

# Using ICT to attract Kenyan youth into Agriculture: E-gardens

## A Case Study of an *e-Gardens* Project in Central Kenya

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**Abstract--** This report offers a detailed case study of an initiative that seeks to use Information and Communication Technologies (ICTs) to attract Kenyan youth to agriculture. Agriculture in Kenya has not been looked at as a career prospect by the Kenyan youth, who consider it as a backward activity best left to the unfortunate; to them it is as a last-resort venture. There is also a general lack of efforts to encourage Kenyan youth to embrace agriculture and farming activities as a profitable venture, especially using the youth's existing attraction to using ICTs, and targeting their innovative capabilities and proclivity for entrepreneurship. This study, carried out between 20<sup>th</sup> and 22<sup>nd</sup> May, 2014 focuses on one such effort, the Gakawa Secondary School '*e-Gardens*' project in Nyeri County, Kenya, funded by Sustainable Environment and Agriculture Network

International (SEANET), a Kenyan Non-Governmental Organization (N.G.O.). The study examined ICTs in use at the study site, impact and effectiveness of this usage, challenges faced by the study population and possible interventions to these challenges. A survey research design was adopted for the study, relying on questionnaires, oral interviews and site visits as data collection tools. The results show that the *e-Gardens* model is a good example of an innovative approach to getting youth into agriculture. There is minimal literature available for this topic as it is a relatively new approach and largely experimental in Kenya and Africa in general, and more studies need to be conducted in other locations.

This paper is limited by its descriptive and not predictive nature, and is not based on a statistically representative sample of the population.

**Keywords:** Information, Communication, Technology, ICTs in Agriculture, Youth, Agriculture, Kenya.

## INTRODUCTION

For a long time agriculture in Kenya has been perceived as a back-breaking, labour-consuming and last resort sort of income. The average Kenyan youth looks at farming activities and agriculture as a reserve of the un-educated, and backward population. They are attracted to the urban lifestyle, with white collar jobs and the imagined associated luxuries with minimal effort. With the increase in enrollment in Kenyan schools after the government introduced free primary education, a corresponding increase in educated youth. Most, due to factors like poverty, hunger and lack of skills are unable to fulfill their potential. Unfortunately, the current 8-4-4 education system does not adequately equip school learners with survival skills, resulting in large numbers of unemployed youth.

In a discussion paper entitled “Kenya’s Youth Employment Challenge” (2013) the United Nations Development Program (UNDP) wrote that “Kenya faces a significant unemployment problem that affects young people especially hard. Youth unemployment rates are several times higher than the rates among adults and particularly high in cities and among females. As young people grow up, they stop depending on other people’s income and become independent.

During their transition from childhood to adulthood, access to good jobs of acceptable quality is essential for youth to acquire independence from their parents, brighten their prospects in the job market and enhance their prospects of forming a family.”

The Kenya National Bureau of Statistics estimates that in 2013, unemployment rates rose to 40%, up from 12.7% in 2011, with the youth comprising 60% of this population, with these figures expected to rise in the coming years. The Moraa Foundation lists drug abuse and crime as some of the challenges facing unemployed Kenya youth. The government of Kenya has recently launched Uwezo Fund, a revolving fund targeting the Youth and women. However, there are few, if any instances, of beneficiary youth investing these funds into farming. There is also minimal information available to the youth on the use of ICTs and its use in agriculture to change their perception of agriculture. Kenya relies largely on its agriculture to feed her population, but the land that is currently available for cultivation is unable to provide adequate food for a rapidly, growing population considering the high rate of natural resources depreciation. There are more water shortages, vagaries of climate change, loss of fertility and loss of arable lands to

urbanization. All the while, demand for quality products continues to rise. Two scenarios are clear here: There is a large number of unemployed youth population; and, there is a rising demand for food products. Addressing an annual International Fund for Agricultural Development (IFAD), meeting in

2011, former UN secretary general Koffi Annan, said “current events show the energy, creativity and the power of young people, and also the importance of ensuring that they can see a future for themselves in the society we live”. “They deserve support to take advantage of the opportunities opening up. We need to tap into the energy and entrepreneurial skill of Africa’s young generation”, he added. The International Labour Organization reports that although the regional youth unemployment rate in Sub-Saharan Africa is lower than in most other regions, it is significantly higher than the adult unemployment rate. Compared with an adult unemployment rate of 5.9 per cent in 2012, youth are twice as likely to be unemployed, with an estimated youth unemployment rate of 11.8 per cent in 2012. ICTs can offer opportunities to young people for learning, skill development and employment.

It is in this context that initiatives have been started to attract youth into agriculture, offering mitigation to both the food deficit and youth unemployment. The modern youth is searching for meaningful, secure, and income-generating work that is different from the norm. One such initiative is by Sustainable Environment and Agriculture Network International (SEANET), a Kenyan N.G.O. working in Laikipia and Nyeri counties.

