

# ICTs and Agricultural Marketing in Africa: A Review

Yohannes Girma<sup>1\*</sup> Abebaw Abebe<sup>2</sup>

1. Department of Agricultural Economics, College of Agriculture, Food and Climate Science, Injibara University, @Ethiopia

2. Department of Agricultural Economics, Raya University Ethiopia

## Abstract

Information and communication technologies (ICTs) have a great role to change the existing traditional agricultural system in developing countries. Through application of ICTs in agriculture it is possible to; make efficient information dissemination, bring precision agriculture and increase market access of farmers. Currently, In developing countries majority of rural farmers' have access to ICT tools, however, most of the farmers have not enough awareness on the significance role of ICTs for agricultural marketing and its subsequent impact on welfare improvement. Thus this review paper is designed to assess ICTs use in agricultural marketing in Africa. The result of this review paper signified that ICTs and agricultural marketing had positive association, in which through application of ICTs in agricultural marketing it is possible to reduce transaction cost, disseminate updated market information and improve the rural farmers' linkage to market. Moreover, ICTs have also the power to increase farm productivity, income and hence improve the food security status of farmers. Therefore, improving awareness of the rural communities and establishing agricultural information system at the country level is crucial to magnify the potential role of ICTs in agricultural marketing.

**Keywords:** ICTs; Agricultural Marketing; Welfare

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## 1. Introduction

The advent of information and communication technologies (ICTs) has the potential to disseminate market information so as to maximize the return from agricultural activities (Asenso and Daniel, 2012). ICTs are agents in agricultural knowledge management process. It helps to create, acquire, store and disseminate agricultural knowledge for the rural communities (Ejemeyovwi *et al.*, 2017). ICTs have a paramount contribution to modernize the traditional marketing system which is reflected in most developing countries (Momenul *et al.*, 2017). It is also a promising area that can bring *efficiency, effectiveness and productivity of agriculture* (Chengappa *et al.*, 2012).

Now a day, in developing countries, the ICT Sector is introduced in agriculture; particularly in marketing of agricultural products; to support farmers' decision making (Jairath and Yadav, 2012). In disseminating appropriate information for the farming community, ICTs has huge role. Through ICTs the farmers can have access to market information in relation to time of sale, place of sale and type of buyers to sale their product. Such information are crucial to make decision making on where and when to sale their farm products, to follow market oriented production system and also to improve the bargaining power of farmers (WB, 2011).

Digital technologies have the power to; overcome information problems, increase market access, improve knowledge transfer through providing extension service, and improve agricultural supply chain management (Deichmann *et al.*, 2016). Furthermore, ICTs have the potential to strengthen interaction among researchers, farmers and DAs which is critical to improve smallholder farmers' production, strengthen their marketing capacity and also to ensure their food security status (Lashgarara *et al.*, 2011). Through ICTs it is possible to bring about rapid change in the agriculture sector and rural transformation at large (Milovanović, 2014).

In most developing countries, rural farmers are far from the market and also they have no access to appropriate market information. Thus, the farmers are exploited by traders and get low price for their products (Magesa *et al.*, 2014). In the region the farmers used traditional means of communication and hence they are deterred from the market access. Furthermore, information asymmetry, lack of information transparency and mistrust between farmers and traders, obliged farmers to sell their product in the local market which makes the trades to benefit more at the expense of farmers (Magesa, 2015). Therefore, applying ICTs in agriculture is not a matter of choice if poverty reduction of the farming community is aimed at large (Kayiska, 2013).

In developing countries, Even if ICTs are believed to have a potential to bring rapid change in the agricultural sector in general, and in agricultural marketing section in particular, inadequate ICT facilities, lack of personnel, insufficient infrastructure, harmonization of knowledge and language, power supply and farmers' perception are challenges that obstruct successful implementation of ICT in the sector (Thankachan and Kirubakaran, 2014; Saidu *et al.*, 2017; Tesfaye *et al.*, 2016; Fisseha *et al.*, 2017; Nekesa and Mulumba, 2016).

By understanding the huge of ICTs to bring agricultural transformation at large, this review paper is prepared to give awareness for the larger farming community and stakeholders regarding ICTs' role for agricultural

marketing and welfare improvement, and also ICT apps and services used in Africa.

Thus, the objectives of this review paper are; to determine:

1. The role of ICTs in agricultural marketing
2. Impact of ICTs on farmers' welfare
3. ICT apps and services applicable in agricultural marketing

## 2. Methodology

To accomplish the objectives of this paper different related studies have been reviewed.

