African countries such as South Africa, Mauritius, Kenya and Botswana in the implementation of the ICT policy for the promotion of livelihoods. This was mainly caused by the country's passage through the crisis period (2000 to 2008). During these difficult times, it was impossible for any sector to thrive. However, the formation of the Government of National Unity (GNU) of 2008 created a conducive environment for ICT growth and development. At the same time, the ICTs policy of 2005 was re-visited to ensure its contribution to reduction of poverty and promotion of development. The policy makers also realised that citizens should have access to information that affects their lives.

As discussed earlier on, the sustainable livelihoods approach consists of livelihood assets, namely human capital, natural capital, financial capital, social capital and physical capital. ICTs have influence on the livelihoods of the poor through improved access to assets. This analysis chapter follows Chapman et al (2001)'s idea that the impact of ICTs on livelihoods can be explained using the livelihood information wheel. As indicated earlier, the information wheel consists of the livelihood assets mentioned above.

5.2 Impact of ICTs on Livelihoods Assets

From the findings, the study established that ICTs have a positive impact on agricultural livelihoods. The most important thing is for farmers to have access to information in order to pursue livelihood strategies for positive livelihood outcomes. Looking through the lens of the sustainable livelihoods approach, the impact of ICTs on agricultural livelihoods can be seen through livelihoods assets. This means that access to ICTs improves livelihood assets in many ways as it is expressed within the framework of sustainable livelihoods approach.

Sustainable development is a matter of concern in developing countries such as Zimbabwe. ICTs play an important role to ensure that sustainable development is achieved. This is achieved through increased production in agriculture, access to markets by farmers, human development skills enhanced and to use a proper management of natural resources (Munyua, 2007). These assets will be analysed in conjunction with the challenges faced by smallholder farmers. The following sections

analyse the five capitals in relation to ICTs and livelihoods promotion among smallholder farmers in Zimbabwe.

5.2.1 Natural Capital

Land is one of the most important natural assets for agriculture production. Natural assets are the natural resources that the rural people have such as land and minerals. These resources need to be used in a sustainable way so as to promote sustainable livelihoods. Scoones et al (2010) state that the land reform programme was successful in Zimbabwe. Many people were given land under the land reform programme. However, smallholder farmers in rural areas still face land fragmentation as their families grow and this reduces their agricultural productivity hence affecting livelihoods.

Smallholder farmers are informed on how to use land through radios, television and newspapers. For instance Agritex (2012), in the Herald of 21 December, 2012 urged farmers to continue planting despite late rains for the 2012/2013 farming season. Such information is vital for the livelihoods of farmers in Zimbabwe since it has a direct effect on agricultural productivity. The information also helps small holder farmers to use their land effectively. The surveyed literature shows that many smallholder farmers in Zimbabwe are benefiting from ICT-related agricultural programmes. For example Chisita (2010 and 2012), Nleya et al (2010), Kundishora, 2005 have discussed about e-Hurudza and AREX programmes that are benefiting farmers in the country. The programmes promote land management skills development among farmers. However, the challenge faced by some rural smallholder farmers is lack of sufficient land for them to fully engage agricultural activities. Munyua (2007) opines that smallholder farmers have small farms.

Therefore, agricultural production is reduced and this could have a negative impact on livelihoods.

Conversely, Biggs and Ellis (2000) argue that small farm agriculture is now known as the very engine of growth and development despite small farm sizes. There is need for smallholder farmers to increase productivity and ability to access markets. This can be done through improved technologies, best agricultural practices and timely information. An increase in production leads to an increase income. This eventually improves the livelihoods of the smallholder farmers. On the other hand, smallholder farmers face the challenge of climate change which has caused a decline in crop productivity as a result of drought conditions. Zimbabwe experienced drought in the year 2001/2002 due to climate changes. The findings show that, agricultural livelihoods are vulnerable to climatic changes, change in market systems and the unexpected unforeseen disasters. The purpose of ICTs is to provide awareness and information in relation to the disasters. This means that, farmers will be equipped with mitigation and adaptation strategies when misfortunes happen. What is necessary is timely information to be used as a measure to prevent agricultural livelihoods vulnerabilities.

