

Information and Communications Technologies (ICTs) and Livelihoods Enhancement in Agro-rural Communities in Zimbabwe: Connections Using the Capabilities Approach

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ABSTRACT Information and communication Technologies for Development (ICT4D) is attracting world-wide attention. The advantages presented by ICTs need to be directed towards enhancement of people's capabilities so as to improve their livelihoods and coping strategies. Using Sen's capabilities approach, this paper analyzes the connection between ICTs and livelihoods in Zimbabwe. Findings show that ICTs can enhance agriculture among smallholder farmers in the rural areas of Zimbabwe. It is therefore recommended that the government and other stakeholders should promote ICT4D in agriculture. This will improve agricultural production and promote food security.

INTRODUCTION

This paper analyzes how Information and Communication Technologies (ICTs) in Zimbabwe can improve agriculture. Using Sen's capabilities approach (Oosterlaken 2014), the paper seeks to establish the connection between ICTs and livelihoods. Being a developing country, Zimbabwe has made significant strides towards harnessing ICTs for development (Government of Zimbabwe 2013a, b). As outlined by the World Summit on the Information Society (WSIS) Declaration of Principles and Plan of Action, Heads of States and Governments in developing countries were urged to adopt the use of ICTs in order to achieve developmental goals through improving the capabilities of individuals, groups and institutions. Zimbabwe is one of the countries adhering to the principles outlined in the WSIS Plan of Action with regard to ICTs.

ICTs have acted as a catalyst for globalization (Needle 2010). The technologies have developed over the years from simple mathematical tools such as the abacus. Today, the world relies on computer-driven activities in many aspects of life. Langmia (2005), Bello and Aderbigbe (2014) and Oosterlaken (2014) view ICTs as catalysts of development initiatives in the world. Langmia(2005) further states that ICTs have

immensely contributed to Africa's development (see also Biggeri and Ferrannini 2014). According to the Africa Partnership Forum (APF) (2008), ICTs are a key component of Africa's development strategy. Although the African continent is making remarkable progress in the area of ICTs, it should be observed that isolated investments in ICTs cannot promote growth without looking at the other key macroeconomic fundamentals. Africa is now connected to the whole world by the Inter-Africa Fiber cable network that facilitates the efficient and cost-effective transfer of information. Countries such as Zimbabwe, Botswana, Namibia, Zambia, Lesotho and South Africa are linked to the Atlantic optical fiber network and are benefiting from this development.

Like many African countries, Zimbabwe has a big challenge of bringing ICTs to the rural areas. For many years, rural dwellers, as opposed to their urban counterparts, have remained marginalized, poor and excluded from ICTs. Lack of access to information has created a 'digital divide' and 'digital poverty'. 'Digital poverty' refers to the lack of access to ICTs in a given area especially the rural areas in our context. 'Digital divide' refers to the gap that exists between the 'haves' and 'have-nots' of ICTs. Poor people in the rural areas seem to lack access to ICTs, hence they become "information poor" (that is, impoverished in terms of information). However, the current 'cellphone revolution' has improved ac-

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cess to ICTs although more still needs to be done. The idea of harnessing ICTs in Zimbabwe should contribute towards poverty reduction, economic growth, equity and social justice. Mugwisi et al. (2014) established that ICTs in Zimbabwe promote agricultural development through cost effective and efficient communication. Marker et al. (2002) state that poverty has multiple dimensions and that, being poor does not necessarily mean the lack of basic resources, but also the lack of ICTs which can also contribute to poverty through reduced capabilities. Mugwisi et al. (2014) note that lack of up-to-date ICTs has negative effects on agricultural development. Therefore, rural farmers should have access to information to bring them out of poverty. ICTs enhance capabilities and empower people to develop strategies to move out of poverty. Through the use of ICTs in communication, the rural poor can be heard. Further, access to ICTs can equip the poor with skills such as marketing.