## 3. Agricultural Marketing: Definitions and Concepts

Marketing is the process of planning and executing the conception, pricing, promotion and distribution of goods and services to create exchanges that satisfy individual and organizational objectives (Cohen, 2011). Marketing is the exchange of goods and services between two parties. In the marketing process the sellers use different marketing strategies and tactics to attract the customers and increase the demand for their products (Lozada and Zapata, 2016).

Agricultural marketing consisted of two words; agriculture and marketing. Generally agricultural marketing is the process of producing saleable farm products to sale for the targeted customers. It involves different market functions, which includes; concentration, grading, processing, warehousing, packaging and distribution (Kiruthiga *et al.*, 2015; Ayo, nd). Since agricultural production is characterized by uncertainty (based on rainfall pattern), seasonality, perishability and bulkiness of production; creating market access for the farmers is crucial to overcome product deterioration, to satisfy the demand for the consumers and improve profit gain for the producers (Vyasa, 2014).

Marketing of agricultural products bring economic development for any countries whose economy is based on agriculture. Farmers participation in the market is the starting point get into commercialization and follow market oriented agriculture (Jyothi, 2014). Agricultural marketing involves process involved from production to post harvest operations. Such operations increase value on the product in terms of time and place (Chijioke and Ada, 2012).

## 4. Concept of E-Marketing

The term e-marketing, internets marketing and online marketing are interchangeable words. E-marketing includes information management, public relations, customer service and sales. Moreover, it is crucial to offer products to millions of people at a glance at lower cost. It is more efficient as compared to traditional marketing strategy (Mahmood, nd). E- Marketing or online marketing is an integral part of modern marketing. In e-marketing the internet plays a great role. Online marketing system reduces cost, increase exposure and accessibility of products and services, increase interactivity and also there is quality customer service (Kaur *et al.*, 2015).

E- Marketing is the exchange of goods and services through digital tools or internet. It is about creating, distributing, promoting and pricing of goods and services through internet. Exchange through internet simplifies the transaction process (Grzywaczewski *et al.*, 2010). Moreover, E- Agribusiness is an E-business which focuses on online transaction of agricultural products. It is helpful to reduce the intervention of wholesalers and retailers, and create new channel to communicate farmers and consumers (Strzębicki, 2011). It has a benefit of reaching extensive geographical populations and providing detailed product information at a relatively low cost (Carpio *et al.*, 2013).

## 5. Results

### 5.1 Role of ICTs in Agricultural Marketing

Access to quality information is the priority issue for farmers to make informed decision making regarding production and marketing issues. ICTs based market information dissemination can avoid information asymmetry and increase market performance (Chiatoh and Gyau, 2016). ICTs facilitate transaction among farmers. It allows information exchange and speed up transaction between two parties. Moreover, ICTs helps farmers to distribute resources efficiently (Langat *et al.*, 2016).

Getaw and Bahigwa (2015) asserted that in Ethiopia use of ICTs is crucial to reduce transaction cost. Through ICTs use it is possible to reduce information searching cost, negotiation cost and improve bargaining power of farmers. Okello *et al.* (2014) signified that in Kenya ICTs has the power to increase market access through improving information dissemination. Information dissemination through ICTs is not just increase market access of farmers but also boost the market knowledge, interaction between farmers and consumers which makes the producers to get appropriate market share (Guiliani and Dalla, 2017).

Okojie and Omoregbee (2012) in Nigeria ICTs helps farmers to make direct communications with buyers, to get price information, to get information concerning sources of agricultural inputs and information related to market place. Similarly the study by Yohannes (2017) showed that ICTs, particularly mobile phone, helped

livestock producers to get price information, increase bargaining power of farmers, increase price negotiation and minimize market information searching cost.

The finding of, Nekesa and Mulumba, (2016) in Uganda, Wyche and Steinfield (2015) in Kenya, and Lwesya and Kibambila (2017) in Tanzania showed that ICTs played a great role to disseminate up-to-date information on time of sale, place of sale, amount of sale and type of buyers. Access to such pertinent information supported farmers to make efficient and effective decision making process production and marketing processes so as to support and make their livelihood sustainable.

