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Information and communication technologies (ICT) towards agricultural development in rural areas: case of smallholder farmers in Umzimvubu local municipality of the Eastern Cape Province in South Africa

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ABSTRACT

This paper was initiated in order to find the usage and relevance of the Information and Communication Technologies *(ICT) by the smallholder farmers of the Umzimvubu Local Municipality of the Eastern Cape Province in South Africa. A survey questionnaire was then developed to collect the relevant data from randomly selected six villages of Umzimvubu Local Municipality targeting 138 respondents. The questionnaires structure employed both closed and open-ended questions that were administered using a face to face interview, conducted on the sample population in each village. There seems to be a correlation between ICT usage and the economies of scale in agricultural development, where smallholder farmers tend to use less of highly modernized ICT, while commercial large scale farmers use more of the modernized ICT. This disparity amongst farmers is exacerbated in many areas by the differing support systems employed by the public extension services.*

Keywords: Information Communication Technologies, Agricultural Development, smallholder farmers

1. INTRODUCTION

Information and Communication Technologies (ICT) is one of the advance technologies that are used to handle information and communication (Okayere & Mekonnen, 2012). Kumar and Singh, (2012) define information and communication technologies as tools that are used in communication and transmission of information through electronic channels. According to Owusu-Ansah (2013), information and communication technology are words that describe devices and applications like mobile phones, computers, radios, television and other technologies that use electronic and digital waves.

The relationship between information needed by the smallholder farmers and the time relevance to information usability remains one of the major limiting factors for agricultural development. Okayere and Mekonnen (2012) indicate that the use of ICTs would assist agricultural advisors in sharing and advising farmers in rural areas with relevant information. In addition, countries such as Ghana and Kenya have incorporated ICTs into their agriculture

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sector to improve communication between farmers and agricultural extension services (Akuku, 2014). Jensen (2007) attributes the ease of market access and participation by Kerala coastline fishers in India to better ICTs integration, which allows them to know where and when to sell. The use of ICT provides opportunities for smallholder farmers to have access to agricultural information and agricultural advisors (Aker, 2010). In addition, broadcast media has the ability to reach many audiences irrespective of the geographic position. Nazari and Hasbulah (2008) report that radio and television are popular in broadcasting modern agricultural technology to all types of farmers in a short period of time. Chhachhar *et al*., (2014) indicates that in India and Ethiopia, the most used ICT to disseminate agricultural information is television. Furthermore, mass media can be a good platform to disseminate agricultural messages that can help towards building farmers (Hassan & Nazari, 2011). In Zimbabwe, there is a forum model that encourages smallholder farmers that do not own radio to gather at one place every week and listen to agricultural programmes (Nyareza & Dick, 2012).

Zwane (2012), states that most smallholder farmers in South Africa rely on television, meetings, friends, family and posters for communication of agricultural information. Mobile phones have the ability of improving access of agricultural information for farmers and improve farmers' learning (Aker, 2010). The provision of ICTs will assist in rural agricultural development by providing timely information that can help smallholder farmers in making relevant and good decisions (Demiryürek, 2010). In Malaysia, agricultural experts believe that ICTs, especially mass media, bring positive change and agricultural development (Solleh *et al.*, 2010).

Agricultural development is a way of improving conditions for farming so that planting, processing and harvesting can be done effectively to improve livelihoods of smallholder farmers. Agricultural development is very important because most people in rural areas use agriculture for survival (World Bank, 2012). Furthermore, in order to see improvement in agricultural development, there is need for investment in technology and cooperation of farmers to adopt the new technology so that it will increase their yields. Solleh *et al.,* (2010) states that planners in developing countries realized that mass media can be a catalyst in agricultural development. According to Hassan and Nazari (2011) the achievement of agricultural development largely depends on the use of mass media.

1.1 Problem Statement

Globally, ICTs have been reported to assist in addressing communication inadequacies that hinder timely information dissemination and agricultural development (Nyareza & Dick, 2012; Akuku, 2014; Chhachhar *et al*., 2014). Despite the reported successful usage of ICTs on agricultural development around the world, it remains an avenue that has limited research in South Africa especially on smallholder farmers (Mukasi, 2015). The extent of ICTs usage and their relevance to Umzimvubu local Municipality is largely unknown and undocumented. Therefore, the study seeks to establish the extent of ICT usage amongst the Umzimvubu local

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municipality smallholder farmers, given the claimed benefits of ICTs towards agricultural development.

1.2 Objectives

The objectives of this paper are to:

- Identify types of ICT devices and services used by smallholder farmers for agricultural development.
- Identify challenges that smallholder farmers of Umzimvubu local municipality face when using ICTs to communicate agricultural information.