5.2.2 Physical Capital

Findings from literature show that the physical capital for the rural people involves the provision of ICT infrastructure, roads and electricity. Infrastructural development in the rural communities needs to be appraised by the government to speed ICT access. Without these infrastructures it will be impossible for the farmers to access ICTs. The provision of ICTs needs the cooperation of the service providers and the government to ensure that it is accessible to the rural communities.

Findings also show that infrastructural development such as the erection of transmitters and rural electrification has benefited rural farmers. ICT infrastructures play a vital role in the development of the country. Infrastructure developments have created job opportunities for the rural people. The people in the rural areas were engaged during the construction of transmitters/boosters. The availability of better infrastructure has an advantage of providing an enabling environment for economic activities to take place. Without proper ICT infrastructure, agricultural livelihoods are affected because farmers will not be exposed to ICT development and the benefits that are attached to ICTs.

According to Chapman et al (2001), infrastructural development helps smallholder farmers to access markets and to have market information. As a result, farmers have a potential to make choices on where to sell their products. In the case of Zimbabwe, farmers access market information through telecentres, mobile phones and internet. Chisita (2010) established that the Gutu World Link Telecenters Project has improved the livelihoods of rural farmers through the access of agricultural information. The farmers are easily connected to markets through the telecenter. Facilities provided by the telecentre able them to sell their products profitably rather than depending on middlemen who tend to be duplicitous.

Accessing information, for example, the use of mobile phones by farmers helps to increase productivity and eventually livelihoods are improved. Because of the Zimbabwe crisis, the country is still trailing behind its counterparts in the region in ICT infrastructure development. During the crisis period the country lacked resources necessary for the maintenance of infrastructure. At the same time the country did not manage to attract new investments so as to promote ICT infrastructure. However

lack of infrastructure caused a lot of challenges to the ICT sector. The challenges include low connectivity density and slow rate networks. This means that for ICT to be accessed by the rural people there must be good roads, telecommunication networks and electricity. Some rural areas in Zimbabwe still have bad roads thus they cannot be reached easily especially during the rainy seasons. Electricity is an important component for the effective use and accessibility of ICTs. Though the government has initiated the provision of rural electricity, there is shortage of power in the country. For rural farmers to effectively use the ICTs, it is vital to consider other important sources of power such as solar energy.

The Podcast project in the Mbire district of Zimbabwe has had a strong impact by providing ICT services to farmers where physical infrastructure is bad. There is lack of access to roads, communication facilities and electricity in the area. However, the podcasts are being used effectively to provide up-to date agricultural information to farmers. As discussed earlier in Chapter 3, about 75 percent of the Mbire population were reached through the podcast system. The statistics below show a report given by Practical Action.

Table 1: The Population of Mbire(75% Benefited from Podcasts)

Ward Name	No. Of Households	Male Headed Households	Female headed Households	Total Population
Ward 7	872	658	216	4850
Ward 9	1162	841	321	5808
Ward 15	1335	1036	299	6631
Ward 8	1640	1298	342	9419
Ward 17	907	667	240	6025

Total	5916	32733

Source: Mika(2009:16) Practical Action.

Mika (2009) of Practical Action reported that the adoption rate of 75% made the project to be very successful. The beneficiaries are very happy due to increased productivity. They have realised an increase in milk production of 300%, which is 0.5 to 2 litres per cow per day. An increase in livestock birth rates of 18 per cent is also remarkable. The farmers are happy because their livelihoods have improved due to increased assets (their livestock). Another aspect is financial capital.

5.2.3 Financial Capital

In the context of financial capital, farmers need to accomplish livelihood objectives. Without income it would be impossible to achieve the intended objectives. According to Chapman and Slaymaker (2002) local financial institutions can improve information provision on services and facilities available such as loans and savings schemes and microfinance facilities. Thus the provision of financial information can improve transparency and more reasonable service provision and this grants an opportunity for the rural people to compare rates of interest charged by money lenders and banks. Obtaining credit from the bank allow farmers to increase working capital which is used to purchase inputs and other farming necessities. Another source of income for farmers is obtained from selling agricultural products. For them to have increased income they need to use better farming practices, ability to control pests and diseases and to have better market prices.

