



## Access Agriculture; *The 21st Century Innovation Strategy in Enhancing Food Production in Kenya*

Dr. Eliud Garry Michura

Kabarak University

Corresponding author: \* Dr. Eliud Garry Michura  
Tel.: +254 Email: emichura@kabarak.ac.ke

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### Abstract:

Video sharing is an innovation that small scale farmers adopt to learn farming technology which they implement through watching agricultural videos. The innovation is simple, less costly, quick and accessible to any farmer and uses mobile technology which every farmer has. Kenya is currently experiencing food deficit and as a result nearly 45% of her population is living in poverty of which small scale farmers form the highest percentage. Farmer extension services and agricultural training colleges have dwindled over the years. Majority of small scale farmers in rural environments face critical challenges in new farming techniques which otherwise would enhance food production. The purpose of this paper was to critically examine new innovations by Access agriculture in enhancing food production in the 21st Century. The target population was mainly the small scale farmers in Kenya.

The methodology of obtaining information was through Access agriculture data base, field observations from the small-scale farmers practice, desk top review and discussions with key informants in Kenya. The study found that Access Agriculture technology is promising to farmers toward achieving household food requirements. The excess food can be turned into cash from the overall production for farmers using Video sharing innovations. Over 50% of farmers in Kenya have expressed positive outcomes from sharing training videos. Most of the agricultural videos are communicating attractive and sexy information on agricultural demonstration techniques changing the perception and attitude of farmers particularly the young people who are now becoming more interested in farming hence increasing food production. The findings would be used to develop strategies of improving food production targeting young farmers who have the energy and sound technology to produce enough food for the Nation and beyond export.

**Keywords:** Innovations, Smallholder farmers, Sustainability, Videos.

### 1. INTRODUCTION

Agriculture has a significant role in Africa as it employs 65% of the work force and contributes 32% of GDP, according to the World Bank report (2018). Similarly, approximately 70% of Africa's population depend directly on agriculture for their livelihood. However, the African agricultural environments are currently facing a number of problems with low food production. This has been compounded by climate change, a lack of technical expertise and the migration of young people away from rural areas into cities. Africa is currently experiencing a rapid growth in population, with estimates suggesting by 2050 the population for Africa will reach 2.2 billion (FAO, 2015). The ability of African farmers to increase productivity is critical in order to provide food and economic growth to support its growing population. The Food and Agriculture Organisation (FAO) predicts that the agricultural market in Sub-Saharan Africa alone will grow from \$200 billion in 2015 to \$1 trillion by 2030. This equates to a fivefold growth. Entrepreneurs in Africa are increasingly seeing opportunities in the agricultural sector and are developing solutions that enable farmers to increase their yields and access markets. Globally, agricultural tech start-ups raised \$800 million in the last 5 years (Kimani, 2018)



Agriculture is one of the largest economic activities, which mostly untapped by technology. Investors are targeting agriculture because it's a huge market that touches just about everyone". There is plenty of information available in the public domain that covers various aspects of extension and know-how about new methodologies for implementation. However this information is often scattered and presented in complex academic language. Hence practitioners, who often have very limited time and/or may only have basic formal education, find it difficult to make use of this information. The Access Agriculture innovation aims to bridge this gap by providing information about extension approaches and methods in easy-to-understand formats (Bentley, et al, 2019)

In recent years technology such as cloud computing, open-source software and digital tools have become increasingly affordable and accessible to farmers. The market is changing as entrepreneurs can provide solutions to small holder farmers at affordable prices. Technological developments in such as aerial imagery from drones or satellites, weather forecasts and soil sensors are making it easier for farmers to manage their crops in real time (Lois, 2018).In addition; financial solutions are evolving to connect small holder farmers with credit, financial institutions and greater market access. Technological advancements in agriculture provide vast potential for farmers, entrepreneurs and investors to improve the productivity and efficiency of agriculture in Africa at a time when numerous factors, such as population growth and climate change, threaten food security. Technological advancements in agriculture provide vast potential for farmers, entrepreneurs and investors to improve the productivity and efficiency of agriculture in Africa at a time when numerous factors, such as population growth and climate change, threaten food security (Brooke, 2018).

