How ICTs are Shaping the Agricultural Landscape in Uganda

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Presented at NARO-MAK Joint Conference - 2016, 21st – 24th November 2016, Speke Resort Munyonyo, Kampala (Uganda)

ABSTRACT

ICT stands for information and communication technologies, being defined by the Uganda communication commission as technologies that provide an enabling environment for physical infrastructure and services, development of applications for generation, transmission, processing, storing and disseminating information in all forms, including voice, text, data, graphics and video. Over the past two decades, Africa has experienced the fastest growth in the global telecommunication market, especially due to the tremendous growth of mobile telecommunication networks. Agriculture is an important economic sector with the majority of the rural population in developing countries depending on it. The sector faces many challenges of enhancing production in a situation of dwindling natural resources necessary for production. Due to the increase in demand for agricultural products, many opportunities are available for producers to improve and sustain their livelihoods. Information communication technology (ICT) plays an important role in addressing these challenges and uplifting the livelihood of the poor people in rural areas. This article explores the significant contribution of ICT to the livelihoods of small scale farmers and the efficiency of the agricultural sector in developing countries, with key emphasis on the different ICT tools which play a significant role in agricultural development, as well as citing key hindrances to accessibility of ICT services plus the different recommendations to cope up with these challenges.

Key words: *ICT, Agriculture, GIS, Uganda, developing countries, RS*

INTRODUCTION

African countries have seen decades of futile attempts to shift from the agricultural sector. Based on experiences from western countries, poorly developed countries, were being pushed to strive for economic diversification through the transformation of their economies with decreased dependence on the indigenous sector (Ansoms, 2008).However, these economies remain agrarian, with the sector accounting for 15% of the continent's GDP, employing 90% of the rural workforce and 60% of the total labor force (urban and rural) , contributing as much as 40% of export earnings and providing over 50% of household incomes(UNECA,2007; McKinsey,2011). With this low contribution to growth, however, Africa's arable land makes 40% of arable land globally, while only 10% is cultivated (EIU, 2012). This is largely due to the fact that the sector has received less attention, especially in the areas deemed critical to its development from national growth, hence the poor performance of the sector. The agricultural sector is faced with a big challenge of enhancing massive production to feed a growing and prosperous population in an environment of decreasing availability of natural resources. Water shortages, declining soil fertility, effects of climate change and rapid decrease of fertile agricultural lands due to urbanization, shortage of critical rural infrastructure, inadequate access to advanced technologies,

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limited access to affordable financing, markets and unfair market conditions, high production and transport costs, low skills etc.,.

Often there is 30% or fewer shares in GDP for agriculture which shows low productivity in the sector. (OECD, UNDP, AfDB and UNECA, 2012). Over the past few decades, agricultural production and yields have lagged behind in developing countries despite the role played by agricultural development (Aker, 2011). One of the important forces in agricultural transformation in countries such as China and Korea was the huge investment in transport and communication infrastructures especially ICT's, apart from emphasis on research and extension, irrigation systems and storage facilities which are all essential in raising productivity (UNECA, 2012). Countries that welcome and invest in technologies that are suitable for their circumstances will be able to sustain growth and be competitive. Strategic application of ICT's to the agricultural sector in developing countries of Africa offers the best opportunity for economic growth and poverty alleviation on the continent (World Bank, AfDB, ArC, 2012). For instance, in a study conducted by the African Development Bank (AfDB), it has been shown that there could be increase in cereal productivity in Africa by 75%, if it prioritizes the use of new high- yield variety seed, chemical fertilizers and other inputs, hence achieve opportunity, higher growth rates and food security. ICT's offer to facilitate technological adoption, to transport information about new markets and market prices at a relatively low cost, hence having a significant contribution to agricultural growth. It is predicted that by 2040, Africa will be with the world's largest working age population, which reflects the economic growth potential with a younger demography, of which 38% of the working youth in Africa are in the agricultural sector (UNECA, 2012, EIU, 2012, AfDB, OECD, UNDP, UNECA, 2012). This will not only help utilization of ICT's and the telecommunications market, and allow business to operate more efficiently and cost effectively, but also present significant opportunities not only to the agricultural sector but to the general business world as a whole (Hopestone.K.chavula,2013)

