CLIMATE CHANGE: THE HIDDEN ADAPTATION OPPORTUNITIES FOR YOUNG PEOPLE IN THE AGRIFOOD SECTOR, A CASE STUDY OF KENYA[1]

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Abstract

Climate change is one of the biggest challenges to sustainable development. Africa is particularly vulnerable to climate change because of its overdependence on rain-fed agriculture, compounded by factors such as poverty, increased land subdivision and weak policy frameworks. The main longer-term impacts of climate change include: changing rainfall patterns affecting agriculture and reducing food security, worsening water security, decreasing fish resources in large lakes due to rising temperatures and rising water stress. These changes coupled with lack of training on climate change and adaptation, lack of efficient means to transfer indigenous knowledge and of integrating it with modern knowledge, translates into low capacity inhibiting active participation in development activities and leaving young people in vulnerable positions. Thus, the youth run the risk of contributing to climate change instead of mitigating it, just as past generations have done. Given this scenario, the youth must actively participate in addressing the climate change problems, not as victims but as solution providers. It is in this context that this paper explores some of the challenges young people in the agri-food sector face due to climate change. It also postulates how these challenges can be turned into adaptive opportunities to contribute to sustainable development and economic freedom for this age group. Success stories in

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Kenya have been explored and lessons with policy implications analyzed. A desk study detailing the current and projected climate change effects was carried out. Further, the adaptation opportunities for young people were deduced and the effects of this analyzed. Results show that young people can be involved in innovative production and change in behaviour for better consumption. They can also create learning networks using ICTs to exchange information, technologies and ideas. In addition, their, capacity can be enhanced through relevant education that is more inclined to current developmental challenges. Youth participation in climate change adaptation and mitigation initiatives, like planting trees, promoting the use of renewable energy, adopting energy saving appliances and practices are other viable options. This requires an enabling policy environment and relevant infrastructure. In conclusion with 75% of the Kenyan population under 30 years of age, the young people are potentially a major driving force in processes of adaptation to climate change effects. For this generation, innovation is important for agricultural transformation and better adaptation to climate change. However, young people must first change their negative perception towards the agricultural sector. This is possible with enactment of enabling policies and good infrastructure that facilitate funding and access to markets. Perceived benefits would include increased employment, increased incomes enhancing poverty reduction and increasing GDP, increased foreign exchange, growth of the manufacturing and services sector. This would ensure that Kenya enhances its food security and better manages its natural capital for sustainable development, economic growth and national security.

Keywords: Agri-food, youth, mitigation, sustainable development

Introduction

Climate adaptation refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences. The agriculture sector has been among the areas worst hit by a changing climate in Kenya. 75% of Kenyans are food insecure, majorly due to reliance on rainfed agriculture which has been affected by cyclic floods and drought. Kenya has suffered major devastating drought episodes in the last decade with the drought in 2009 affecting 10 million (Kenya Food Security Steering Group, 2009). This affects a great proportion of the economy and the livelihoods of many Kenyans, given that agriculture contributes 26% to the GDP and employs approximately 75% of the employed population in Kenya. Hence, addressing and adjusting to the challenge of climate change is certain to be a defining feature of the future of today's youth. It is therefore critical that young people educate themselves and become more actively involved in combating this threat. As they

constitute a great proportion of the population and are likely to be worst hit by the effects from the changing climate and increased food insecurity. Currently, 78.31% of Kenyans are below 34 years old. Those aged 15-34 years old Constitute 35.39% (IEA, 2010). This means Kenya is largely a young nation. The proportion of children (0-14 years) has been declining since the 1980s, and that of producers (aged 15-64 years) has been rising consistently, the bulge will shift to the 15-34 year olds meaning that Kenya will transition from a 'child-rich' phase/child bulge to a 'young adult' /youthful or youth bulge population (IEA, 2010). The young people have the energy, innovation that could be used in the agri-food sector in combating with climate variability. Climate change touches every aspect of life and impinges on development efforts, with consequences ranging from immediate to long term. Major adjustments are required to promote more sustainable patterns of production and consumption at both the collective and individual levels (UN, 2010).