Information is power. As such, access to information helps farmers to make wise decisions to enhance food security and improve livelihoods. Unfortunately, in the recent past, agricultural extension has performed poorly. Institutions, governments and NGOs have tried to fill this gap and reach farmers with extension information through projects and programmes but also with limited success. The Kenya National Farmers Federation (KENAFF) is a national farmers' organization covering the whole country. KENAFF is the umbrella organization of farmers groups, representing the interests of about 2.1 million farm families in Kenya (Nyanjong, 2017).

## 2. Objectives

The objective of this paper was to critically examine new innovations by Access agriculture in enhancing food production in the 21<sup>st</sup> Century.

## 3. LITERATURE REVIEW

Access agriculture is a farming organization working with small scale farmers in the rural areas to increase the production of food and making it accessible to every Kenyan (Access Agriculture, 2018). Access Agriculture have developed innovation by using sharing videos with modern farming technology content given to farmers at very minimal cost and farmers watch the techniques which they apply in their own farming environments. The innovation is farmer to farmer transfer knowledge and skills for better farming management and environmental conservation. New technology is evolving making agriculture more attractive to farmers specifically targeting young people. Video sharing is an innovation that small scale farmers adopt to learn farming technology which they implement through watching agricultural videos. The innovation is simple, less costly, quick and accessible to any farmer and uses mobile technology which is affordable to every farmer (Nafissanth, 2016).

A few hundred quality farmer-to-farmer training videos are helping farmers improve their livelihoods across the Global South. Access Agriculture believes that, the videos will provide important training and knowledge sharing across national borders, especially for women and young people. Additionally, the videos motivate new farmers to take advantage of new possibilities in agriculture (Nassifath, et,al,2018). Access Agriculture believes the videos will provide important training and knowledge sharing across national borders, especially for women and young people. "Whether it is poor soil quality, shorter and more intensive rainfall, or the need to diversify food production and reduce food wastage, farmers are eager to learn from others and to share knowledge. Access Agriculture provides training on video production, translation, and script writing to organizations across Africa, Asia, and South America. "The young people are quick in adapting to technology, bringing value addition to the current tertiary mode of farming (Mele, 2018),

#### 4. METHODOLOGY

Information was sourced from Access Agriculture Kenya, Desk top review, discussions held with various stakeholders in agricultural industry such as policy makers, agricultural experts, Information Technology experts, small scale farmers, young farmers, educationists among others. Self observations were recorded and key informants were interviewed.

#### 5. FINDINGS AND DISCUSSIONS

The research carried out revealed that there are hosts of significant steps and principles to be undertaken to produce quality and appropriate technology that will bring good response and results to farmers. The study found that, the following areas must be considered by Access Agriculture in video production;

First is relevant content: Video content must be based on farmers' needs and scientific principles. Even a video that introduces a new practice should involve farmers who have already tried the practice and made it farmer-friendly.

For success of video sharing technology, farmers come first. Farmers were involved in the development of the video, depicting them in the video (e.g. demonstrating ideas, explaining why things work), and involve them in the dissemination to ensure that their views are represented. Focus content on principles, encourage experimentation: To ensure that videos have wider relevance beyond a few communities, the content should present a menu of technical options that farmers can experiment with. Explain the underlying principles of each innovation to encourage discovery learning.

The third finding was the quality of Videos. Videos must have good quality audio and visuality with solid story structure, and a relevant message in order to capture the audience's attention, engage their thinking, and stimulate learning. Combine with other methods: For training, information, and knowledge sharing, it may be necessary to combine video with other extension approaches such as demonstrations, group discussion, and printed materials.

For success of video sharing Institutionalisation and policy must be well structured: ICTs as extension tools need to be institutionalised within rural advisory services through appropriate policies and regulatory frameworks.

