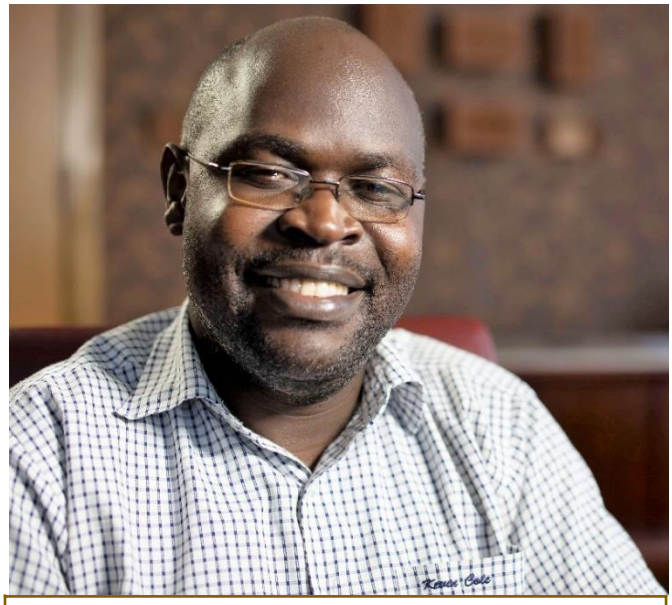
Digitalisation of Agriculture in Africa Challenges and Areas of Action

Agriculture still remains the core economic activity for low-income families globally and the most prevalent form of agriculture practice is smallholder farming, which accounts for over 500 million farms producing 80 percent of the world's food supply. On African continent, Agriculture remains a backbone of most of African economies, providing livelihood to over 70% of the populations especially those that live in Sub-Sahara Africa. Over 80% of farms in Africa are smaller than 5 hectares and make up most of farmland on the convenient and these are largely run by family farmers who feed and employ approximately 2/3 of the population.



Dr. Drake Patrick Mirembe - ICTInnovations and Incubation, ICT4D, Cyber Security, ICT Integration and Organization Leadership

Besides Agriculture, one sector that is rapidly expanding on the continent is the Information and Communication Technology (ICT) sector i.e. the digital technology sector. The landing of global Internet sea cables on the continent and the associated improvement in the global connectivity of the continent continues to stimulate the rapid expansion of the ICT sector in all regions of the continent. As noted by various scholars and practitioners, that access to ICT services in a digitally and globally networked world plays a critical role in social transformation of communities. Thus, most African countries through various stakeholders including; governments, development partners, academia, civil society organizational among others are making serious investments in promoting the development, access and use of ICT innovations (i.e. digitalisation of service provisioning) in various sectors of the economy.

Key sectors that seem to have witnessed more dedicated efforts on digitalisation include; financial, Agriculture, Educational, Health and governance. However, the outbreak of COVID-19 pandemic accelerated the demand for digitalisation across all sectors of the economy especially agriculture, health and education as the need for continued production and access of essential service like food, healthcare and education for populations especially those in urban centres who were subjected to lockdown and closures of facilities took a whole new level of urgency. From various reports and news bits, it is very clear that most Africa countries where not prepared to deal with COVID-19 especially in agriculture. For example, some decisions like closures of shopping centres and lockdown on transport services greatly impacted on farmer's access to inputs and delivery of produce to markets resulting in some cases, to food insecurity especially for populations in urban centres.

Even before COVID-19 outbreak the social and technological advances on the continent had made digitalization of Agriculture a must for all economies. It is worth noting that successful Agriculture like any other occupation is skill and knowledge intensive practice across various segments of the value chains. For example, farmers need to have timely information, knowledge and must develop appropriate skills in managing the value chain their practicing in. In that respect, digital technology plays a critical in enabling farmer access critical information for decision making, access to advisory services, collaborate with other stakeholders and access to quality markets among others.

Agriculture Digitalisation

Agriculture digitalisation deals with the automation of agricultural business processes across segments of the value chain with tools focused on effective and efficient; data capture, analysis and dissemination so as to enhance decision making of various actors along the value chain. Agriculture digitisation involves a number of actors who include; digital technologies developers, telecom services providers, agriculture e-service providers, farmers and value chain actors, telecom and digital technology regulators, academia among others. In recently years, there is increased interest in digitalisation of agriculture on the continent largely inspired by the need to address challenges of weak extensions systems and access to quality markets. Also inspired by the renewed efforts to export agricultural produce outside the continent, whose strong requirement on production history tracing and tracking for public safety compliance for most export markets mean, digitalisation is a must. While large scale agriculture seems to have easily taken on agriculture digitalization, there is low digitalisation of smallholder agriculture on the continent which is practiced by family farmers located in rural areas. Yet, most food produced on the continent is produced by the smallholder farmers. However, access and usage of digital technology in agriculture by farmers and other actors faces a number of challenges, some are discussing the following section.