A brief highlight on the roles of ICT in the agricultural sector:

Increasing agricultural production is critical in alleviating poverty as it can boost farmers' income especially smallholder farmers who have limited resources to leverage on growing and marketing their products. This could be achieved if there exists an efficient value chain, which entails engaging many stakeholders ranging from farmers to input suppliers and distributors. Existence of efficient value chains depends however on the efficient and systematic flow of relevant information, which in turn depends on the existence of an efficient and reliable ICT system and associated services to network a diverse range of stakeholders within the long value chain (Halewood and Surya, 2012). Thus ICT could provide a peculiar opportunity to advance related technological adoption and access, provision of information on markets and market prices, weather, transport and agricultural techniques.

Another significant impact of the ICT sector in developing countries is the utilization of ICT enabled solutions for food and agricultural production. ICTs improve access to financial services which could result in economic growth and poverty reduction in developing countries (Burgess and Pande, 2005; Levine, 2005a, b). This is seen in Kenya where studies show that households with access to mobile money services through M-Pesa, are better able to manage negative livelihood stocks such as job losses , death of livestock , or problems with harvests (Anker and Mbiti, 2010; Sen and Choundry, 2011). Other financial services including insurance and credit and savings services based on the mature mobile money systems are being involved in Africa. One of them is the Kilimo micro-insurance product that uses M-Pesa to provide pay outs to smallholder farmers where crops fail (Sen and Choundry, 2011). Hence having an impact on agricultural growth and peoples' livelihood.

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Extension workers and researchers are able to adopt improved agricultural practices and disseminate them to farmers through ICT services. Relevant agricultural information such as agricultural techniques, commodity prices, and weather forecast to farmers. The utilization of ICT services, especially mobile technologies, helps farmers who are often unaware, of commodity prices in adjacent markets and rely on information from traders in determining when, where, or for how much to sell their produce, to have relevant and timely information to this regard. In rural Africa for example, the utilization of e-Soko in Rwanda, enables farmers to compare to market prices for the grain they produce and fishermen are able to sell their catch every day and reduce spoilage and waste by locating customers (Aker and Mbiti, 2010; Chavula, 2012). Using ICTs has led to an increase in up to 36% of farmers' income and up to 36% of traders' income in countries such as Kenya, Ghana, Uganda, and Morocco (Halewood and Surya, 2012). ICTs increase the efficiency of market interactions and provide access to real time information by enhancing farmers' access to markets and pricing power through the use of trading platforms over the internet through web/mobile applications thus facilitating agricultural growth (Driouchi et al., 2006).Many other ICT modalities such as GIS and RS can be used to quantify water requirements of different crops and pastures in Uganda. In one study, they were used to quantify the water requirements of Grain amaranth (GA) (Joseph kyagulanyi, Isa kabenge et al., 2015).Therefore the importance of ICT in the agricultural sector development in Uganda is imminent and once adopted; it will enhance increase in agricultural productivity and poverty alleviation in the poor farmers.

Challenges faced by farmers during utilization of ICT services

Many farmers lack the skills to manage and operate the necessary ICT modalities since most of them live in rural areas with low literacy levels. Others are too poor to access these tools as they lack money to buy them (Winnie.N.Akullo, Onan Mulumba, 2016). There is also a challenge of inaccessibility of telecommunication networks, internet and power supply (SNRD, (2016). Absence of gender mainstreaming is another challenge of utilization of ICT services within the agricultural sector. Since women make up 43% of the worlds' formal agricultural workforce, most rural women have limited access to financial resources and are still left out when it comes to utilization of ICT services (USAIDS,2012).

Recommendations:

There is need for the government to train farmers in ways which they can use these ICT modalities. The government of Uganda also may subsidize on the costs of acquiring these equipments such that they can easily be accessed by local peasants. Gender mainstreaming especially on the women side, such that they can easily benefit from government programs and access these services for their welfare.

Summary and conclusions

The above information show how important ICTs can be to the development of the agricultural sector in Uganda, and Africa as a whole. The government must address the prevailing challenges in the accessibility, utilization and handling of ICT modalities by rural farmers such that there is increased productivity. Once dealt with, ICTs can play a crucial role in poverty alleviation and agricultural development in Uganda.

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