It is on this backdrop that this paper seeks to explore the effects of climate change on the agri-food sector in Kenya and how the youth can explore opportunities that come with the adaptation process to improve on their livelihoods and achieve food security as a country. Kenya's constitution defines youth as all individuals in the republic who have attained the age of 18 years but have not attained the age of 35 (GOK, 2010). The UN on the other hand defines youth as persons between the age of 15 and 24. Due to these varying categorizations of youth, this paper has to the extent possible addressed youth as those aged between 15 and 34. The paper also seeks to address some of the enabling factors that could improve capacity and better equip young people to adapt to climate change, and mitigate against further deterioration of the environment through behavioural change and sustainable consumption patterns.

Problem statement

The CAADP estimated that 10% of the national budget investment on agriculture would lead to a 6% increase in annual agricultural growth across the continent. This would in turn lead to a 10% GDP growth (NEPAD, 2010) hence; investment in agriculture has a big multiplier effect on the economy. Under a conducive environment, increased productivity in agriculture should increase incomes where markets, credit, infrastructure and skill are available. This should be a major contribution to poverty reduction and increased food security. However in Kenya, the majority of land owners are the older members of the population who may not readily adopt improved technologies or acquire new improved skills for increased investment in agriculture. Therefore current agricultural investments do not necessarily translate to increased food security at national level or better incomes and more employment to the youth. Ongoing farm practices may also not motivate many young people to be engaged in

the agricultural sector. In Kenya this poses a great threat since 75% of the population is below 34 years of age and Approximately 67 per cent of the unemployed in the country were the youth (Republic of Kenya, 2008c). Agriculture being the mainstay of the country could provide employment to these youth directly or indirectly. Climate change poses great threats to agricultural growth in Kenya and it will require innovation to deal with its impacts. As the agri-food sector seeks to adapt to climate change it offers many opportunities for youth innovation and enhanced involvement in agriculture. This paper identifies opportunities in transformative agriculture for climate adaptation that young people have taken up and exploited as producers, entrepreneurs and as consumers. The needed policy environment and infrastructure are also evaluated. Lastly, the paradigm shift to increase motivation for the youth to be engaged in agriculture in the face of climate change is explored.

Objectives

The main objective of this study is to analyze the effects of climate change in Kenya and identify opportunities in the agri-food sector that the youth can use to improve their livelihoods and enhance food security. The specific objectives are:

- Deduce the enabling factors that have assisted the youth to better adapt and cope with the climate change effects in the agri-food sector.
- Analyze the implication to policy of some of the interventions and how best they can be implemented at a national level.

The agricultural sector in Kenya and Youth involvement

In Kenya, smallholders produce most of their own food and also contribute about 68 percent of the nation's total marketed output (GoK, 1998). Smallholders in Kenya are, however, known to be resource poor and, therefore, operate below their potentials (Nyikal, 2000). In addition, smallholder farmers; are largely elderly people between the ages of 45-65 years, who lack enthusiasm as they engage in traditional subsistence cultivation, which gives poor returns and its major focus is home consumption, there has been little effort to produce for the market or engage in farming as a business coupled with traditional and rudimentary means of production. Food security is already being threatened by climatic shifts. Agricultural productivity could decline between 9 and 21 per cent in developing countries as a result of climate change (Food and Agriculture Organization of the United Nations, 2009b).

Currently, 78.31% of Kenyans are below 34 years old. Those aged 15-34 years old Constitute 35.39% (IEA, 2010). According to (IEA, 2010) 61% of Kenya's youth (15-34) live in rural areas and only 39% live in urban areas. (Census, 2009).

