

Creating an Enabling Environment for Digitalization to Transform African Agriculture

A Report of the PARI Side Event at the Africa Green Revolution Forum in Africa (AGRF)

3rd September 2019

The event reported in this piece was organized under the auspices of the Program of Accompanying Research for Agricultural Innovation (PARI) www.research4agrinnovation.org, a research program of the Center for Development Research (ZEF), University of Bonn, Germany. PARI is supported with funding from BMZ. The logo of other partner organizations is appended



Background

Recent advances in digital technologies is fast affecting walk of life in every sector across the globe. The changes in approach to work is fast in the more developed Western countries and Asia, it is slow in Africa but certainly affecting all sectors including agriculture.

Farming in Africa erstwhile relies on rudimentary equipment that are propelled manually and, in some cases, motorised. The post-harvest and processing activities uses industrial machines that require substantial human operations and monitoring to yield good outputs. The same applies to services such as extension, financial services, transportation and logistics and supply, equipment hiring and input/output marketing. Recent advances in the Information Technology (IT) is bringing Africa into digital era. The upsurge in access to mobile phone across the continent is transforming the way people communicate with one another; access to information and financial services. Several activities can be carried out with relative ease following the development of applications that are based on either the internet or mobile phones. For instance, the development in robotics is also having a huge bearing on farm activities as well as industrial processing. Same way emerging digital technologies, such as blockchains, big data, artificial intelligence, drones, and robotics, portends a fundamentally change in the way things are done and the effect of such on the economy.

Different countries in Africa are responding to the reality of the digital era at different speed, this is due to various factors, such as the needed investment, availability of needed baseline infrastructures, national security policies and political stability. It is essential to position the Africa continent for the huge social and economic benefits that digitalization would bring especially in its agriculture; a sector bedevilled with ills and require smart attention to meet the current and emerging needs for food and fibre. There is the need for the right framework and a thought-tough strategy to support the development, operation and impact of digital services for farmers and the entire agricultural value chain.

The Program of Accompanying Research for Agricultural Innovation (PARI) has created a research cluster on digitalization to carry out basic research in Africa countries to establish an informed background for enhancing digitalization in Africa agriculture. The current research efforts in the countries will identify opportunities to integrate existing knowledge in order to offer smart options to stakeholders in the agricultural sector. The research will also assess the utility of ICTs to build the technical and commercial capacities of producer organizations (PO) to serve as competent intermediaries between the African smallholders and other value chain actors. Research will investigate options for strengthening the enabling environment for providers of agricultural ICT solutions to develop and commercialize their applications, those that leverage more advanced ICTs to transform the agriculture sectors in Africa.

The PARI took advantage of the AGRF 2019 to organize a discussion forum as a side event.

Objectives of the session:

- Discuss the opportunities being created by disruptive digital technologies in the agricultural sector in Africa
- Highlight key challenges limiting digital agricultural transformation in Africa and the current ICT innovation environment in Africa
- Shed light on the types of conditions that are needed to accelerate the digital revolution in Africa's food and agriculture sector, including conducive policies, infrastructure, financing, skill development and start-up support
- Discuss the future of digitalization in African agriculture

Proceedings

The side event featured presentations from PARI researcher from Kenya, Nigeria and Ghana on the status and readiness for ICT in agriculture. A high-level panel discussion was later organized and series of discussions followed.

1. Highlights of presentations

A. Kenya

ICT Infrastructures:

- a) Key factors leading to improvements in ICT Infrastructure include Policies that led to liberalization of ICT sector and creation of Competition among operators
Investments e.g. Public-Private -Partnerships to install undersea cables enabling high speed connectivity, secondly the government led National Optic Fibre Back-bone Initiative (NOFBI) and the Digital Literacy initiatives in schools.
- b) Role of actors: Government provided good enabling environment and policies for implementation. The Private sector invested and run business, while a number of development partner provided financial support.
- c) Gaps: Currently the Infrastructure distribution is skewed towards the cities. The rural area has Poor internet access hence low digital literacy, especially in some rural areas. There is low rate of ICT use in agriculture

End users' access to ICT facilities

- a). As at year 2017, 90.4% mobile penetration but low internet penetration <10% among adult population. Higher for population – 18-35 (youth)
- b) Factors for improving access
 - Availability of low-cost digital appliances & availability of after sales support services

- Need for financial service provision - MPESA
- Expansion of telecommunication infrastructure including broadband, electricity and mobile coverage in rural areas
- Improvement in data storage e.g. use of hard drives, servers etc.
- Use of social media (WhatsApp) for information sharing and motivating collective action (building of a water pan)
- Use of SMS to access plant doctors for monitoring incidences of disease and pests

c) Gender or location divide - No discernible gender divide but location divide exists due to issues of connectivity (North Eastern, Western and Coast vs Nairobi)

d) Digital Literacy - Low digital literacy especially in remote areas and with age

ICT service provision in Agriculture

a) Status of digitalization in agriculture- Many mobile applications are developed but the level of usage is low.

b) Digital services offered

- Public services that affect agriculture (land registry information, crop suitability)
- Production (Pest & disease incidences; agro-weather) & market information
- Financial and insurance services
- Knowledge brokerage through provision of agro-info through mobile phone at a fee.

c) Key factors leading to development of the services

- Effective demand for real time solutions (e.g. case of plant doctor services)
- High uptake /use of mobile phones by the population especially, the youth

d) Reach of the services – low to medium

e) *Impacts* of services include:

- Increased crop and livestock yields (case of cow)
- More farmers reached through e-extension messages

B. Ghana

ICT Infrastructures

a) Key factors leading to improvements in ICT Infrastructure

i. Policies Environment

- Telecommunications Accelerated Development Plan (1994 -2000); Ghana ICT for Accelerated Development (ICT4AD) Policy launched in 2003; National telecommunications Policy (NTP) of 2004

ii. Regulations

iii. Investment by public and private establishment.

iv. Creation of innovation space.