2. LITERATURE REVIEW

The provision of ICTs will assist in agricultural development by providing timely information that will assist farmers to make informed and relevant decisions (Demiryurek, 2010). Information and communication technologies are the main elements which disseminate effective information that have a positive effect on agricultural production (Chhachhar *et al.*, 2014). Furthermore, Apata (2010) suggests that smallholder farmers need to exploit all possible channels of agricultural information in order to have significant development because agricultural information is disseminated using many channels.

In addition, exchange of information in agriculture between farmers and extension services has been identified as a challenge in many African countries (Chukwunonso *et al.,* 2012). Provision of infrastructure and adoption of new information technologies is also a challenge for most African countries. Sithole *et al.,* (2013), points out, that ICTs have the potential of speeding up agricultural development. A communication gap can arise due to the large extension worker-farmer ratio and ICTs can close the gap.

In Ghana, smallholder farmers use mobile phones to negotiate with customers in advance the prices of banana (Chhachhar *et al.*, 2014). The other utilities that mobile phones created are business chances for smallholder farmers and they have given entry to market information and weather services (Chhachhar *et al.*, 2014). Poor network coverage in some rural areas of Malawi has resulted in limited access to mobile phones because of poor signal or no signal available at all (Byres, Dorf and Nelson, 2011). The limitations of mobile phones have been observed in Tanzania as mainly constrained by unavailability of electricity which negatively affects the availability of agricultural information that was supposed to be obtained via mobile phones (Mtega & Msungu 2013).

Low ICT acceptance and use can be attributed to different reasons. Rural South Africa is confronted with problems of ICT use, despite ICT rules and policies, such as the much applauded Broadband Policy, which was passed in November 2013 [South Africa Broadband Policy (SABP), 2013]. The main objective of this policy was to make sure that all South Africans were included in the current communications grid (Carrim, 2013).

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Application and adoption of technology is also affected by the level of education and age of smallholder farmers (Khan *et al*., 2012). Absence of good leadership, especially in sharing ICT information, little community involvement, and financing also reduce the adoption time for any project (Kaushik and Singh, 2004).

3. METHODOLOGY

The information on smallholder farmers was obtained using a semi-structured questionnaire, which is a quantitative research method. Random sampling was used in the study to select respondents from Umzimvubu smallholder farmers. The questionnaires that were used to obtain information had closed and open-ended questions. The data was collected in 6 villages namely: Njijini, Lugangeni, and Mandileni villages in Mount Frere and Tela, Lubaleko and Cabazana in Mount Ayliff.

The study was interested in collecting data from agricultural households. Unfortunately, no documented registers existed for agricultural households. As a result, the purposive sampling was used focusing on agricultural households. To avoid bias, respondents were then randomly selected from the purposively selected agricultural households for interviews. A total of 138 agricultural households were randomly selected, 23 farmers from each of the 6 villages.

4. FINDINGS

4.1 Types of ICT devices and services for agricultural purposes

This section presents results on the types of ICT devices and services used by smallholder farmers for agricultural purposes. Figure 1 presents a summary of ICT devices and services that are being used by smallholder farmers in the sample for agricultural purposes. Results reveal that smallholder farmers in the sample mostly use the following ICT devices: Mobile phone (23%), Radio (25%), TV (20%), Internet (6%), (b) Photocopying (3%), Videos (13%) and (e) Cameras (10%).

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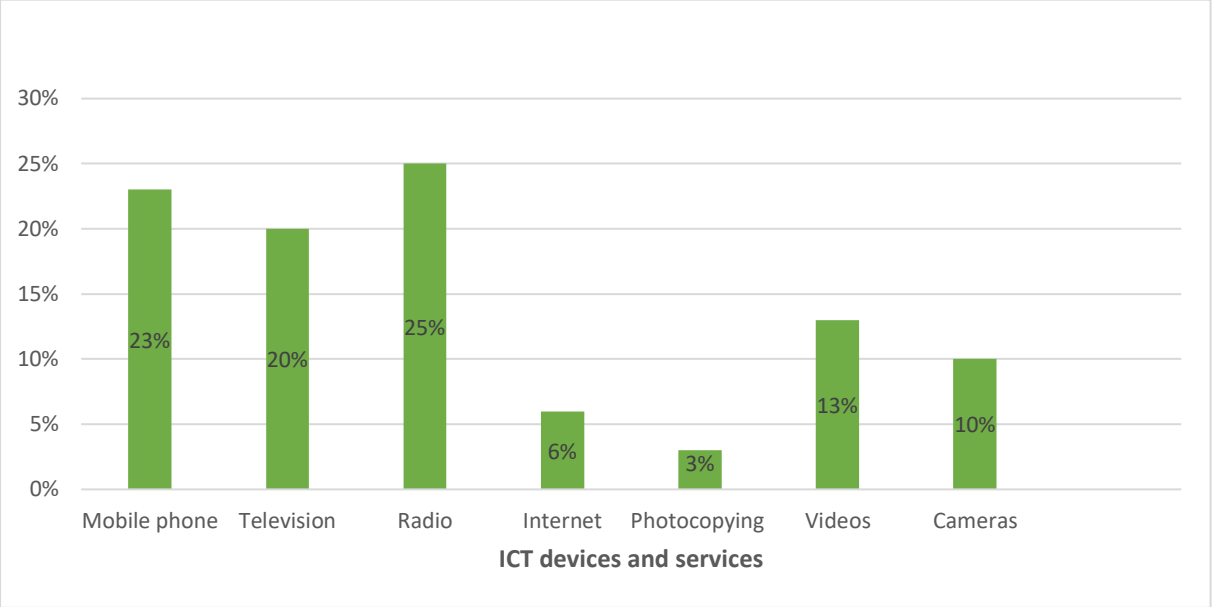