Once the production of videos is made, implementation is the next step: Producing a video: Before you produce a video, think about how you plan to disseminate and use it. There are six basic steps to producing any type of video: conceiving a topic, planning, producing the video, validating, distribution, and monitoring and evaluating. Who plays the lead role in each step will depend on what type of video you want to develop, but all videos for agricultural extension and learning will involve scientific organisations, partner organisations (e.g. non-government organisations (NGOs), extension services, farmer organisations), farmers, and other rural stakeholders. If farmers will be making the film themselves, it will be necessary for the video production team to work with film professionals who will provide guidance and train them on basic film-making. Scientists, extension staff, and film professionals should always listen carefully to farmers so that the finished video reflects their perspectives and conveys a message that is technically accurate.

Each video is focused on a single topic and the duration of watching is limited to less than twenty minutes. The videos contain diversity of farmers (women, men, the poor, youth etc.) and rural people (landless, market sellers, etc.) appear in the video (Nyangog, 2017).

Once a video is finalised, it can be translated into local and international languages and printed onto a DVDs. Videos may also be distributed on USB sticks, tablets, mobile phones (not just smart phones), Pico projectors (pocket-sized projectors that can be run from smart phones or tablets), and smart projectors.

Access Agriculture has produced over 60 farmer learning videos with farmers, in 67 languages. A script is written with each video, to ease translation. The videos are shown by partners and are also placed on [www.accessagriculture.org](http://www.accessagriculture.org) where they can be downloaded for free by extension officers or anyone else (Muliaro, 2018)

## 6. CASE STUDIES

The study has examined a few cases where video sharing technology has helped small scale farmers to understand the knowledge of farming with credible improvements on household food production in various ecological zones in Africa;

### 6.1 Case 1

Using video sharing techniques, farmers have learnt how to improve farmers' access to relevant knowledge and enable experienced farmers to share their knowledge with others in their own country, and beyond, at little cost? In Benin and Mali, over 80 percent of rural people earn a living from agriculture. Many are not food secure because they lack knowledge of good agricultural practices, natural resource management, and ways to cope with climate change and natural disasters. Through action research, PhD student Gérard C. Zoundji revealed how digital agricultural extension supported by Access Agriculture has the potential to make global impact on farmers' lives and the environment. Zoundji's research showed that *80% of some 700 videos were sold by mobile DVD vendors and agro dealers within 4 months*. Farmers readily paid 1 USD or more, indicating they are willing to pay for e-learning. The study showed that, almost all the farmers found the content of the videos extremely useful and changed the way they had been growing vegetables for years, such as spraying agrochemicals to control nematodes and using too much water to irrigate. After watching videos, all respondents were even willing to invest in drip irrigation. Already 18% bought the kit which costs about \$500 and 6% had made their own drip irrigation kit using buckets and old hoses. Because the videos were presented in French and various local languages, farmers understood and remembered all the key messages without the need of a facilitator. They also readily shared what they had learned with others in the community. In Mali, videos significantly triggered farmers to use various techniques to adapt to climate change. Over 95% practiced crop rotation combined with intercropping, managed their soil fertility in a more sustainable way, and diversified their crops. About 78% used improved short-cycle seed varieties, 68% planted trees and 51% used zaï pits (micro water catchments). In the villages where the videos were shown, sorghum, millet and maize yields increased by 14%, 30% and 15% respectively (Bentley et al, (2015).

### 6.2 Case 2

In Malawi, Access Agriculture on International Women's Day shared two stories from Malawi to show how watching "Farmer to Farmer" training videos has helped improve women's lives. The first relates to growing chilli through co-operating with other women in the local area. In February 2016 Mpinda Chizumeni received three Access Agriculture farmer to farmer DVD's from Khuze Kuyabwe Telecenter in Mwanza district. There were many videos on different subjects on the DVDs, but Mr Mpinda's interest was on how to grow chilli. After trying out the methods shown in video, he had a bumper result in his chilli garden. He was able to harvest and sell the chilli to traders at the local market at 1000 kwacha per kilogram. Mr Mpinda also sold chilli directly to end users and food stalls around his home. Mr Mpinda was later linked with NASFAM field officers during a meeting at a Flemish Extension fair in Lilongwe, and as a result was given "Birds Eye" chilli seedling (Mpinda, 2018).