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 percent of the GDP". Agriculture also remains the main source of livelihood for rural dwellers. Most of the rural people in Zimbabwe engage in agriculture and other non-farm activities. The majority of the population (65%) lives in the rural areas and 72 percent is poor and food insecure. Stienen et al. (2007) posit that agriculture is the main source of income and employment in rural areas. However, most remote rural areas in Zimbabwe rely on agro-based income. Munyua (2007) asserts that agriculture plays a vital role in economic and social development in rural areas. This provides us with a pointer that in order to reduce poverty, attention should be focused on the transformation of the agricultural sector through the improvement of land use, labor productivity, access to remunerative markets and promotion of the capabilities of farmers. Stienen et al. (2007) agree that ICTs can have a direct impact on food security at both national and household levels. Jain et al. (2014) point out that precise and accurate agricultural-based information promotes effective agricultural management and production systems. Further, the incorporation of ICTs in agricultural development strategies has potential to improve access to markets for agricultural pro-

duce thereby increasing income (Jain et al. 2014). Quality agricultural information is an important catalyst for agricultural development (Ajani 2014). The absence of ICTs and market information has been identified by Munyua (2007), Tiwari (2011), Ajani (2014) and Bello and Aderbigbe (2014) 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 to promote rural livelihoods. Countries such as Kenya, India, and Ghana have managed to introduce ICT projects that have promoted agriculture in rural communities.

The Zimbabwe national ICT policy framework of 2005 has an ambition to modernize rural areas 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. Through the ICT policy, the government of Zimbabwe 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 all economic sectors and improve 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 livelihoods as is the case in Taiwan and Singapore (Nwagu 2006).

Statement of the Problem

Although the government of Zimbabwe formulated the ICT policy in 2005, the benefits of ICT4D still need to be known among rural smallholder farmers. The problem that this paper sought to investigate was whether ICTs can improve livelihoods of smallholder farmers or enhance their 'capabilities'. There are challenges in the implementation of ICT policy with regard to agriculture. Developing countries that have fully embraced ICTs are enjoying the benefits of the on-going technological revolution (see for example Ajani 2014; Jain et al. 2014; Bello and Aderbigbe 2014), whilst in Zimbabwe it is not certain whether these benefits are being recognized. The widening of the digital divide continues to hamper the means and ends of livelihoods

enhancement programs in the rural areas. This research is motivated by the view that the role of ICTs has not been recognized for the transformation of the rural poor's livelihoods. Can ICTs improve rural livelihoods through capabilities enhancement? Can ICTs improve the capabilities of rural smallholder farmers? These are the questions that this paper seeks to answer.

Objective of the Paper

The objective of this paper is to evaluate how ICTs promote the livelihoods and capabilities of smallholder farmers in Zimbabwe. Since ICTs are believed to be catalysts of economic growth and development, it is important to find out how they promote the livelihoods of smallholder farmers in the rural areas of Zimbabwe. It is anticipated that the findings will benefit smallholder farmers and policymakers in the country.

Conceptual and Theoretical Reflections

Information 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)." 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 infrastructure 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 tech-

nologies, which include the use of telephones, radio and television and lastly networking technologies, which involve 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 in the rural areas as identified by authors such as Onayinka (2011), Ajani (2014), Bello and Aderbigbe (2014), Jain et al. (2014), Mugwisi et al. (2014), Sreekumar (2007) and Alemna and Sam (2006). 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 example, the Msunduzi community anti-crime network project in South Africa (Thioune 2003), the Grameen phone project in Bangladesh (Gupta 2004) and the Women of Uganda Network (WOUGNET) in Uganda (Owiny 2014a,b). These projects have reported the expansion of individual and community capabilities.

Braund et al. (2006: 3) propound that ICTs are being "identified as a powerful enabler for economic growth and social development" (see also Ajani 2014; Bello and Aderbigbe 2014; Jain et al. 2014; Owiny 2014c; Mugwisi et al. 2014). Thus, ICTs can increase economic growth, enhance social inclusion (through closure of the digital divide), increase health and education services and improve governance at all levels. 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 ICTs.