Kenya has a pyramid shaped population structure mainly because the majority of the country's Population is currently concentrated at the bottom between age 0 and 14 years old. It is envisaged that Kenya will experience a demographic shift/transition due to changing patterns in fertility, mortality and population growth as well as socioeconomic factors. As the 0-14 age group matures into teenage-hood and young adulthood, and as many women continue to give birth later, space their children more or give birth to fewer children, it is envisaged that the bulge will shift to the working population, mainly starting with the 15-34 year olds. Kenya will transition from a 'child-rich' phase/child bulge to a 'young adult' / youth bulge population. This translates to available labour that can be used in various sectors of the economy. The combined purchasing power of Young women and men translates into significant market control. Young people not only make decisions about their own purchases, but they also exert a strong influence over the spending of their families and peers. (United Nations, 2010)

Young people's (15-34 years old) desired occupation in 2027 would be to work in the service industry (41%), enterprise (25%), social service (14%), industry (7%), and public service (6%). Only 5% want to work in agriculture). Informal 6,407,200 sector is the highest employer followed by agriculture 327,400 and manufacturing 247,500 (IEA, 2003). Even with the availability of labour not many young people are motivated to work in the agriculture-sector.

Adaptation strategies are therefore important to increase resilience for the young people. Young people through a changed mindset have the energy and innovation to transform the agri- food sector they can be involved in various stages of the value chain; production, consumption and entrepreneurship. This however will be catalysed by an enabling environment. There is growing recognition that developmental policies must, at a minimum, cater to the needs and aspirations of youth. Thus, the UN has declared the period from 12 August 2010 – 11 August 2011 as the International Year of Youth, with its slogan 'Our youth, our voice'. Similarly, 2008 was the African Youth Year. Young people's effective engagement in policy processes is seen as a means to channel their energy, passions and frustrations in a more beneficial manner (Lintelo, 2011)

UNESCO posits that national youth policy strategies that are effective and beneficial for youth are above all, those that empower them to actively influence and shape the political agenda. Progressive policies, on all sorts of issues (not merely those deemed 'youth issues') thus need decision-makers to work not only for, but with young people, and let their

experiences inform the development of appropriate interventions and services (UNESCO 2004).

The Kenya national youth policy's goal is to promote the participation of the youth in community and civic affairs and to ensure that their programmes are youth centred and engage the youth. It envisions A society where youth have equal opportunity to realize their fullest potential-productively participating in economic, social, political, cultural and religious life without fear or favour. (GOK, 2002). Moreover, involvement in political processes is seen to allow youth opportunities to develop important skills and improve self-confidence (United Nations 2003; United Nations 2005; finally, the argument is advanced that a failure to enhance youth participation in policy processes risks policy failure, crime, violence and intergenerational discord. Thus, successful youth policy is posited to depend on effective representation.

Data sources

A desk study and field interviews was conducted to understand the various areas of engagement by the youth in the agri-food sector in Kenya. Youth groups initiatives and individual innovative enterprises in the agri sector were interviewed and their initiatives contribution to sustainability in the agri sector analyzed, in addition the possibility of scaling up this individual initiatives was also analyzed and its implication to policy.

Results

1. **Innovative contribution to food production value chain**

Through innovative engagement of the young people in the agriculture entire value chain adaptation to climate change and increased production stand to be realised. Below are some of the success stories in production, marketing and the service sector involvement of the youth in Kenya

(i) Production

The *agrivijana* loan has provided an opportunity for the young people to be involved in high value crop production which are less labour and land intensive. These enterprises however require high investment and high level of skills and capacity in production. The government has engaged in a public private partnership where it provides the financial capital and Amiran Kenya provides technical capacity and the equipment. This innovation has high returns and hence stands to motivate more youth to be involved. It also requires less land which is scarce. With a green house and use of more modern technologies there is more control over the environmental variability and hence less chances of losing an entire crop to drought.