### 6.3 Case 3

In another finding, (Mele, 2016) 953 people took an on-line survey to evaluate Access Agriculture and its services. The survey was available in English, French, Spanish and Portuguese, to include as large an audience as possible. Respondents from 102 countries answered the survey, from Africa (63%), Asia-Pacific (23%), the Americas (6%), Europe (3%) and some who work on more than one continent (5%). Most users (56.1%) watch the videos on the site, followed by about a third who downloads them. Respondents use the videos to train themselves (45%), farmers (38%), colleagues (21%), and students (15%) and for "other" use (9%). The sectors that are most likely to use the videos in farmer training are: national or local NGOs (53%), followed by farmer organisations (47%), radio & TV broadcasters (45%), and government extension (43%). Nearly a quarter of the respondents share the videos with other organisations; they listed 435 organisations by name, although many other organisations also received videos. Nearly all (79%) of the respondents find the videos and the website very useful, and they tend to use the videos for training two to five times a year (Karubanga, 2015). Over 800,000 farmers watched Access Agriculture videos in meetings with the respondents, their institutions or their partners. By a conservative estimate, at least 42 million more viewers watched some of the videos on TV, or listened to radio broadcasts, using the audio tracks of the videos. The top four uses of the videos are: showing them to small groups (34%) and to communities (15%), using the videos to get

ideas for extension activities (23%), and watching the videos on cell phones or tablets (12%). We are not sure how many people were watching videos on cell phones four years ago, but it was certainly much less than now, especially in Africa.

Two-thirds of the respondents want translations of the videos, into Hindi, Spanish, Arabic, Swahili, Bengali, Luganda, Portuguese and many others. The respondents like the videos for their simplicity, high-quality images and sound, their narrations and the topics which are useful for real farmers (Nafissath Fousseni Barres, (2016) ([Nafissath@accessagriculture.org](mailto:Nafissath@accessagriculture.org)))

#### 6.4 Case 4

In Uganda, Emmanuel Aliguma did research on farmers and found that, farmers in Kmwenge district were as sensitive as anyone else to their setting and time of day to watch videos, where, when and how. Watching video influenced how well the farmers learn. In August 2015, research in seven villages in Kamwenge district, Uganda, 2000, farmers in Kamwenge district did not know much about rice farming. They were used to seeing rice served on plates at funerals, weddings and introduction ceremonies. They thought it was food for white, Indian and rich people. They enjoyed eating rice but did not know how to grow it. Even those that grew rice on a small scale did not know the best practices for growing it. They broadcast it or dug planting holes, rather than growing rice in lines. Karubanga, (2015) found that, learning through videos does not occur while in the video hall, but occurs outside when farmers can discuss, reflect and share experiences to practice what is being screened". The videos triggered the farmers to establish demonstration sites based on the new practices they learned about in the videos (Karubanga, 2015).

#### 6.5 Case 5

A case in point is in 2016 when KALRO and the Arid and Semi-Arid Lands-Agricultural Productivity Research Project supported development of mobile phone applications for accessing agricultural knowledge and technologies by farmers. These mobile phone applications were designed and developed by Irene Kimani, an Information Technology PhD student of JKUAT. They enable small scale farmers to use digital technologies to boost their farming ventures (Kimani, 2018). They are able to make informed decisions based on current expert information. The major challenge for small scale farmers and pastoralist has been lack of timely access to current expert agricultural information. In the past, small scale farmers depended on extension services as main source of agricultural research information. Supply of such information was always falling short of demand due to logistical and limited human resource. The good news now is that digital technologies have made it possible to bridge this gap. The developed mobile technologies complement access to extension and advisory services in Kenya and do not require special training to access information. Mobile technology is an innovative and cost effective way of disseminating agricultural research knowledge and information. There are three mobile applications that have been developed and published in 2017 at the Google Play Store for ease of access. They are KALRO Indigenous Chicken, Dryland Crops, and Range Pasture Seed Production. These mobile applications have been launched and promoted at various agricultural field days and exhibitions in Kenya. The mobile applications provide key information on how to tap and use KALRO agricultural expert information and technologies, prices, production requirements, application and best management practices, harvesting and post-harvest handling. The applications have an inbuilt social media platform enabling interactions by value chain actors. These mobile applications are an innovative and cost effective tool towards better utilisation of agricultural research knowledge, information and data for food security. The information provided on the mobile application is based on expert advice provided by KALRO scientists and their partners. The call centre and social media platform facilitates interaction between the farming communities, service providers and agricultural research experts. The mobile applications do not require Internet connection once downloaded to users' handset or tablet, all the needed information can be accessed offline thereafter (Kimani, 2018). Techno serve is using Access Agriculture videos in a Mobile Training Unit in Kenya. A three year project is showing training videos to farmers in North Rift Valley. Among the videos which have been catching farmer's attention are the series on Sustainable Land Management. At the launch event the programme on Conservation Agriculture fostered a lot of interest. One of the farmers said, "I wish to urge everyone in our village to attend this video shows next time they come to our training. Among the conversation points for the farmers were: New farming techniques No need to burn maize stalks after harvesting as it helps in enhancing soil fertility importance of intercropping. Techno serve is now exploring the Access Agriculture website to select other suitable videos to help farmers in their target counties (Technoserve, 2018).