In Zimbabwe, the e-voucher system (an ICT-based system) has facilitated easy access to agricultural inputs by smallholder farmers. As discussed earlier, FAO

(2012:6) reported that 339000 households in Zimbabwe received agricultural input during the 2010/11 cropping season through e-voucher system. This empirical evidence shows that farmers are beginning to have access to agricultural inputs thus they can plant in good time to improve their farm productivity. Before the system was in place, farmers would have their individual arrangements to buy seeds but they were facing serious financial constraints. FAO (2012) further indicated that the 339 000 households that are benefiting from the e-voucher system have improved their productivity thus improving their livelihoods.

Furthermore, Econet wireless introduced EcoCash facility in September 2011. EcoCash is a cellphone enhanced money sending facility. It is part of mobile banking that promotes financial inclusion among the marginalised rural areas. Farmers in the rural areas can send or receive cash using this innovative facility. Such initiative has improved the livelihoods of the rural people through the reduction of transport costs. With EcoCash, for example, the people in rural areas have reduced transport costs by more than 50% (www.econet.co.zw). Therefore, the study suggests that ICTs help to increase income by adopting better farming practices, reduced travelling expenses, increase sales and better market prices. However, the challenge is that smallholder farmers do not have access to credit from banks. Without credit it would be difficult to achieve the intended livelihood objectives.

5.2.4 Social Capital

In this context, social capital refers to formal or informal social networks and co-operations among smallholder farmers. Such networks and co-operations can be facilitated by the development of ICT. Social capital is the glue that brings the society together.

From the findings, it is established that ICTs contribute to the development of social capital. If farmers are equipped with relevant and accurate information it motivates farmers to participate in decision making processes hence boosting social development. In this regard social capital is improved because there is an interaction among rural farmers. Through ICTs, farmers interact with other farmers to share some experiences. For example, the use of radio allows farmers to ask questions about matters that affect them during the agricultural season. Farmers also increase social capital by communicating with their relatives and friends across the world. From the findings, radio and television have been used to facilitate the interaction of farmers in the country. Farmers share farming experiences and this has promoted participation among farmers throughout the country in Zimbabwe. All the ICT-based agricultural programmes implemented in the country such as Mbire Podcast Project, e-Hurudza, ZARNet, e-Voucher System and e-Mkambo have facilitated close interaction among farmers. Farmer-to-farmer agricultural information exchange has been enhanced thus strengthening the social capital among farmers. For example, the 339 000 households who benefited through the e-voucher system are training farmers in other communities on how to access agricultural inputs through the system. Consequently, the networking among farmers has tremendously improved.

Conversely, Molony (2007) in his research titled, “I Don’t Trust the Phone; It Always Lies’: Trust and Information and Communication Technologies in Tanzanian Micro- and Small Enterprises” discovered that ICTs uptake is constrained lack of trust by some communities. Finmark Trust (2012) expresses the need for ICTs uptake by the rural farmers needs to be taken seriously. Currently, about 45% appreciate the use of ICTs. Not all farmers can visualize the benefits of ICTs in farming. This implies

that the government has to drive outreach and awareness programmes to promote the uptake of ICTs and demystify their use. Human capital is also important.

5.2.5 Human Capital

According to Chapman (2002) human capital consists of elements of skills, knowledge and the ability to work in order to promote livelihood strategies. Farmers need to have knowledge in pursuing agricultural activities. This is done through farmer education and training on how to implement ICTs for their benefit. As a result, capacity building is improved. In Zimbabwe, programmes such as ZARNet and E-Hurudza were established in order to educate and train farmers. This has helped farmers to have knowledge on how to explore agricultural activities. For example, ZARNet provides internet and training services to farmers. This has empowered farmers and at the same time they access markets for their produce.

The use of Web 2.0 technologies is helping many farmers in Masvingo province. For example Scoones et al (2011) carried out a study in Masvingo and discovered a group of farmers called “cell phone farmers”. Statistics given by Scoones et al (2011:4) show that the ‘cell phone farmers’ constitute about 5% of the farming population. These farmers use cell phone to do their farm management. They are taking advantage of mobile technology to manage their agricultural activities from any part of the country. They do not need to be present at all times. However, the challenge is lack of adequate training facilities in the rural remote areas.