Figure1 Types of ICT devices and services used by smallholder farmers for agriculture purposes

These findings reveal that smallholder farmers mostly use mobile phones, television and radio for agricultural purposes. The dominance of mobile phones as an ICT device used by smallholder farmers for agricultural purposes may be explained by the fast expansion of mobile network services in rural areas in recent years. Lately, there is easy access to extension services and market information through phones. It has been observed that cell phones are the most popular method for communicating agricultural information in Tanzania (Churi *et al.*, 2012). Smallholder farmers are using these phones to communicate with other farmers, customers, agricultural advisors and seeking agricultural information. This is very helpful because they get hold of each other easily and they do not have to visit offices or wait for a visit from agricultural advisors in order to get hold of advisors. Previous studies by Mtega and Msungu (2013) in Tanzania discovered that there was an increase in the use of cell phones in accessing agricultural information and its positive impact on agricultural productivity.

Results also indicate that radio is still used for agricultural purposes by 25% of smallholder farmers from the study area. Murty and Albino (2012) indicate that radio remains one of the best sources of disseminating agricultural information to the farmers in Pakistan, India, and Bangladesh. Thus far, promoting agricultural programmes on the radio may be targeted to enhance farmer information access. There is a farm forum model in Zimbabwe which makes the members of the forum gather in one farmer place to listen to an agricultural programme that is done to accommodate those who have no access to radio or poor network coverage (Nyareza and Dick, 2012).

Results also further indicate that televisions were still being used by smallholder farmers for agricultural purposes. Murty and Albino (2012) note that in Pakistan, it is easy for smallholder farmers to receive agricultural information by watching TV. Chhachhar *et al.*, (2014) found

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similar results in India and Ethiopia, arguing that TV has played an important role in disseminating agricultural information. Despite being used by a significant number of farmers (20%), farmers were complaining about the time of broadcasting for agricultural programs as well as the language used. In Iran, a comparable study indicated that smallholder farmers preferred the agricultural program to be broadcasted in their local language so that the information could be well understood (Chhachhar *et al.*, 2014).

Results further indicate that the following ICT devices and services were rarely used by smallholder farmers from the study area to develop agriculture: (a) Internet, (b) photocopying, (c) videos and (d) cameras. This may be explained by the low awareness of opportunities and benefits that can be obtained from the use of such ICT devices by smallholder farmers. Some of the smallholder farmers who were interviewed had no clue of using mobile phones to search from the internet. Dannenberg and Lakes (2013) note that in Kenya there is limited knowledge about how to use the internet and, therefore, complexity of using it might lead to low use of it.

4.2 Challenges faced by smallholder farmers in using ICTs to retrieve agricultural information

This section presents results on challenges faced by smallholder farmers when using ICTs for agricultural development. Figure 2 presents a summary of the challenges that smallholder farmers face. Results demonstrate that the challenges faced by the majority of smallholder farmers who are using ICT devices and services.

