

ICT Supported, Agricultural Extension and Advisory Services in Ethiopia

Turyasingura Benson ^{1*}

^{1*}Faculty of Agriculture and Environmental Sciences, Kabale University, Uganda; P. O. Box 317, Kabale, Uganda; College of Agriculture and Environmental Sciences, Africa Center of Excellence for Climate Smart Agriculture and Biodiversity Conservation, Haramaya University, P. O. Box 138, Haramaya, Ethiopia; ORCID ID: 0000-0003-1325-4483; Tel No.: +256784580916:

*Corresponding Author: bturyasingura@kab.ac.ug

Abstract Agricultural extension is critical for agricultural development and rural areas in Ethiopia. However, Ethiopia's agriculture industry is characterized by delayed technological change and the slow introduction of alternative institutional and organizational frameworks to boost growth and development. The aim of this study was to identify the ICT supported, Agricultural Extension and Advisory Services in Ethiopia. This study was guided by specific objectives namely, brief description of agricultural innovations, identifying the role of ICT for agricultural extension service, and determining the challenges affecting the use of ICT in the agricultural information Service provision. It was found that non-governmental organizations in Ethiopia provide technology and inputs and best practices to farmers, training on how to use ICT in agriculture and mass education. It was found out that ICT enhances the livelihoods of small-scale farmers to get markets for their produces using mobile phones, promoting existing farming information and knowledge which is communicated within the agricultural sector. The lack of access to ICT infrastructure was also said to have hindered the national and regional sharing and exchange of knowledge and information generated by research centers. It was recommended that the Ethiopian government should come up with policies to enhance the adoption of ICT.

Keywords: ICT supported, Agriculture, Agriculture extension, Advisory services, Ethiopia

1. INTRODUCTION

Ethiopia is the most populated country in Sub-Saharan Africa and the largest country in the Horn of Africa. Ethiopia's current population is 118,462,390 people, according to World meter's elaboration of the most recent United Nations data for 2021. With a GDP per capita of less than US\$400, Ethiopia is one of the world's poorest countries, ranking near the bottom of the UN Human Development Index (174 out of 179 countries) in 2011 (Birke, 2021).

Agricultural extension is critical for agricultural development and rural change in Ethiopia (Davis et al., 2020). "A government's policy instrument and legitimate weapon for bringing about desired changes in political, socioeconomic, cultural, and environmental elements is considered as extension" (Debelo, 2020). The obvious purpose of agricultural extension is to persuade farmers to adopt/adapt and utilize innovations in order to overcome agriculture-related restrictions (Tesfaye et al., 2021).

The method to agricultural extension in Ethiopia has evolved throughout time (Norton & Alwang, 2020). The Ministry of Agriculture and Natural Resources recently adopted a Participatory Extension System, which is a modified version of the participatory demonstration and training extension systems that have been in place in the country since 1995 and have had a positive impact on local farmers' livelihoods and food ecosystems (Keba & Kedir, 2020).

Agricultural extension and consulting services play a critical role in agricultural development and can help farmers and other rural inhabitants improve their livelihoods (Jimma, 2017). Agricultural extension services were originally developed in 1953 by Alemaya University (since renamed Haramaya University) in recognition of this fact (Gudeta et al., 2021).

In the 1960s, the Comprehensive Integrated Package Project (Chilalo Agricultural Development Unit, Wolayita Agricultural Unit, and Ada District Development Project) provided extension services to a wider number of farmers (Birke & Knierim, 2020).

The extension system shifted to a Training and Visit (T and V) model in the 1980s, which was favored by international donors at the time. The Participatory Demonstration and Training Extension System (PADETES) used this T and V technique to persuade the government to expand the National Agricultural Extension Intervention Program (NAEIP) coverage in 1995. By 2007/2008, 9 million small-scale farmers had enrolled in extension programs (Abebe, 2018).

According to Turyasingura and Chavula (2022), many African countries, including Ethiopia, have expanded their extension and consulting services to encompass governmental, non-profit, and private sector firms that are critical parts of the agricultural value chain.

Turyasingura and Chavula (2022) concluded that extension reforms are needed for the long-term process of reforming and strengthening rural advisory systems hence a gap to fill. Some immediate priority actions for developing climate-smart rural advisory systems and services like establishing local-level platforms/mechanisms for better alignment and collaboration between public sector advisory services working on agriculture, water, environment, forestry, and fisheries also need to improve to ease ICT in agriculture (Turyasingura & Chavula, 2022).