5.3 Conclusion

This analysed the impact of ICT on livelihoods. The study established that ICTs have a positive impact on agricultural livelihoods. The impact of ICTs on livelihoods can be seen through livelihood assets namely human, physical, financial, social and natural capital. Smallholder farmers have natural resources such as land and they need information on how to use land effectively. Infrastructure development in rural communities ensures accessibility of ICTs to rural farmers. Financial information to farmers helps them to increase income and have a positive impact on livelihoods. ICTs have improved social interaction among farmers and allow them to share ideas and experiences. Farmers need training on using better agricultural practices and to gain knowledge on how to use ICT gadgets. However, there are challenges that include inadequate financial resources, lack of infrastructural development and inadequate land. These challenges have a negative impact on the livelihoods of the farmers. The next chapter will be the conclusions and the recommendations.

Chapter 6

Conclusions and Recommendations

6.0 Conclusion

This chapter focuses on the summary and recommendations of the study. It provides concluding remarks and recommendations. The conclusion gives the final position of the study. The recommendations discussed are expected to influence policy in the area of ICTs and livelihoods of rural smallholder farmers.

In order to ensure proper guidance and direction to the implementation of ICT strategies, the government of Zimbabwe formulated the National ICT policy in 2005. The main purpose of national ICT policy is to develop suitable sub-policies and strategies that promote ICT advancement in all sectors of the economy. The government of Zimbabwe harnessed ICTs in order to promote poverty reduction, economic growth, equity and social justice. The study focused on the impact of ICT development in the promotion of livelihoods of smallholder farmers in Zimbabwe.

The adoption of ICTs in developing countries can improve the livelihoods of the rural poor, increase income opportunities as well as escaping poverty. The study used the Sustainable Livelihoods Approach (SLA) which is a useful tool for understanding the livelihoods of the people. It is essential to consider the impact of ICTs in people's livelihoods since they are fundamental to rural development activities.

The government supported the implementation of ICTs through the provision of foreign currency for the development of the ICT sector, ICT training through ZARNet and electricity in rural areas. Further support is being given through infrastructure development, scrapping of import duty on ICT gadgets and deregulation of the telecommunication sector. The government implemented strategies to ensure the expansion of ICTs in rural areas. The ICT development strategies for the rural communities include infrastructures such as telephones, mobile phones, and radios television internet for the benefit of smallholder farmers. Findings show that the government is working towards infrastructure development. On the other hand, the government ensures that capacity building is improved. This was done to provide adequate ICT personnel and this was achieved through education and training programmes. The results show that the farmers receive training from programmes

such as ZARNet and e-Hurudza. Benefits from the use of ICTs are identified as access to markets, infrastructure development and increased productivity. Smallholder farmers are faced with challenges in regard to ICTs. According to Chisita the challenges include low connectivity, lack of infrastructure, lack of financial resources and others. The challenges need to be addressed.

The study came to the conclusion that there is a positive impact of ICT on livelihoods of smallholder farmers. The benefits from ICT empower individuals because they will have information that improves their livelihoods. The most important thing is for the government to harness ICT opportunities to enable rural farmers to handle information provided to them. The government ensures that sustainable development is achieved by building strategies that can easily transfer information that is important to the people's livelihoods. The recommendations are discussed in the following section.

6.1 Recommendations

To foster a strong and vibrant pro-poor ICTs sector in Zimbabwe, there is need to have strategic priorities that are supported by institutional and political will. It is imperative to have a pro-poor ICT policy framework that supports the livelihoods of the people through the enhancement of food security among smallholder farmers. In light of the findings discussed above, the following recommendations are made to the government of Zimbabwe and other stakeholders:

- **Strengthening of ICT policy for effective smallholder farmers.**

The Zimbabwean government has made an effort to develop the ICT policy for the promotion of people's livelihoods. Notwithstanding the initiative, more effort still

needs to be done to ensure effective implementation and fine- tuning of the policy for the enhancement of livelihoods amongst smallholder farmers. Based on the weakness of the policy discussed in the presentation chapter, it is recommended that the government strengthens the ICT policy through nationwide consultation. This can be done through linkages with a number of stakeholders that include citizens, private companies, non-governmental organisations and other different government ministries. There is need to involve these stakeholders in order to develop a comprehensive ICT policy that caters for the needs of the people for the promotion of sustainable agricultural livelihoods of smallholder farmers.