The Youth Enterprise Development Fund (YEDF) and Amiran Kenya Ltd have partnered to support young farmers in acquiring a tailor made Amiran Farmers Kit (AFK). YEDF has started the AgriVijana Loan to help youth, who are in groups, to get involved in Agribusiness. The AgriVijana Amiran Farmer's Kit, contains 2 greenhouses, a drip irrigation system for the greenhouses and 400m of open field, a water tank, plant support system, Gold Medal Seeds to be grown inside the greenhouses and in the open field, high quality fertilizers for one season, crop protection products for one season, a farmer's sprayer, nursery set, health and safety protective gear, training, agro-support, and AFK insurance. (http://www.amirankenya.com)

Agriculture is highly rewarding if the investment is carried out diligently, with appropriate timing, inputs and expertise. The case below illustrates how some of the young people in Kenya are having great benefits from agriculture.

Box 1: Fruit farming

Ms. Ann Nyaga a graduate of biomedical Science and technology from Egerton University in 2007 is practicing farming on her father's 20-acre piece of land. She dedicates three acres to water melon farming through irrigation.

In a year, she manages two major seasons which are well planned so that they peak at a time when the rain relying growers are out of season - a move that earns her optimum prices. In a good season each acre produces over 20 tonnes of watermelon. Usually, a kilogramme of the produce goes for between Ksh. 20 to Ksh. 25. This translates to 800, 000 to 1 million gross earnings in just three months.

At just 27 Ms. Nyaga is a bubbling millionaire whose success story is worth emulating thanks to agriculture. (Dailly Nation, 2012)

(ii) Consumption

80% of Kenya is Arid and Semi Arid lands (ASAL) farmers in these areas have a large access to land. This land however is not very productive due to climate variability and erratic rainfall. In this areas orphan crops of high value which are more drought tolerant are able to withstand the variable rainfall. With good farming practices e.g. early planting, soil and water management and natural resource management like mulching, water harvesting and use of manure. The orphan crops stand to be used to alleviate extreme hunger in the semi arid areas. A youth group in Mbeere South district is producing enough food for their consumption and for the market hence, increasing food security and incomes. Through this

alternative production the young people in this area are changing their consumption patterns to more traditional recipes or a blend of the old and the new.

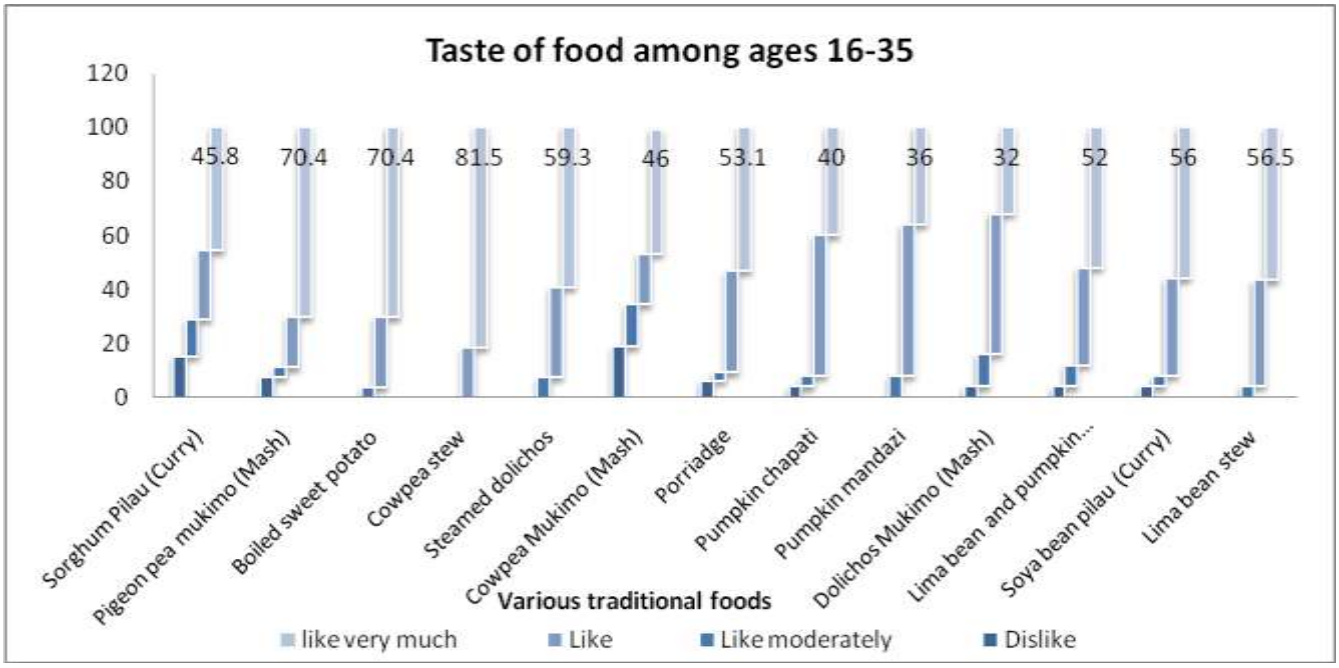
In collaboration with the Making agri-food systems work in Eastern and Southern Africa" project being implemented by Kenya Agricultural Research Institute Newsite Initiative Youth Self Help Group is engaged in planting of drought tolerant crops. For the last two years members of the group have learnt about improved agricultural technologies from KARI scientists that they now apply on their farms.