Challenges Facing Agriculture Digitalisation on the Continent

A number of challenges constraining agriculture digitalisation on the continent exists and these include;

a) **Low level of digital literacy skills among stakeholders:** Generally, most the farmers and other agriculture value chain actors like transport providers and agriculture produce aggregators on the continent are semi-literate and have had low quality formal education, in addition they lack digital literacy skills to enable them make use of the available open access digital technologies.

b) **Limited access to energy sources by farmers:** Most farmers on the continent live in rural areas, which have limited access to power grids and alternative sources of energy like solar are expensive. The lack of access to affordable and reliable power source is one of the leading constrain in the digitalization of agriculture on the continent as farmers cannot charge their electronic devices such as phones, radios and TVs.

c) **High costs of internet and access devices:** On average Africa has the highest cost of Internet per MB compared to other regions of the world. The high costs of internet and access devices coupled with the low incomes from farm produce limit the number of farmers and other value chain actors who can access digital services.

d) **Unregulated online content:** Most of the agriculture content available on digital platforms is unregulated, this sometime leads to confusion to the consumers of the content, hence discouraging the consumption of that content.

e) **Digital divide:** Most digital technologies and programmes in the continent are not inclusive as they do address the unique challenges of persons with disabilities and women among others. For example, nearly 12% of the population on the continent is made up of persons with disabilities and majority of these depend on agriculture and live-in rural areas, yet digital technologies are not uniquely designed to enable them access them.

f) **Infant Agriculture e-services:** most agriculture e-services on the continent are under developed and weakly regulated. This discourages farmers and other would-be users of this services from adopting digital technologies.

g) **Low investments in digital technology innovations:** Generally, there is low investment on development of local digital technologies for agriculture given the low market push. Most of the digital technologies are developed through social investment approaches by development partners, academia and civil society as opposed private sector demands, unlike FinTech Innovations which are market driven, hence their rapid growth and adoption.

h) **Poor telecom network coverage:** Most parts of the continent are suffering from poor telecom network coverage as most telecom operators concrete in urban centres which have network traffic to sustain network operations. It is worth noting that telecom make decision

on network investment based on perceived or projected revenue from a given area by the population demographics.

Areas for Action

a) **Develop and promote open access agriculture knowledge platforms:** Governments, academia, knowledge platform providers need to promote the development and deployment of open access knowledge platform across the continent.

b) **Promote localisation of content and digital technologies:** Governments and digital technology service providers need to promote localization of content and technologies to enable easy access by farmers and other stakeholders.

c) **Enhancing value chain actor's digital literacy skills:** Governments, academia and other actors need to increase investments in digital technologies awareness and digital skilling programmes so as to build capacity of potential users of these digital technologies,

d) **Promote the development and consumption of local digital technologies:** Governments and academia need to invest and promote the development local AgriTech innovations to address the unique needs to their ecosystems.

e) **Improve internet coverage and accessibility across the continent:** Government and telecom operators need to increase network coverage across the continent so as to make the internet and other telecom services available to the rural populations especially farmers.

f) **Improve power accessibility:** Governments across the continent need to address power access issues, through increased investment in power generation, distribution and lowering taxes on renewable sources like solar so that to make them affordable by farmers and other value chain actors.

g) **Promote the manufacturing of ICT devices on the continent:** Access devices like computers and phones still remain expensive to most rural farmers in part due to the cost associated with importation of these devices, therefore governments and private sector should promote the establishment of electronic manufacturing factoring on the continent.

h) **Integrity E-waste and electronic device end of life management in educational curriculum:** The promotion of agriculture digitalisation will lead to the generation of e-waste, hence need to integrate e-waste and electronic device end of life management in educational curriculum at all levels of formal and civil education

on the continent.

i) **Promote infrastructure and resource sharing across boarders such as data centres and specialist time and knowledge**: Governments across the continent need to promote digital technology infrastructure sharing especially data centres to lower the capital investment and accelerate development of high value digital services.

j) **Promote inclusive access to digital technologies by various categories especially youth, women and persons with disabilities:** Governments, academic and technology developers need to promote the development of inclusive digital technologies so that to harness the demographic dividends on the continent.

About the Author:

Drake Patrick Mirembe holds a PhD in Information Systems Security from Groningen University, a Masters of Computer Science from Radboud University, Nijmegen and Bachelors of Computer Science, Math and Chemistry from Makerere University. He is a Pracademic working both in academia and industry. Dr. Mirembe is a Researcher and Lecturer in the Department of Networks, Makerere University. His research interests include: data networks, cyber security, ICT policy and strategy, ICT4D, mobile and wireless technologies, artificial intelligence and data science, innovations and entrepreneurship acceleration. In the industry he has worked with Microsoft, ITU, Cisco Systems and Eight Tech Consults (www.8technologies.net). He has been at the forefront in the development of Uganda's ICT innovation sub sector and has been responsible as a mentor for a number of ground breaking innovations in ICT field especially in Agriculture (more details on: www.drakemirembe.org).

This is our nineth issue in a series of articles we are releasing as part of the RUFORUM Seventh Africa Higher Education Week and RUFORUM Triennial Conference Digests. More information about the conference is available at https://www.ruforum.org/Triennial2021/. Join the Conversation on Social Media using our Official hashtag **#AfricaHEWeek2021**