- **Awareness Campaign**

Another recommendation is for the government to organise ICT awareness campaigns directed towards rural people especially smallholder farmers. The study found out that most smallholder farmers are not aware of the benefits of ICT gadgets in their possession for the enhancement of agricultural activities. As indicated earlier, the government could involve other ICT stakeholders to participate in bringing awareness to the rural communities. Such campaigns need to highlight the benefits presented to smallholder farmers by ICTs.

- **Up scaling ICT Infrastructural development**

It is recommended that the government scales up the development of ICT infrastructure to promote inclusion of smallholder farmers into the economy through bridging the ‘digital divide’. The infrastructure will help smallholder farmers to be easily connected to markets hence improving profitability of their agricultural activities.

- **A large-scale ICTs and livelihoods research must be commissioned in the country.**

It is clear from the research results that ICTs have a potential to improve the livelihoods of smallholder farmers in Zimbabwe. This opens a window for the need to have a large-scale ICTs and livelihoods study in the country. The findings will then be made available to the government, other national stakeholders and international organisations such as the ITU, IST-Africa, WSIS, IMF, the World Bank, UNDP, among others for collaborative planning in line with ICTs and agricultural livelihoods. Institutions such as Institute of Development Studies (IDS) at the University of Zimbabwe, and national University of Science and Technology (NUST) could be commissioned to carry out a national ICTs-Livelihoods research. These institutions have high impact researchers who can generate invaluable information for the development of the pro-poor ICTs sector in Zimbabwe.