In addition members have been trained on Upgrading of goats with superior breeds, Tree grafting, Safe use of pesticides, Terracing and terrace establishment, Choice of drought tolerant crops, Row cropping patterns, Sprayer calibration and effective fertilizer application methods. The group also has a savings scheme and a welfare support initiative for the group members.

Continued production of these crops has led to change in consumption patterns with more traditional recipes becoming more popular in the area. During a farmer Feedback workshop held by KARI, the community prepared most of the traditional crops that they are growing and a sensory food survey was carried out to find out the perception of the community members on the culinary properties of these foods.

The table below indicates that most young people appreciate the various traditional foods with cowpea stew being highly ranked where 81.5% of the respondents like it very much. There is an incorporation of the traditional and current recipes as seen with the pumpkin chapatti and Mandazi.

Figure 1: Taste Rating for various tradition food crop recipes in Mbeere South district



(iii) Entrepreneurship

Involvement of the young men and women in the agri-food sector is not only limited to production. Young people are involved in various levels of the value chain: Some as manufactures, in value addition, bulking and marketing. A critical analysis of one's skills and strengths is relevant in identifying which level to engage in for optimum benefits.

Box 2: Group marketing and bulking

Multigrow is a local company whose main aim is to market cut flowers for small scale farmers abroad. The company facilitates bulking of flowers by farmers in Njabini and other areas in Kenya. It also trains farmers on various requirements for export and the planting seasons. Small holder farmers through scheduled planting are able to bulk their products and market them in Holland as a group. Each farmer under the group is able to get Net incomes ranging from Ksh. 120,000 to over 1 Million per season. Depending on the size under production, quality of flowers and varieties planted. Multigrow charges Ksh. 5 shillings per dollars earned by the farmers as service charge.

This initiative brings increased incomes both to multigrow group and individual farmers. Collectively the farmers are able to provide support needed in production and meeting the international standards. Innovation in the agriculture sector and capacity building to be able

to use available resources optimally will lead to increased benefits in the agri-food sector. Success stories like this play a huge role in motivating other young people to be involved in the agri-food sector.

2. Capacity development and training

Youth training on various aspects of farming business, from production, value addition, and marketing should be a priority of African governments and development agents. For growth to take place there is need for skill development both in production and management. Information on new technologies needs to be disseminated in a modern fast and user friendly way. Comprehensive value chain analysis of various products should be done and possible involvement of the youth at the various stages of the value chain explored. Agricultural training in schools should also incorporate the current changes in the sector; however changing trends in agriculture often require changing ways of production, information agricultural education and training strategies need to consider the implications of rapid population growth, climate change, changing consumption patterns and the consequent increasing food and raw material requirements.