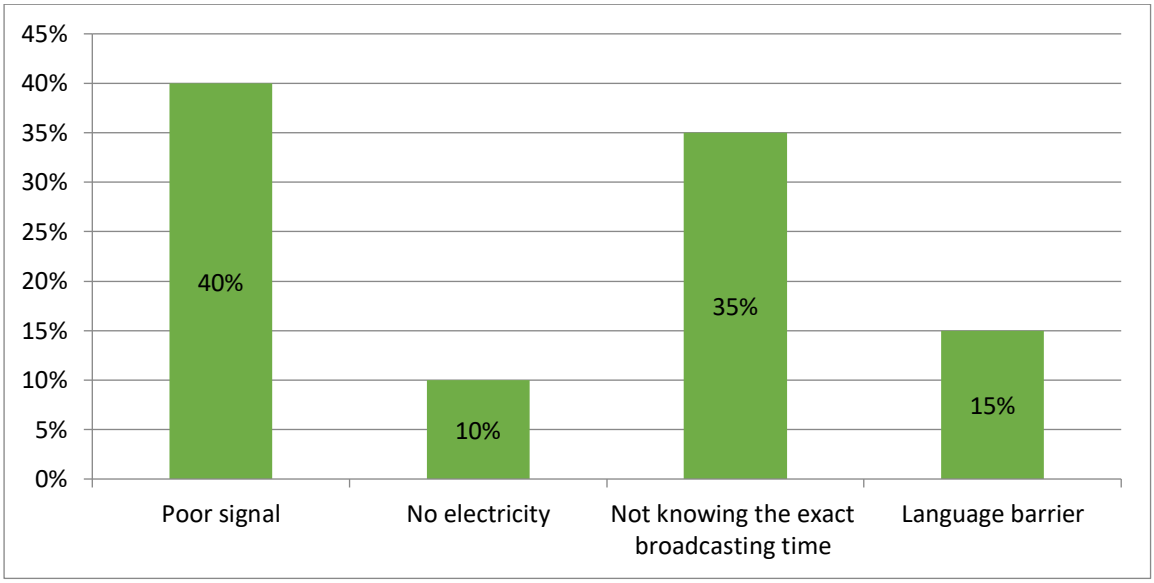

Figure 2 Challenges faced by smallholder farmers in using ICTs to retrieve agricultural information

These findings demonstrate two major challenges faced by smallholder farmers when using ICT devices and services as (a) the problem of not knowing the exact broadcasting time of agricultural programs from (radio and TV) and (b) poor signal when using mobile phones and

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when watching TV. Smallholder farmers claim that the broadcasting time changes frequently and there is no proper advertisement of agricultural programs on TV and radio. Chhachhar *et al.*, (2014) states that it is good for agricultural topics that will be discussed on the radio to be advertised prior for the listeners to be aware of the time and the topic, in that way they can prepare questions and comments.

In most rural areas, smallholder farmers also face a challenge of poor network coverage that makes it difficult to use mobile phones which then requires them to be in a specific area for good network coverage. In addition, the usage of televisions requires a DSTV (Digital Satellite Television) installation so as to improve poor signal. Byres *et al.*, (2011) also notes that smallholder farmers in Malawi are struggling to have full access to ICTs especially mobile phones due to poor network signal.

These findings suggest that the lack of electricity has a potential of affecting smallholder farmers' retrieval of agricultural information through ICT devices and services. Smallholder farmers are affected by electricity because depending on batteries and solar systems makes it difficult for them to always have their phones working or to be able to watch TV any time of the day. To that end, expansion of electricity to smallholder farming areas and promotion of alternative sources of energy like solar power may positively influence smallholder farmers' access to agricultural information. Previous studies in developing countries by Chhachhar *et al* (2014) indicate a problem of electricity in rural areas which limits ICT access and utilization by smallholder farmers. The study further points to the language barrier as a critical challenge affecting smallholder farmers' full utilization of ICT towards accessing agricultural information. Most ICT devices and services use English, while the majority of smallholder farmers prefer and understand their indigenous language (Rao *et al.*, 2004; Mittal, 2012). These findings suggest that developing ICT devices and services compatible with local language may enhance smallholder farmers' access to agricultural information worth supporting given that most agricultural information necessary to boost productivity and market access is readily available on ICT services.

5. CONCLUSION AND RECOMMENDATIONS

According to the data that was collected from smallholder farmers of Umzimvubu local municipality, ICT devices and services were not well utilized due to lack of awareness. It has been noted that the most popular ICT device that were being used to communicate with extension advisors and amongst farmers is mobile phone for agricultural purposes. In addition, one of the reasons that makes mobile phones to be frequently used is because it is easy to use even some illiterate farmers were using it. The communication between smallholder farmers and extension advisors is very important whereas some smallholder farmers were encountering a challenge on using mobile phones due to less of exposure and lack of awareness on how to properly use it for improving agriculture. The other ICT device that was used is radio whereas most smallholder farmers were complaining about the agricultural programs from the radio,

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that were inconsistent. It is recommended that agricultural extension services may leverage on this to package their extension services in ICT devices to increase their visibility. Government and rural development implementing agencies can also leverage on ICT platforms to share agricultural information, technologies and innovations given that the majority of smallholder farmers own these devices.

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