- v. Financial incentives and support systems establishes.

End users' access to ICT facilities

Factors for improving access

- Ghana Investment Fund for Electronic Communications (GIFEC) established to bridge the digital divide between the urban and rural areas. Over the years, 429 Rural Telephony sites have been built and a further 300 internet point of presence supplied
- Innovative pricing e.g. bundling for data, MTN zone for calls etc. Consumer protection from all forms of abuse either from the telecom operators, ISPs, and value-added service providers e.g NCA undertakes periodically assesses quality of service and impose penalties
- Data Protection Act, 2012 Act 843 established to provides avenue for aggrieved persons to seek redress in courts.
- E-skills Development e.g. ICT in education policy developed and it helped introduce ICT into the curriculum of both basic and second cycle schools

Service provision in agriculture

Key factors leading to development of the services

- Many problems in the agricultural sector creating the demand
- Targeting youth and women
- Collaboration with public and private sectors, and development partners and NGOs
- Wide availability of mobile phones and other devices
- Funding support for development and deployment

d) Reach and impact of the services

- Mostly farmers in both rural and urban areas
- Impact
 - Good database on farmers
 - Increased access by farmers to information
 - Increased market access

C. Nigeria

ICT Infrastructures:

Factors that enabled the ICT include

- Full deregulation of the telecom sector following the Nigerian Communications Act 19 of 2003; Nigerian Telecommunications Commission, NCC, exclusively license and regulate telecom operators; Regulates e.g. broadband services, mast and towers installation, spectrum allocation etc.

Telecom actors:

- Government – legislation and regulation; not much infrastructure investment
- Private telecom operators: main investors in telecom infrastructure
- Power – mainly public for 80-83% of population

Challenges to telecom development in Nigeria:

- multiple regulatory bodies along the telecom value chain,
- conflicting agreements at federal level and state levels with operators,
- sporadic road works lead to damages to fiber infrastructure,
- erratic grid electricity supply,
- fragile backbone infrastructure due to low public investment
- Several competing policy documents aimed at performing similar regulatory functions
- Inter-agency rivalry in the implementation of guidelines
- Unregulated acquisition of CDMA operators by GSM operators, reducing competition

End users' access to ICT facilities

Current access status:

- Voice subscription grew steadily from 74,518,264 in 2009 to 160,886,485 in 2018
- Tele-density from .02 % in 2000 to 75.9% in 2017
- National internet access from 6% in 2000 to 26% in 2016
- Access to Nigeria's international landed broadband capacity estimated at less than 10% of total available
- GSM accounts for 99% voice and internet access; <1% through CDMA

Rural /urban divide:

- Urban internet access moved from 11.6% (2010) to 29% (2016);
- Rural internet access increased from 1.5% (2010) to 9.8% (2016)
- Total mobile phone access: Urban 84% 2010 to 93% 2016; Rural 59% 2010 to 86% 2016

Key success factors - -

- Issuance of operating licenses to eligible private telecom operators following telecom deregulation
- Access to mobile phones largely deregulated, determined more by affordability

Service provision in agriculture

- **Sample of digital devices used for services:** Global Positioning System (GPS), Satellites, Sensors, Camera, Voice recorder, Mobile phone, Short Message Service (SMS), Unstructured Supplementary Service Data (USSD) Interactive voice Response (IVR), Smartphone app, Email, Point of Sale Terminals (POS), Automated Teller Machines (ATMs) and Cards.
- **Sample of services offered:** data collection, data analysis, investment platforms, information dissemination, information to farmers on agricultural best practices, linkage of farmers to insurance coverage and processors

- **Impact of services on income:** Household income increased on the average from NGN871,640.00 to NGN1,480,680.00 per annum; paired t-test significant at the 1% level; (USD1.00= N357.00)

2. High Level Panel Discussion

The high-level panel discussion facilitated by Dr. Ousmane Badiane, Africa Director of IFPRI. The panelist included:

- Hon. Dr. Gerardine Mukeshimana, Minister of Agriculture and Animal Resources, Rwanda
- Sandra Abrokwa Owusu-Kyerematen, Country Director, Viamo, Ghana
- Yemi Akinbamijo, Executive Director, Forum for Agricultural Research in Africa
- Benjamin Gyan-Kesse, Program Manager, Kosmos Innovation Center (KIC) Ghana

Key recommendations

1. Government needs to invest in ICT administration at the country level, this is the key leverage point for growth.
2. The use of ICT in financial services is growing across the continent and this needs to be maintained and made secure.
3. Smart awareness creation is vital for ICT use in agriculture; in most countries majority of the smallholders are not aware and are not educated enough to maximize the use of the facilities. Attention should be giving to emerging farmers with modest education to appreciate ICT use in agriculture.
4. The various tipping point like education and industrialization of agriculture is an important factor.
5. The issue of farmers registration is growing and this needs to be fast-tracked at the country level to inform policy development and intervention targeting.
6. Investment in digitalization education is very vital.
7. There is the need to regulate digital growth to forestall the likely negative effect of identity theft and fraud.
8. Enhanced partnership to streamline digital facility in the direction of country interest.
9. There is also the need to make a balance in censoring information in the digital space.