This study will focus on one of the success cases identified by SEANET, the Gakawa Secondary School *e-Gardens* project. Key questions this study seeks to answer are: has the initiative achieved its objectives; what direct and or indirect impact has it had on the target population; and has the role of the youth changed as a result of the introduction of ICT?

## BACKGROUND

Sponsored by the District Education Board and situated in the Gakawa area of Kiini East Division, Nyeri County, Gakawa Secondary School is a public day mixed school. It has an enrollment of 284, with a student teacher ratio of 17.75 with a total teaching staff of 16 people. This school occupies a 25 acre plot of land. The school’s address is P.O. Box 1328-10400 Nanyuki. It borders the Mt. Kenya forest and the climate is generally cool in the day and cold in the evenings.

Figure 1: showing a road route to Gakawa Secondary School.

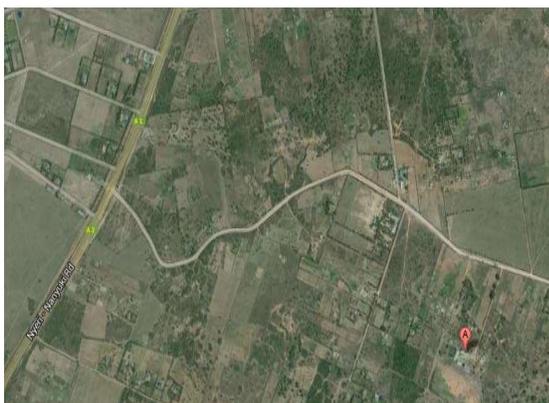


Figure 1: Directions map to Gakawa Secondary School. Photo courtesy of Google Maps ©2014 Google

The *e-Gardens* club has 51 members, 26 being male, and 25 female. The project was started in 2011, as a pilot for the 11-school *e-Gardens* project.

The SEANET website defines an *e-Garden* as ‘A dynamic and adaptive model in which multi-disciplinary think tank-inspired enterprises are synergistically integrated with relevant capacity building, renewable energy and the Internet in order to promote sustainable agriculture and rural development’. An *e-Garden* is a demonstration plot where field days are held and from which internet agriculture and cottage food industry extension will be based. It targets about 10% of Kenya’s and 2% of Africa’s schools. It targets Kenyan youth, most who are found in Kenyan Secondary schools. In an interview, Mr. Karuku, the Executive director at SEANET justifies this approach, arguing that to target the youth later would be like “closing the stable door after the horse has bolted” SEANET’s website explains the *e-Gardens* methodology: Water is harvested from roofs into reservoirs, and then led to greenhouses/drip systems in the *e-Garden*. Here, sub-enterprises include micro-livestock, crops, agro-forestry, tree/flower nursery botanical garden and a cottage food industry. Energy is derived mainly from wind or solar and is used to power computers and the cottage food industry. The latter adds value to the garden products that are then used for school food while the surplus is sold. Outputs of the cottage industry include; tomato sauce, rabbit/chicken sausages, yoghurt, home butter, rabbit and chicken cutlets, etc. Computers and an internet connection are installed and basic computer training is offered to the students, allowing them to fully participate in the production and distribution of *e-Gardens* bulletins by schools. There are two forms of the bulletin: An

online version which requires signing up, and an *off-line* version that is printed and distributed amongst the students, parents and communities around the schools. The blog is then the forum for ideas exchange. Students from the project schools register on the blog website, and from there are able to write articles, and exchange ideas with sister schools. The management sub-system with a multi-disciplinary think tank completes the picture. An *e-Garden* is finally a demonstration plot where field days are held and from which internet agriculture and cottage food industry extension will be based. This study concentrates on the ICT sub-system of the *e-Gardens* initiative. At the site, there is a computer laboratory with twenty computers, all connected to high speed broadband internet, using a new innovative technology called ‘Mawingu’ (the Swahili name for clouds), that uses ‘white space’ technologies. According to the school Principal, the current twenty computers and internet connection were a donation from Microsoft, a leading ICT company, to supplement SEANET’s initial computers donations as part its efforts towards development of the ICT component of *e-Gardens*. This computer laboratory is used by the *e-Gardens* members to access agricultural information from the internet. Also, through a blog set up by SEANET, students are able to exchange ideas with other 10 sister schools in the *e-Gardens* project.

## MATERIALS AND METHODS

This study is a survey research which involves the collection of information from a sample of individuals through their responses to questions. This method is an efficient method for systematically collecting data from a broad spectrum of individuals and educational settings. This study is carried out in Gakawa Secondary School, which lies between Latitude 0.059545 and Longitude 37.060422.

Figure 2: shows an aerial view of the school layout.