Many developing countries have initiated the development of ICTs for the benefit of the rural poor. Good examples of these initiatives have been piloted in Ghana, Kenya, Uganda, Bangladesh, and India. A number of African countries are members of the IST-Africa that assists member countries with the development and implementation of effective ICT policies. IST-Africa partner countries include Botswana, Burundi, Cameroon, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Senegal, South Africa, Tanzania and Uganda" (IST-Africa 2012). Unfortunately, Zimbabwe is not yet a member.

Alemna and Sam (2006) and Owiny (2014b) 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 to reduce administrative costs and increase service quality. ICTs reduce administrative costs, for example, sending money via mobile phones is cost effective. 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 has reduced transaction costs and improved communication between buyers and sellers. This also enabled 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 percent of the world's population out of poverty and the numbers of ICT users increasing tremendously over the last decade. Comparing the figures obtained from the last ICT Sector Strategy of the World Bank Group (WBG) prepared in 2000 with the figures in 2010, it was noticed that there was an increase of 3, 7 billion. It was also observed that 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 and pave way for investment opportunities which in turn create employment for the unemployed.

According to McNamara (2008), ICTs have been adapted in the rural communities so as to improve the livelihoods of the rural people, increase their income opportunities and improve 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 drafted a strategy document and a comprehensive policy in order to harness ICTs for development.

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. Chambers (1993) conceptualized rural development as:

"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, rural people are marginalized and excluded from most development efforts, hence their failure to enhance their livelihoods. Because agriculture is the mainstay of livelihoods in the rural areas of developing countries, it is imperative to find ways of improving agriculture using ICTs. Raj et al. (2011) (in Grimshaw and Kala 2011: 33) assert that "rural poverty reduction is closely related to increased 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 access markets to sell their fresh farm produce. They also fail to engage with agricultural markets of the digital divide. 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 indicates that ICTs can be used effectively for rural development in developing countries. ICTs can play an important role in responding to the needs of rural people.

Agriculture in Zimbabwe

Before the economic crisis, Zimbabwe was known as the breadbasket of Africa. However due to the economic crisis, the country is now

importing food from countries such as South Africa, Malawi and Zambia. Most people in Zimbabwe depend on agriculture and the majority live in rural areas. In other words, agriculture is the mainstay of the Zimbabwean economy. Currently, the country does not have sufficient food reserves partly because the 'new farmers' who were settled during the fast track land reform program are not being productive. Having realized the importance of agriculture in developing countries, 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-agriculture is defined by the Food and Agricultural Organization (FAO) of the United Nations 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 conceptualization, 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 et al. (2009), agricultural informatics is a new notion that has emerged in the advent of ICTs. It refers to the use of ICTs to distribute information to farmers. This improves agricultural development and promotes food security for poor people in the rural areas. Examples of traditional ICTs known to be providing agricultural-related advisory services include radios and TVs.

ICTs and Agriculture in Zimbabwe

Many people in rural communities rely on agriculture to sustain themselves. However, there are many challenges faced by smallholder farmers in developing countries. Firstly, smallholder farmers, unlike commercial farmers, have small farms. This translates to low productivity. Some of the challenges were highlighted by Munyua (2007) who argues that small farm sizes lead to a weak knowledge base. This implies that smallholder farmers do not have information that can help them improve agricultural activities. Another challenge is that most do not have adequate tools for farming. Usually they use tradi-

tional methods and tools, resulting in the decline of agricultural output. Smallholder farmers also lack adequate inputs such as fertilizers. Inadequate inputs can result in low agricultural productivity and food insecurity. Smallholder farmers are faced with the problem of marketing their products. Support in the development of marketing links is an important aspect that can be easily supported by ICTs. Disconnections from the market due to poor infrastructure and lack of ICTs make separate farmers from buyers. Perishable agricultural products get destroyed as farmers fail to access the market. Rural farmers need marketing support and infrastructure to facilitate selling of their products.