Table 1:
 Some NGOs in agricultural extension and advisory service provision in Ethiopia

Major NGO	Major areas of extension service
SG-2000	Introduces the FTCs to a variety of agricultural technology and methodologies, as well as building the ability of development agents to improve crop yield, postharvest handling and processing, public-private partnerships, and market access.
Oxfam (International)	Improving food and income security through promoting corporate and public sector engagement to promote market access, particularly for women, and by improving access to production technology and sustainable markets.
Self-Help Africa	Scaling-up agricultural production and developing new enterprise and market opportunities for farmers and rural households.
World Vision	Providing knowledge and tools to help increase household food security, shock resistance, and catastrophe recovery.
Save the Children	Providing technologies and information to reduce chronic food insecurity households. So far, it has been able to: support households to cope in times of hunger; increase incomes for vulnerable households; improve management of natural resources; strengthen early warning systems; and improve
Agri-service Ethiopia	Providing information, technology, and training to help communities learn and act more effectively, enhance community-based institutions, increase smallholder market access, and improve food security and livelihood possibilities.
Catholic Relief Services (CRS)	CRS strives to build individual and community assets through non-food aid in the form of agriculture, livestock, health, nutrition, and water and sanitation assistance by providing knowledge and capacity building.

Source: (Center, n.d.) with some modifications.
Literature Review

Agricultural Innovations in Ethiopia

In Ethiopia, innovations tend to follow a supply-driven technological distribution path through the government (Weir & Knight, 2000). As a result, agricultural advances that support the livelihoods of the population, particularly smallholder farmers, are lacking. The social networks of agricultural actors do not take the nexus approach into account, and they are inadequately interconnected.

Farmers are excellent innovators because they have a lifetime of expertise. As a result, supporting farmer professors, recognizing their inventions, inspiring farmer innovators, inventorying and documenting those discoveries, and scaling up those innovations are all critical aspects to emphasis.

Ethiopia's innovation system is insufficient to enable the country's agricultural revolution (Gebremariam & Tesfaye, 2018).

Ethiopia's agriculture industry is characterized by delayed technological change and the slow introduction of alternative institutional and organizational frameworks to boost growth and development. Ethiopia is ranked 140th out of 145 nations in the Knowledge Assessment Methodology (KAM) report on knowledge index (KI), which analyzes a country's ability to generate, share, and apply knowledge (Jimma, 2017).

The present umbrella stakeholder's platform is the Agricultural Development Partners Linkage Advisory Council (ADPLAC). Only ADPLAC has survived among the several stakeholder platforms that have been established over the previous few decades, and it now acts as the institutional linkage mechanism for key agricultural stakeholders working in the country (Wodajo & Ponnusamy, 2015).

It also helps to strengthen agricultural advisory services by facilitating frequent meetings of actors and institutions involved in the provision of agricultural advisory services across the country. However, the platform's efficiency at various levels varies significantly and is tied to a variety of restrictions (Zewdie, 2012).

ADPLAC's success is hampered by poor links between research, extension, and other institutions, significant staff turnover, a lack of commitment among players, inadequate budgetary resources, and the dominance of the public extension system, among other factors (Ababa, 2012).

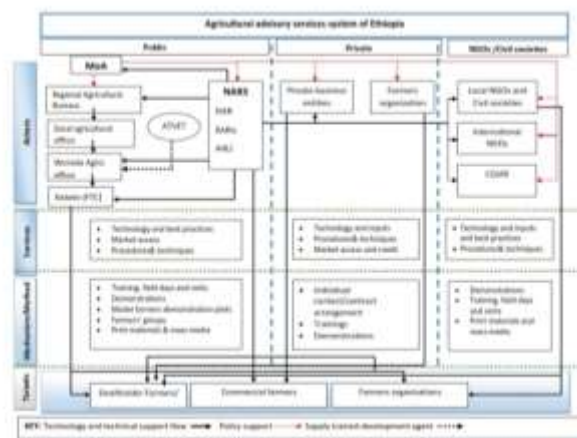


Figure 1: Map of Agricultural advisory system of service adapted from (Center, n.d.).

