Information Communication and Technology in Agriculture for Food Production and Rural Economic Development

ISAAC SAMUEL AND AUGUSTINA NDU

Department of Agricultural Science Education
Federal College of Education [Technical], Bichi, Kano, Nigeria.
E-mail: isaacsamue107@gmail.com

ABSTRACT

Evidently, Information Communication and Technology applications, opportunities and benefits are affecting all aspects of life and can enhance sustainable development in all fields of human endeavour, especially agriculture within the framework of national agricultural transformation agenda. The transformation agenda sets 2015 as a targeted date to affect the lives of Nigerians positively and join leagues of nations in economic and social development. This paper focuses on ways through which ICT can be effectively used to achieve the agricultural transformation agenda. The paper also reviews how ICT has influence agricultural development in some developing countries and vis-a-vis make recommendations towards sustaining these opportunities in Nigeria agriculture.

Keywords: Rural Economic Development, Information Communication Technology, Agricultural Development, Food Production.

Introduction

The history of software introduction in the agricultural sector has over the years shown slow acceptance due to farmers' perceptions of low benefits for the expense and effort of data entry. In the United Kingdom, for example, growth of computer use in agriculture has come through increasing statutory requirements for data especially related to tracking, mapping and quality assurance such as the demand on the part of buyers for information on the provenance of food (EFITA, 2006). Use of email is increasing the presence of ICT in agriculture as well as use of information updating services like price and market reports and weather reports. Although, the fear that e-commerce has not yet fulfilled expectations, which has raised some doubts about its success. However, there are small scale trading sites in agriculture and horticulture, which focussed on niche products often in the organic or green sector where the demographics of internet users tend to favour this type of agricultural

trading. Typically, these businesses are already operating mail order delivery which affirms that fulfilment, the major obstacle to successful e-trading is already in place.

There is undoubtedly a place for e-trading in agriculture. The increasing acceptance of the internet as a business tool by both the rural and urban community will drive progress in supply trade direction for sustainable transformation agenda and also the growing demand for agricultural products offers great opportunities for producers to sustain and improve their livelihoods.

Agriculture and ICT

Menou (2005) stated that ICT is used for information sharing, communicating as a global community, proffering better solution to global and local environmental challenges, improving health care and educating children. Similarly, Adeya (2000) stated that ICT has been recognized as bedrock for national survival and development in a rapidly changing global environment for educational development, creation of wealth, poverty eradication, job creation and global competitiveness.

The potential of ICT in improving the livelihoods of small-scale farmers and the efficiency of the agricultural sector in Nigeria is unlimited. This includes the use of computer, internet, geographical information systems, mobile phones, as well as traditional media such as radio or television in dissemination of information to the farmers and to the buyers. Realising these opportunities for the agriculture industry requires stringent quality standards and regulations through the transformation agenda for the production and handling of agricultural produce, as well as foster agriculture growth and bring economic prosperity to many Nigerians.

Agriculture Value Chain and ICT

Agriculture as a sector faces major challenges in enhancing production in situations of dwindling natural resources, lack of financial support and under-utilization of some of the land grabbed during the so-called land reform programme. Nigeria has a lot to learn from other agricultural programmes and projects across the world, particularly in countries like India, Uganda, Kenya, Ghana and Bolivia which have all embraced ICTs. The role of Information Communication Technologies in the improvement of agricultural value chains cannot be over emphasized.

Agriculture Value chains encompasses the full range of activities and services required to bring agricultural product or service from its conception to sale in its final markets-whether local, national, regional or global. Agriculture Value chains include input suppliers, producers, processors and buyers and are supported by a sustainable government policy and legal frame-works. ICT s plays an important role in agricultural value chains, with different types of ICT having different strengths and weaknesses when applied to a particular intervention. The impacts of ICT are diverse, and they influence market competitiveness in different ways.

Despite the positive impact ICT can have on governments' agriculture value chain transformation agenda, many rural farmers still do not have access to or the capacity to use ICT. Farmers do not have access to reliable market information to help them sell their products, do not have adequate access to scientific research findings to help improve their farming techniques for improved resource flow. However, with increased penetration of mobile telecommunication technologies into the agrarian rural areas we will see an increased use of technology to foster agricultural growth and bring prosperity and empowerment to many rural Nigerians.

Information Communication and Technologies will play an important role in addressing these challenges and uplifting the livelihoods of rural poor and resettled farmers. It also has the potential to improve the technical know-how of both small-scale and large-scale farmers as well as efficiency of the agricultural sector. These roles include the use of computers, internet, geographical information systems, mobile phones, as well as traditional media such as radio or television in disseminating of information to the farmers and the consumers (buyers). Realising these opportunities for the agriculture industry requires strict adherence to quality standards and regulations for the production and handling of agricultural products. There is need for new approaches and technical innovations are required to cope with these challenges and to empower rural populace in ICT for better performance and productivity.

Internet Application in Agriculture for Food Production and Rural Development
The internet is an interconnection of several computers of different types belonging to various networks all over the world. It is the web of different machines and computers in different networks which are constantly on the increase worldwide every minute. Ojo (2009) referred to it as an information super highway which allows the free flow of information through many

interconnected computer networks and from which information can be retrieved 24 hours a day from all over the world on event that have happened and topics man has ventured into.

According to Sodiya (2004) it is viewed as a global computer network covering several countries all over the world and providing links to hundreds of thousands of academic, government, military and public computers systems together, enabling millions of people from diverse culture share information and other internet resources. It is a network of networks. Iromatu (1995) however viewed it as the fastest information retrieval system with a local and international entity, a group of networks arranged in hierarchy with medium for effective communication as the most efficient scientific research tool.