The result of Daisy and Tawanda (2015) in Zimbabwe, and Alhassan and Adjei (2012) in Ghana depicted that ICTs use and agricultural marketing has a positive correlation. Information dissemination through ICTs is crucial for production increase which in turn increase farmers market surplus. Ease of communication among market actors and save time in search for the market are the prominent roles of ICTs, particularly, mobile phone, in the regions.

### 5.2 Impacts of ICTs on Farmers' Welfare

In developing countries, smallholder farmers are physically isolated from information and market. This physical isolation of farmers brings high transaction cost for the farmers owing to transportation and information searching cost. Improving information access, communication networks and market access of farmers is crucial to increase farm production and productivity. Such increase in productivity is a necessary condition for income improvement, food security and poverty reduction. Therefore, to this desirable change, the role of ICTs is appreciable (Mcnamara, 2009).

Access to ICTs tools has higher impact to improve farmers' welfare. Through ICTs the farmers can have access to advisory services from agricultural experts, gain up-to-date information about crop and livestock production practices, and also procure timely information on market price of agricultural products (Jairath and Yadav, 2012). Chikaire *et al.* (2017) showed that access to ICTs have direct relation with farmers' welfare improvement. Their finding signified that access to quality health services, increase in income, improve in supply chain and access to nutritional food are the welfare contributions of ICTs.

In developing countries, the farming activity is constrained by production, institutional and market risks. Access to information through digital tools about farming methods and climate change; market information and provision of advisory service are critical to tackle different agricultural risks the farmers encounter (Mittal, 2012). Thus, the ICT sector speed up information deliver, bring efficiency and improve market performance which contribute to food security through enhanced trade (ITU, 2009; Katengeza *et al.*, 2010).

FAO (2013) and FAO (2017) pointed out that in the current technology era ICTs are the means to bring about sustainable agriculture. Different ICTs innovations are come to application and are changing the lives of smallholder farmers in developing countries. Among ICTs mobile phone is widely accessible to billions of people in developing countries. Innovations taking in the agriculture sector include commodity and stock market price information, meteorological data collection, advisory services to farmers for agricultural extension, early warning systems for disaster prevention and control, and also financial services are crucial to make informed decision for the farmers which has positive implication on food security status of the farming households.

Proenza (2015) depicted that use ICTs has a capacity to increase the performance of agricultural sector and boost farm income. This can be done through improving the performance of the agricultural market, reducing intermediation cost and through reducing the cost of agricultural extension services. Moreover, Akin and Ismaila (2016), and Uduji and Onyinyechi (2011) in Nigeria depicted that there is a positive correlation between ICTs use and food security status of rural farmers. This is due to the fact that ICTs had the potential to; provide better marketing exposure and pricing, reduces agricultural risk, enhances income, links farmers and consumers easily, reduce cost of production and reduce transportation cost.

Jain *et al.* (2012) and Jere (2015) signified that access to ICTs has found to bring precision agriculture, improve rural income, avoid gender imbalance in access and resource use, boost productivity and also improve livelihood. The study conducted in Tanzania by (Khaliq *et al.*, 2016) depicted that ICTs are essential to provide banking services, improve agricultural marketing, prevent middlemen exploitation, expanding and strengthening social networks, and ensure accessibility and ownership of assets.

Moreover, Matto (2018) in Malawi, Ali *et al.* (2016) in Uganda; and Lwesya and Kibambila (2017) in Tanzania signified that ICTs is used by the farmers to get: information and knowledge about postharvest handling methods, market information, pest/disease control mechanisms, weather information and fertilizer applications which is essential to increase productivity and keep food security status of the resource poor communities.

### 5.3 ICT Apps and Services in Agricultural Marketing

ICTs application technologies are critical to transmit information in the form of voice or text to a wide number of beneficiaries. Currently, since mobile phones are affordable ICT tools, mobile applications for agricultural and rural development (m-ARD apps) are believed to bring about rapid change in the agricultural sector. Mobile apps

enables users to have: access to better production and marketing information, better access to extension services, better market links and distribution networks and also better access to finance ( Zhenwei *et al.*, 2011).

Table 1 shows mobile applications currently used in different parts of Africa. The table signified that mobile technologies is revolutionized and being applied in agriculture in most African countries.