**CASE 6**

**AGRICULTURAL VIDEO SHOW DEMONSTRATING YOUTH IN AGRICULTURE**

**ATTRACTIVE FARMING VIDEOS SAMPLES.**

<https://www.google.com/search?source=univ&tbm=isch&q=examples+of+videos+youth+in+farming&sa=X&ved=2ahUKewjKpeqHwbPrAhXt6eAKHdvTDAgQ7Al6BAGHEBk&biw=1322&bih=631>

**(A)**



Why agripreneurship y.

Youth participating in agriculture in Tanzania/ Malawi

**(B)** Great migration of youth leading to urban farming



**Ci** Family participation in youth. Mentoring youth in agriculture



**Cii** Can social enterprise improve the agricultural value chain for farmers



**Di** Digitalization of farming by youth using drone facility



**Dii** Future really lie with youth farmers



**F)** Digital inclusion in agriculture future success in food production.



Farmers sharing videos. Watching demonstration using mobile phone technology



**G) Young farmers trigger climate smart agriculture in Zimbabwe**



Smallholder farmer using mobile for video show information. How digital technology can help African farmers achieve their food production



KARLO lounges mobile phones as way of providing extension services





Digital improving and certification in the agricultural last mile. Mobile solution.



H) Lucrative herbal farming



## RECOMMENDATIONS

Access Agriculture is a useful platform for farmers, policy makers, Agricultural Research and Development staff, service providers, extension agents, communication professionals and representatives of farmer organisation.

Access Agriculture farmers video shows tell vital first-hand stories, challenges and successes of farming practices in different communities which help in gaining a better understanding of the problems experienced and enable to get the best solutions from the successful practices shared.

Video shows developed by Access Agriculture attract youth, women, smallholder and marginalised farmers and users of natural resources to relevant knowledge through networks, partnerships, appropriate information and communication technologies and feedback mechanisms.

Video shows help agricultural education systems and advisory services to value farmers' knowledge and innovations, and encourage joint learning on sustainable agriculture and natural resource management.

## CONCLUSION

The research study found that, [more than 70%](#) of Africa's population depends on subsistence agriculture for food, jobs and income. The continent has immense potential to feed itself and the world. It is also a home to over 60% of the world's uncultivated arable land, but this potential has not been used effectively. Kenya being part of the continent faces the same scenario.

Food production is comparatively low as in developed countries. This is largely because of several factors such as inappropriate technology in farming systems especially in small scale farmers' cohort. Most importantly, there are poorly developed climate and weather alert systems to help farmers plan for crop seasons and adopt better ways of farming.

Smallholder farmers in Kenya rarely have a direct voice in shaping policies and understanding of their needs. To celebrate the often unsung work of farming communities, Access Agriculture has developed [a series of short videos](#) telling the farmers' stories in their own words. The videos tell a vital story of why the living conservation and use of these irreplaceable resources are crucial, not just to the communities concerned, but for future generations. It is believed that, the videos will help to create understanding at all levels and enable many other farmers to gain from these successful practices. The videos tell a vital story of why the environmental conservation and use of these irreplaceable resources are crucial for sustainable society.

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