Olusegun (2003) estimated that a new network is added every 20 minutes while over 60,000,000 users are connected to the internet through over 60,000,000 computers. The global internet networks consist of about 168,000 domains. Application of Internet in agriculture key into the basic services of internet in the following areas:

- Agricultural and Scientific Research / Innovations
- Agricultural Extension and Distance Education / Learning
- Agricultural Shows, Exhibitions and Entertainment
- Video and teleconferencing
- Electronic Purchase and shopping of agricultural products

Challenges of Information Communication and Technologies Use in Agriculture

Literacy Level / Awareness: Computer is household equipment in advanced countries and the awareness and knowledge of its use is limitless as the literacy level in those countries is high. But opposite is the case in developing countries like Nigeria, where computer literacy level is very low. This is because the use of ICT facilities depends greatly on an individual's technical know-how and level of awareness.

Income Level: For any individual to acquire ICT facilities and get connected to the global village (internet), requires much money. This is because acquiring such facilities is capital-intensive and too expensive for the average Nigeria due to high level of poverty and too many low-income earners.

Poor Maintenance Culture: Most of the ICT facilities procure into the country requires regular maintenance to retain its durability. And most individual using

these facilities lack basic knowledge of its maintenance. Also, the internet service providers in the country are more often than not faced with great challenges of sustainability due to poor maintenance culture and so have resulted in some of them selling-off their facilities or changing operators.

Recommendations

- Farming involves risks and uncertainties, with farmers facing many threats from poor soils, drought, erosion and pests. Increasing the efficiency, productivity and sustainability of small-scale farms is an area where ICT can make a significant contribution which stem from information about pest and disease control, especially early warning systems, new varieties, new ways to optimise production and regulation for quality control.

- Government should increasingly incorporate ICT in agricultural sector policies and programme and with necessity link ICT and agriculture. This must be spearheaded in conjunction with all stakeholders to achieve the transformation agenda.

- Government through the ministry of ICT must always make timely, innovative agricultural information and data available in appropriate electronic format on portals and platforms where it can be accessible by farmers of all categories. This will allow farmers realise economies of scale through shared platforms.

- Creation of special website for farmers to grant them awareness of recent and up-to-date market information on prices of commodities, inputs and consumer trends. This will intimate them with information of the best time and place to sell and buy goods and raw materials, thereby creating a level playing ground between producers and traders in a particular location or across the globe.

- Special programme through the transformation agenda should be organised for capacity building and empowerment of farmers to provide an enabling environment for the successful adoption and use of ICT in agriculture and agricultural practices. This will help greater information sharing, interaction and exchange needed to support better mutual understanding and collaboration with their international partners as well as other stakeholders in the sector, document and communicate their situation and needs as well as access benefit from credits.

- Developing the models, strategies, and tactics that best prepare, promote, and retain new professionals who demonstrate content knowledge, technical competence, moral boundaries, and cultural awareness coupled with communication and interpersonal skills.

- Creation of programs that develop the skills and competencies necessary to improve the communications and knowledge sharing effectiveness of all in the agriculture-related workforces of Nigerian society.

- Retraining existing and developing new human capital in agriculture as part of a life-long learning system.

- Setting up of Agricultural Extension Resource Centres in all the 774 local governments in Nigeria. This will serve as a key resource centres for farmers and a data bank for government in accessing contribution of agriculture to the GDP of the country as well as information collection points for developing favourable policies for agriculture related enterprise.

Conclusion

Agriculture is a sector with capacity and full potential to salvage the nation's economic from the miry of food and socio-economic insecurity through the adoption of ICT in agriculture and agricultural practices to achieve successful agricultural transformation agenda. This is because ICT holds great opportunities for developing agriculture and addressing the major challenges facing the sector. Realising these opportunities for the agriculture industry requires stringent quality standards and regulations through the transformation agenda for the production and handling of agricultural produce, as well as foster agriculture growth and bring economic prosperity to many Nigerians. Nigeria has a lot to learn from other agricultural programmes and projects across the world, particularly in countries like India, Uganda, Kenya, Ghana and Bolivia which have all embraced ICTs in agriculture.

References

Adeya, C.N. (2000) Information and Communication Technologies in Africa: A Selective Review of Studies and Projects. Oxford: International Network for the Availability of Scientific Publications (INASP).

American Association for Agricultural Education (2012). Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st

Century. National Research Agenda: 2011-2015 Research Priority Areas. Retrieved from http://www.aaae.org   http://www.

EFITA (2006). European Federation for Information Technologies in Agriculture. E-book

Iromatu, C.O (1995). Internet Connectivity: A way out. National Internet Workshop 1, (1) 1-4.

Menou, M.J. (2005) Information Literacy in National Information and Communication Technology (ICT) Policies: The Missed Dimension, Information Culture, London: Department of Informal Science, City University.

National Academy of Sciences. (2009). *Transforming Agricultural Education for a Changing world*. Washington, DC: The National Academies Press.

Ojo, M. (2009). ICT As a Tool for Promoting Science Education Towards Meeting the Millennium Development Goals. *Bichi Journal of Education*, 9(1), 89.

Olusegun, F. (2003). *Essentials of Computing*. Abeokuta: Yomight Ventures.1, 102.

Rivera, W. M., and Alex, G. E. (2008). Human Resource Development for Modernizing the Agricultural Workforce. *Human Resources Development Review, 7*(4), 374-386.

Sodiya, A.S. (2004). *Digital Communications and Computer Network: An Introduction*. Abeokuta: Yomight Ventures. 92.