## 6. Conclusions

The introduction of ICTs within the agricultural sector is a new opportunity to modernize and increase the contribution of agriculture for the economic development. The application of ICTs in agriculture, particularly in agricultural marketing, is critical to reduce the interference of middlemen and make farmers beneficiary from the market. Information dissemination through ICTs helps farmers to make informed decision making on place, time and amount of sale of their farm products. ICTs have the power to increase the market participation of farmers which in turn increase farmers' productivity and income. The return gained from sale of agricultural products is crucial to reduce poverty and food insecurity. Thus, to improve agricultural market process and welfare of farmers, introducing ICTs within agriculture is crucial.

## 7. Recommendations

Based on the review made from different literatures, the following recommendations are forwarded;

Awareness creation on the potential advantage of ICTs apps and services on agricultural marketing should be done through training. Moreover, Promoting adult education in Africa is important for farmers who are unable to read and write which paves the way for establishment of ICTs within agricultural sector.

Establishing agricultural market information systems (AMIS) at the country and regional level is important to disseminate market information continuously. This helps farmers to; know day to day market activities, improve farmers' bargaining power, create market integration and save farmers from price distortion.

Designing different mobile apps and services which is compatible with the farmers need is also helpful to inculcate ICTs within farmers' agricultural activities. Mobile apps and services should be designed using farmers local language; voice and video message service are also crucial to benefit illiterate rural farmers.

### Gaps in ICTs and agricultural marketing researches

- Most research studies are focused on ICTs role on crop product marketing, however, the role played by ICTs on livestock sector is not seen deeply.
- Moreover, there is no commodity specific research study done in connection to ICTs and livestock marketing.
- There is no quantitative research studies on the area of focus and most researches are done qualitatively.
- The impact of ICTs on; food security, multidimensional poverty and transaction cost reduction

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## Appendices

Table 1. ICT Apps used in Agricultural Marketing in Africa

S/No	Mobile applications	Country	Apps Benefits
1	KACE, DrumNet	Senegal, Ghana, Kenya, , Uganda. Mali, Nigeria	Better access to market information leads to increased income. Linking suppliers and buyers directly. Avoid interference of middlemen
2	Virtual City , Dialog Tradenet, RML, DatAgro	Kenya	Improve supply chain Give up –to-date information
3	Esoko,	N. Sudan, Burkina Faso, Cote d'Ivoire, Ghana, Nigeria, Mali, Rwanda, Tanzania, Zambia, Kenya, Mozambique, Uganda, Malawi, Mozambique, Madagascar	Improve the market integration Speed up transaction through quick information dissemination Bring market efficiency

S/No	Mobile applications	Country	Apps Benefits
4	VetAfrica	Ethiopia	Provide veterinary service and market related information.
5	i-cow	Kenya, Ethiopia, Tanzania	Improve farm output and input market Link farmers to agricultural financial service providers, veterinary experts and agricultural extension service providers.
6	Agro-Hub	Cameroon	Provide Market and price Information. Improve farmers income
7	E-farming	Kenya	Provide advisory service on farm production methods. Help farmers to have access to input and output markets
8	E-vouchers	Malawi	Improve distribution of farm inputs
9	M-Birr	Ethiopia	Provide access to financial services
10	M-Farms	Kenya	Helps to make online transaction
11	<b>Cocoa Link</b>	Ghana	Delivers information related to production and marketing from agricultural experts to farmers in English and local languages at no cost
12	<b>Modisar</b>	Botswana	Helps farmers to track their farm records, cattle herds, farm costs and sales. Provide advice to farmers on animal vaccinations, feed and nutrition also, they receive instructions on finance
13	Kilimo Salama, KUZA Doctor,	Kenya	Improve farmers access to input market Provide advisory service for farmers on farm production methods
14	Infotrade	Uganda	It is a platform built to integrate collection, analysis and dissemination of agricultural and other market information
15	LimaLinks	Zambia	It is a market linkage system that improves farmers with market.
16	Manobi	Senegal	Improve farmers' access to input and output markets Provide up to date market information Improve farm income
17	SALI	Kenya	Provide weather information for farmers Save farmers from production risk
18	SANGONeT	East Africa	Helps small scale dairy farmers to record their cows lactation period Helps to improve milk production and act according to the market
19	WOUGNET	Uganda	promoting and supporting the use of ICTs by women in Uganda improve rural women farmers to have access to the market
20	E-TIC portal	Senegal and Mali	share knowledge for young people and women to manage their farm effectively
21	Remote livestock market system	Zimbabwe	helps farmers to sell and buy their livestock online
22	Coders4Africa	Africa	Used to make partnership with universities and organizations so as to address agriculture.

**Source:** own web search