Munyua (2007) argues that farmers have poor market infrastructure and inadequate marketing experience. This happens because the farmers lack bargaining skills and information about the real price of their products on the market. Sometimes, they give away their products below or at cost price. Smallholder farmers also do not have access to credit from financial institutions. Since they offer their products at low prices they usually end up running short of capital. Lack of marketing experience can affect the prices of agricultural products. Agricultural markets in developing countries are characterized as inefficient (Grimshaw and Kala 2011). This is a disadvantage to the farmers because they cannot engage effectively in agricultural markets without information. Mukhebi (2007) concurs that agricultural markets have long chains of transactions between farmers and consumers. This can be a problem because the middle man puts a markup 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 costs (Grimshaw and Kala 2011). Furthermore, if the farmers do not effectively engage in the transmission of information, their market information is limited.

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 behavior. This would enable farmers to make decisions about crops that are grown in a certain season and have information on where to sell and buy commodities. Stienen et al. (2007) posit that price information can be published on a

website that is accessible to farmers via information centers, rural radios, TVs, or mobile phones. Mobile phones are a good example of ICTs that increase price transparencies. 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 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, Munyua posits that improved technologies do not reach down to farmers and that the farmers experience unfair trade practices (see also Gudza 2010). That is, they are exploited by middlemen. However, the importance of the use of ICTs in rural development has been recognized by governments in developing countries (Stienen et al. 2007).

Stienen et al. (2007) view ICTs in agriculture as enhancing production, improving market access and building capacity and empowering farmers. ICTs have a potential of providing a link between farmers and the market (Mugwisi et al. 2014). Farmers' bargaining positions are improved as they look for their own markets and reduce or eliminate reliance on rich individuals and organizations that dupe farmers of their produce because of their ignorance of profitable markets.

According to USAID (2010), using ICTs can help farmers find market prices and make decisions regarding when to harvest and how to solve common agricultural problems. In Punjab, India (Jain et al. 2014), ICTs have helped to bridge the information gap between farmers and markets. As a result, farmers have managed to come up with informed choices and improve efficiency in farming. Through ICTs, farmers in India receive daily information on farming techniques, weather forecast, input availability and ways of improving their operations. In Kenya, ICTs have reached the rural poor with market information and market linkage services (Mwombe et al. 2014; Mukhebi 2007). Farmers

need market information in order to choose what commodities to produce at a particular time and where to sell their produce at what price. 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 pollution, food production and deforestation.

Stienen et al. (2007) posit that ICTs can increase efficiency, productivity and sustainability of small farms. Thus ICTs can make a significant contribution to smallholder farmers by increasing efficiency and productivity. Further, the farmers face risks and uncertainties and threats such as poor soils, drought, erosion, diseases and pests. Therefore, the use of ICTs can 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 networkings and increasing productivity. The spread of ICTs in developing countries has brought about success stories. Success stories include the E-choupal project in India (Mahonar 2005) and the Kenya Agricultural Commodity Exchange (KACE) program in Kenya. These programs have promoted agricultural productivity among smallholder farmers. Mukhebi (2007) highlights that Soko Hewani involves the use of West FM radio that offers to sell and buy agricultural commodities for smallholder farmers in Western Kenya.

The Capabilities Approach

Amartya Sen (1999), a Nobel Prize winner, developed a 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; Biggeri and Ferrannini 2014). The capability approach speaks to capabilities and 'functionings' (Sen 1999). 'Functionings', according to Amartya Sen, refer to a person's state of being and doing, 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. Capabilities can be analyzed as all states of being and doing available to a person. Sen argues that all individuals have capabilities and it is through realizing these capabilities so that people will be in a position to come out of poverty and escape the state of 'unfreedom' (Zheng and Stahl 2011). Sen (1999) views hunger as entitlement failure. People without entitlements are marginalized and have no access to opportunities and resources, hence they go hungry. Amartya K Sen, in one of his seminal works stated that:

... for many evaluative purposes, the appropriate "space" is neither that of utilities (as claimed by welfarists), nor that of primary goods (as demanded by Rawls), but that of substantive freedoms — the capabilities — to choose a life one has reason to value. If the object is to concentrate on the individual's real opportunity to pursue her objectives (as Rawls explicitly recommends), then account would have to be taken not only of the primary goods the persons respectively hold, but also of the personal characteristics that govern the conversion of primary goods into the person's ability to promote her ends (Sen 1999: 74).