Figure 2: Gakawa Secondary School layout. Photo

courtesy of Google Maps ©2014 Google

Research questions were structured in a questionnaire. The objective was to test effectiveness of this model to elicit interest in agriculture. The population size is small (forty two), and it made sense to use the whole population (*e-Gardens* Club members) as a sample. This approach would eliminate any sampling errors and provide reliable data on all the individuals in the population. The cost rationale was also considered in terms of cost of developing a questionnaire for the entire population, which is the almost the same as for a sample population. In fact, the entire population would have to be sampled in small populations to achieve a desirable level of precision.

Three oral interviews were also conducted; one with the school principal, Mrs. Ndorongo; the other with Mr. Macheru, the SEANET International executive director; and lastly with the *e-Gardens* patron, Mr. Muketha. Physical examination of the facilities was also done and observations duly noted.

The entire population was given the structured questionnaire and responded to questions presented. Rating scale questions were used. This raw data that was collected was analyzed using percentages and mean. For the research questions, it was decided that any item with a mean score of 3.75 (3<sup>rd</sup> percentile) and above would be considered as agreed, with any item with less than that considered as disagreed.

## RESULTS

An analysis of the questionnaire responses revealed that the project had elicited a high interest in agriculture. Almost all scored above the 3.75 score set out in the acceptance parameters, agreeing projects initial projections. In an interview with SEANET's Mr. Macheru, he intimates that SEANET had chosen this method over others because ICT was fast becoming a popular means of youth empowerment and economics turn around in many countries. This case study results show good functional institutional and social sustainability and shows significant developmental impact, and indicates that the use of ICTs is scalable, reliable and cost effective.

Q/N	QUESTION TOPIC	SCORE (1-5 SCALE, AVERAGE)	DECISION
1	Enjoy using ICTs	4.6	Set objective is 92 % achieved
2	Basic Computer skills gained	4.25	Set objective is 85% achieved
3	Internet skills gained	4.4	Set objective is 88 % achieved
4	Improved agricultural materials access	4.5	Set objective is 90 % achieved
5	E-mail skills gained	4.25	Set objective is 85 % achieved
6	Blogging skills gained	4.15	Set objective is 83 % achieved
7	Interest in agriculture	4.9	Set objective is 98 % achieved
8	Plans to pursue agriculture after school	4.2	Set objective is 84 % achieved
9	Use ICTs in future pursuits	4.9	Set objective is 98 % achieved
<b>Mean = <math>\sum \text{score}/n</math></b>		40.15/9=4.46	Set objective is 89.2 % achieved

Table 1 showing average responses to questionnaire questions

Respondents' grades in class had also visibly improved in the agriculture subject, attributing this to better agricultural information now available through the project. The average mean score in the agricultural subject among the respondents had increased by 33.33% since the project was launched in 2011. This is evidenced by term reports that were supplied by the school Principal during the oral interview, whose permission was sought to reproduce below:

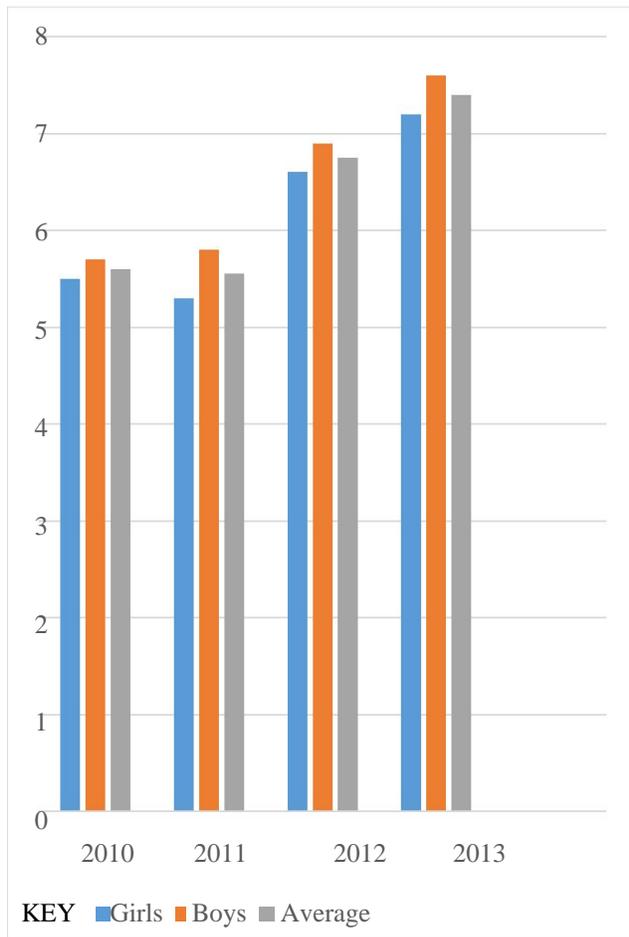


Figure 3. Agriculture subject mean scores among e-Gardens members. Courtesy of Gakawa Secondary School

In an interview with the school’s e-Gardens club patron, Mr. Muketha said that the students had developed a strong rooted ownership of the project, citing a recent school unrest, where the students broke all classroom window panes. However, the e-Gardens club members surrounded the project green house in a defensive move against the rampaging students.