2.2 THE ROLE OF ICT IN AGRICULTURAL EXTENSION SERVICE

ICTs as a developmental tool can enhance the livelihoods of small-scale farmers to get markets for their produces using mobile phones (Tata & McNamara, 2018).

The internet which is a functional member of the ICT family is very beneficial in providing opportunities for distance education and training, thus overcoming some of the problems of location and lack of time in family-run small business in remote areas (Spielman et al., 2021).

In addition, publications from the internet are produced in down loadable election form instead of paper format, thereby allowing access to information unlike before one must go to library to look for books by professionals (Tata & McNamara, 2016).

ICT is one of the promising areas to do agricultural extension, aids in sharing of knowledge. Hand mobile phone in combination with radio enables messages to be given to a large number of listeners (Barber et al., 2018).

The use of knowledge management, web portals with pertinent production and marketing information has even been tried in some communities in Asia and Africa with some challenges which are not insurmountable. Evidence also suggests that the technology is being effectively used in some countries in Africa with remarkable success on market price information, weather forecast, transport information on storage facilities (Kameswari et al., 2011).

Knowledge and information according to Nyaga (2012) have become the major drivers of social and economic transformation in the world, they play a critical role in the transformation process to transfer technology, support learning, assist problem-solving and enable farmers to become more actively embedded in the agricultural knowledge and information system.

ICTs are used in distribution and supply chain management and traceability to increase efficiency and predictability to reduce spoilage. Examples are diary sector in Ethiopia which improves the standards of living of people.

Information and Communication Technologies (ICTs) are all technologies used for the widespread transfer and sharing of information. ICTs are rapidly consolidating global communication networks and international trade with implications for people in developing countries. ICTs can be used to enable, strengthen or replace existing information systems and networks. ICTs promote and distribute new and existing farming information and knowledge which is communicated within the agricultural sector since information is essential for facilitating agricultural and rural development and bringing about social and economic changes (Omotesho et al., 2012).

2.3 THE CHALLENGES AFFECTING ICT IN AGRICULTURAL EXTENSION SERVICE

Smallholder farmers with particular degrees of formal literacy can only properly exploit agricultural information. Farmers

who have received a basic education are more inclined to adopt new technology and increase their productivity (Nyarko & Kozári, 2021).

Education improves one's ability to gather, decode, and assess relevant data for agricultural output (Mujeyi et al., 2021). González-Cutre et al. (2020) claims that adapting to a new novelty requires a greater level of literacy. Most local farmers in Ethiopia's rural areas, such as Bati and Haramaya, are illiterate.

Furthermore, Ethiopia's inadequate ICT infrastructure is thought to have prevented the sector from reaching its full potential. As a result, research-extension-farmer connections are weak and costly, necessitating physical interaction such as training, field demonstrations, field day programs, and visits (Sagaro et al., 2019).

The lack of access to ICT infrastructure is also said to have hindered the national and regional sharing and exchange of knowledge and information generated by research centers (Mahon et al., 2019). In addition, despite recent efforts to extend the electrical grid to rural regions through the rural electrification initiative, electricity infrastructure coverage in rural areas remains low. As a result of the lack of electrical coverage, the expansion has been stymied.

Furthermore, affordability is a significant barrier to ICT service accessibility, particularly among subsistence farmers. To evidence this, Ethiopia has one of the lowest tariffs in Africa for contemporary ICT services such as mobile phones, internet, and fixed lines, costs are not that low in purchasing power parity terms when considering the low levels of household per-capita income (Blandford, 2019).

ICT knowledge is insufficient or inadequate (user friendliness of the technologies). Hence, most extension workers lack training on how to operate most current ICTs; they lack expertise and confidence in managing and operating them (Betts et al., 2019).

Inadequate capital: Due to poverty and illiteracy, several Ethiopian farmers, particularly small-scale farmers, are unaware of current lending possibilities (Matewos, 2020). ICT can help these farmers by giving crucial information about available funding options.

Conclusion and Recommendations

- There is need for ICT development to ease information dissemination.
- Government policies to enhance the adoption of ICT in agriculture.
- Mass education and training of local crop farmers on how to use ICT in agriculture

- Local communities should be encouraged to access ICTs by supporting them financially by the government and other donor agencies like World Bank.
- More awareness and training of farmers and extension agents on the effective and efficient use of ICT equipment by the government through extension heads.

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