It is clear from Sen's theory that substantive freedoms (capabilities) are central to the livelihoods of the people. Hunger, malnutrition, exclusion, food insecurity, lack of food rights, lack of access to opportunities can be obliterated once people have substantive freedoms. With regards to food, it is imperative to make sure that people can feed themselves with dignity. Receiving food handouts from the government or non-governmental organizations (NGOs) does not constitute dignified access to food. Household heads feel dignified when they supply their families with food from their farms rather than from food parcels that may also have strings attached. In most African countries, food handouts are used to buy votes. This constitutes a violation of food rights as enshrined in the international conventions on right to food. The rural people's capabilities can be enhanced if ICTs are developed (Oosterlaken 2014; Biggeri and Ferrannini 2014). This can also help the individuals to make strategic choices and 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, and help farmers to increase yields and realize better prices for the produce. Heeks (2010) opines that ICTs increase both capabilities and 'functionings' in developing countries. However, it is not clear how capabilities can be measured or translated into policy that analyses the well-being of the individual (Zheng and Stahl 2011; Biggeri and Ferrannini 2014; Oosterlaken 2014).

From the capabilities perspective, access to information helps a person to identify desired freedoms. Usually, marginalized people are not aware of opportunities around them due to 'digital poverty'. Information poverty drives them into material poverty. Onayinka (2011:68) puts it as follows "...the minimum capabilities of information and communication also play a 'catalytic' role for the advancement of the freedoms in other aspects of life of the poor". Onayinka further asserts that there is need to integrate the interrelated capabilities that include assets ownership, information and communication (see also Barja and Gigler 2004; Gigler 2011 and Oosterlaken 2014).

The integration of assets ownership, information and communication (Baraja and Gigler, 2004) can also be applied in the agricultural sector to promote food production among small-holder farmers. They explained that ownership of assets (physical, human, social and economic), the capability to use and exchange information transparently (this could be social, economic, political etc) and effective communication can be integrated to support productivity in any sector. As indicated earlier in 2005, Zimbabwe's agricultural sector accounted for 17 percent of GDP (Government of Zimbabwe 2005). It remains dominant in the economy despite the 'chaotic' fast track land reform program of the year 2000. As a result, the modernization of agriculture through the systematic adoption and use of ICTs can contribute directly to food security at both national and household levels. ICTs can also lead to improved agricultural productivity through effective land management systems that lead to the creation of national wealth (Government of Zimbabwe 2005: 21). The government of Zimbabwe recognizes the importance of ICTs

for the development and expansion of the agricultural sector.

ICT-Agro Programs for Capabilities Enhancement

E-Hurudza Program

Hurudza is a Shona term for ‘a very successful farmer who keeps hunger at bay’. *E-Hurudza* is an agricultural planning software package designed by a local private company to help support the government’s agrarian reforms and farm mechanization program (Chisita 2010). The software package provides agricultural information for all regions in the country. It presents tutorials on how to grow crops, planting methods, information on inputs, farming equipment and is concerned with livestock control and management (Nleya et al. 2010). *E-Hurudza* permits the farmers to plan their work and to realize the full potential of their investment. It provides timely agricultural information to farmers so as to promote productivity. Early warning systems are also provided and this helps to reduce crop vulnerability hence promoting productivity. The *e-Hurudza* program is operationalized by the Agricultural Research Extension (AREX) office. Farmers can also use cell phones to get information about market prices of agricultural products. Another program is the radio and television agricultural programs.