Sustainability was evidenced in that the ICT equipments were supplied new and required little or no maintenance for a long time. It was also evident that the students were responsible for the equipment in the way they ensured that all machines were safely shut down and covered using dust proof covers after they finished using them. The project also looks easily scalable as it did not require specialized equipment. Furthermore solar and/or wind energy could be harnessed to provide power. Answers to

specific research questions that the study sought to answer were as follows:

Research question	Result and justification
Has the initiative achieved its objectives?	Yes. It set out to attract youth to agriculture. 89% of the target population are keen on pursuing agriculture and farming activities after their Form 4 studies. 89% of the target population are keen on pursuing agriculture and farming activities after their Form 4 studies.
What direct and or indirect impact has it had on the target population?	Direct: Creating interest of using ICTs for agriculture and farming activities. Better production yields in their e-Garden project. Indirect: Computer skills gained. Community empowerment through their youth. Anticipated and sustainable better farming methods as a result of information gained through exposure to ICTs.
Has the role of the youth changed as a result of the introduction of ICT?	Yes. Their enthusiasm is clearly visible. Their grades in Agriculture subject have gone up.

The above success has not come without challenges however: for SEANET the main challenge was raising funds to implement the project. Use of ICTs in agriculture and farming activities is a relatively new approach in Africa and indeed Kenya, and fund-raising to implement the project was not easy. Another challenge was the poor computer literacy levels amongst the target group. Teachers had first to be trained so that they in turn could train the

students. For the school, challenges included provision of a secure classroom to host the ICT equipment and provision of power as the solar panels installed were inadequate.

The main challenge the school faced at the time of this report was coping with the demand of students wanting to join the e-Gardens club, given the limited resources. It is currently sourcing for donors to help expand the current project. For the students, the main challenge was learning to use the ICT equipment. Most had never even seen a computer previously, but their enthusiasm helped overcome this. These challenges experienced in the project under study seem to be consistent with findings published in the book "Agricultural Innovation Systems: An Investment Sourcebook" by The World Bank (2012), where the author observes that many agricultural systems in developing countries do not employ even low-level ICT in the teaching/learning process. Reasons for this include poorly trained teaching staff who have not been exposed to ICT in their training, lack of funds to purchase ICT equipment, unreliable power access, and no supervisory pressure to adopt and use ICT.

## DISCUSSION

The results of this study paint a successful picture of utilization of ICTs as a tool to attract youth into agriculture. It agrees to a report titled "Youth, ICTs and Agriculture: Exploring how digital tools and skills influence the motivation of young farmers", published by the International Institute for Communication and Development, as a result of a recent research that focused on three projects in western Kenya, which focused on enhancing agricultural productivity and access to markets. The research investigated the linkages between the introduction and the use of ICT in farming and the interest of youth in farming and value chain development. The report says that "ICTs can play a role in countering youth migration to urban areas by enhancing access to market information, production techniques, new technologies and financing opportunities. The use of ICTs enables choice, the option to stay on farms and take full advantage of new technologies and farming techniques, while incorporating valuable traditional practices and knowledge." These sentiments are echoed by SEANET, whose work in rural Kenya has largely targets the youth.

Kenya's Vision 2030 has "Ukulima Bora-We all want a Kenya that is able to adequately feed itself, the world and give jobs to its citizens" listed as a

'dream'. The *e-Gardens* project looks like a good example of how to achieve this dream as it addresses both food sustenance and job creation through agricultural skills development and food value chains.

It goes to show that well packaged and managed ICTs can be used successfully to generate interest in farming among the Kenyan youth, proving that use of ICTs is indeed a reliable intervention to improve students' agriculture subject grades and mitigate problems of lack of survival skills amongst the Kenyan youth. Broadly, use of ICTs can be used to entrench farming and agriculture as a viable and attractive source of income for the Kenyan youth. The findings of this study seem to agree with R. Saravanan (2010), who observed that encouraging youth may assist the use of ICTs in the agricultural sector, attracting the addition of a younger pool of farmers to a group where average age is over 60 years. He also observed, as this study has, that youth and ICT use seem to be almost natural.

## CONCLUDING REMARKS

Whether or not Kenyan youth will benefit from opportunities now afforded by advances in agricultural and farming activities through use of ICTs, depends largely on the extent to which ICTs will be availed to them. It is encouraging to see SEANET taking steps to actualize this.

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