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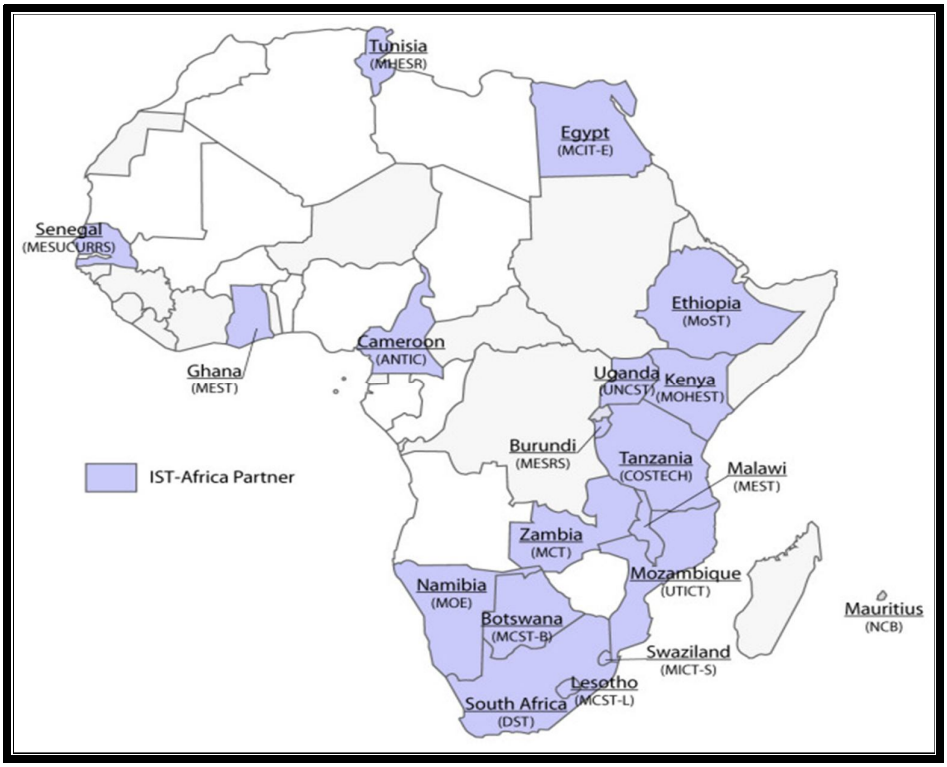
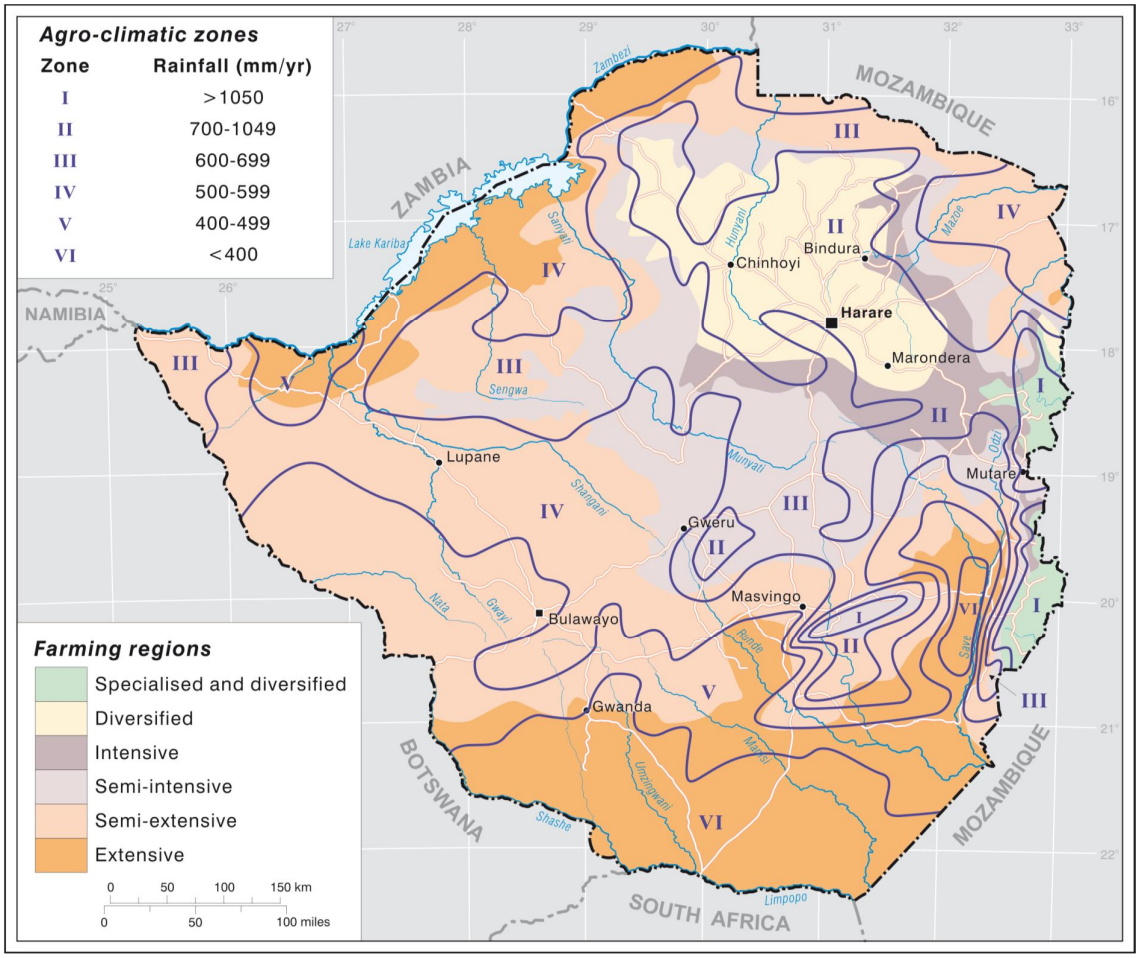
APPENDICES

Appendix A: IST-AFRICA MEMBERSHIP



Source: http://www.ist-africa.org/home/default.asp?page=countries

Appendix B: Zimbabwe's natural regions



Source:http://www.bwpi.manchester.ac.uk/research/ResearchAreaProjects/Zimbabwe/Zimbabwe_summary_final_051109.pdf