Radio and Television

Radio is widely used to reach the majority of the people in Zimbabwe. Many people have access to radio networks because radios are affordable and the waves can reach all corners of the country. Radio agricultural programs are broadcasted by the Zimbabwe Broadcasting Corporation (ZBC) to all the citizens without exclusion. Farmers have an opportunity to listen to the programs so as to get important agricultural information. TV broadcasts have more advantages since demonstrations can be easily observed and this promotes information dissemination of improved production methods and disaster management skills. 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) (see also Bello and Aderbigbe 2014). 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. In Zimbabwe, there is a program where farmers are allowed to phone in and pose questions on various topics concerning agriculture. The questions would be discussed and the farmer would get relevant information through the radio. The program benefits new farmers who are settled under the land reform program.

Mobile Phones

Mobile phones are seen as cheaper, compared to 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 in shantytowns, cities and remote rural villages. Etzo and Collender (2010) and Bello and Aderbigbe (2014) 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 the people 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 for a fee. People can also make a living through selling airtime vouchers to mobile phone users. Thus, ICTs have created employment for the locals and increased income to meet household needs. Smallholder farmers are reaping a lot of benefits from the 'cellphone revolution'. 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.

Podcasts

According to Mark and Chan (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, 2012) and Gudza (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 by illiterate people. The advantage of podcasting is that it can be readily available, and can be used in local languages. It is easy to use and is suitable for rural areas. For example, podcasting is being implemented in Mbire rural district of Zimbabwe where rural agricultural activities are predominant (Gudza 2010; Chisita 2012). During the rainy season the area cannot be reached easily when infrastructure such as electricity, mobile networks and telecommunications are not available. Podcasts have improved the capabilities of rural farmers through information enrichment. Telecenters were also developed to ensure that ICTs penetrate the rural areas.

Telecenters

Telecenters were established to offer ICT services to the rural areas. The services offered include typing, fax, internet, printing and scanning. Such centers are connected to online agri-

cultural databases (Mangena 2011). Internet connections enable farmers to connect with their counterparts in different areas and share useful agricultural information. According to Chisita (2010, 2012), Telecenters are projects that are attached to a combination of telecommunication services, including telecommunication, internet, e-mail, office equipment, radio and television. Telecenters can be a platform for buyers and sellers to get information with regard to agricultural produce. They provide locals with affordable communication systems. After its inception, the project became popular with farmers, teachers and others. Chisita (2010, 2012) highlights that there are eleven telecenters in Zimbabwe and they are changing lives of people in rural areas.

CONCLUSION

In recognizing the importance of ICTs, the government came up with the ICT policy framework that enables the provision of ICTs to all sectors. The policy was meant to bridge the 'digital divide' between the rural and the urban dwellers through providing ICTs to all citizens. ICTs help in the reduction of social and economic inequalities. Information can be accessed by farmers through mobile phones, podcasts, and telecentres among others. Projects such as *e-Hurudza* assist farmers to have relevant agricultural information that promote agricultural production. Agriculture in Zimbabwe has been the backbone of the country's economy and for many years, Zimbabwe has been the breadbasket of the SADC region. However, due to the economic meltdown, Zimbabwe now imports food from other countries. ICTs should be embraced to expand the capabilities of farmers. Findings from ICT programs elsewhere suggest that there is a link among ICT development, smallholder farmers' livelihoods and poverty reduction. This means that the harnessing of ICTs for development (ICT4D) will lead to economic growth and poverty reduction. As explained by Amartya Sen (1999), the integration of asset ownership, information and communication strengthens the farmers' capabilities and improves livelihoods.

POLICY IMPLICATIONS

Given the findings above, it is recommended that ICT4D should take center stage in policy formulation and planning. Moreover, the advan-

tages it presents to rural farmers should be harnessed to improve livelihoods. As indicated in the Ministry of Information and Communication Technology's strategic plan, the government is making strides towards the improvement of the ICT policy in Zimbabwe. However, comprehensive research still needs to be undertaken to generate useful information for ICT policy-making and implementation. The government could commission Research Institutes at universities to carry-out nation-wide research and gather information that can be used to inform policy.

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