Since rural youth possess unique aptitudes and qualities for understanding of and work in the rural sector. The rural background makes them well suited for professional and technical work in agriculture. Training on agriculture as a business should begin at the elementary levels to have a complete mind shift of the agricultural industry. Further ensure increased absorption of personnel trained in agriculture in the relevant sectors. This is a challenge as the local sector is not able to adequately absorb the graduates and remunerate them satisfactorily. These has led to brain drain of the agriculturally trained personnel to other areas especially the service sector e.g. banking and marketing which are more rewarding.

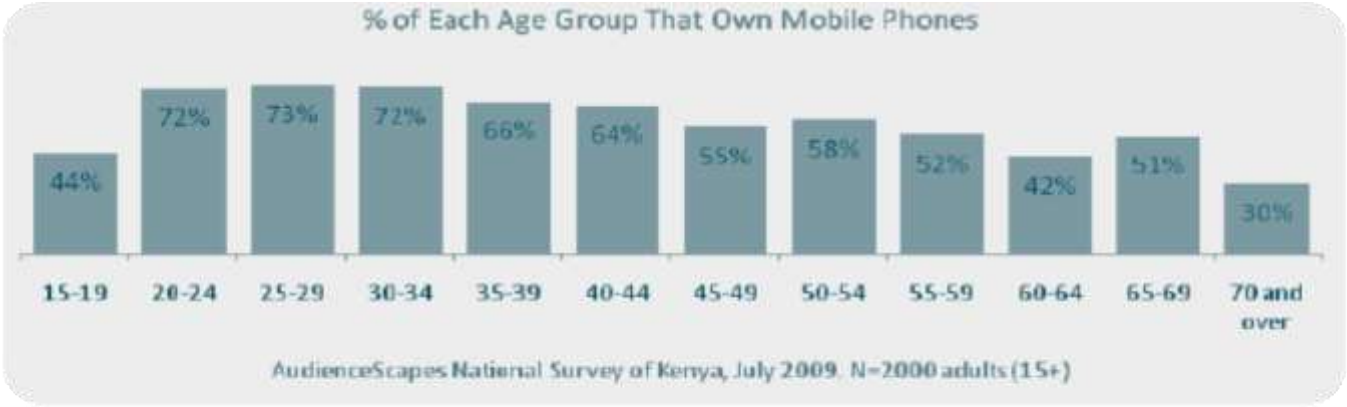
3. ICT in agricultural information dissemination

According to (World Bank, 2007), Information and Communication Technologies (ICTs) consists of hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. Communication technologies consist of a range of communication media and devices, including print, telephone, fax, radio, television, video, audio, computer, and the internet. Of these, internet, mobile phone, and computer (also referred to as new technologies are growing much faster than older information and communication technologies (ICTs) such as television, radio, mainline telephones, and newspapers. Mobile phones have overtaken mainline phones in coverage in many parts of the world, and there

are more internet users per 1,000 people than there are daily newspapers purchased in every region except South Asia.

In Kenya, Young people are the main users of the new ICTs (internet, mobile phone, and computer) which are growing much faster than older ICTs (television, radio, mainline telephones, and newspapers). The new ICT technologies are having wide-ranging effects on youth transitions. Internet connection was prioritized highest among the new mass media to access reliable information and knowledge (57%) followed by communicating with others (39%) through E-mail, social networking, chatting, VOIP etc. Computer use increased with age; Among 7-10 year olds only 23% had used a computer, 36% among 11-14 year olds, 47% among 15-17 year olds and 57% among 18-19 year olds, with, internet facilities becoming continuously available to many Kenyans. People have come up with innovative applications and social spaces to spread and share information on agriculture most notably are the following. (IEA, 2010)

Figure 2: Mobile phone ownership by age



Most of the young people have access to mobile phones averagely 72% of those aged 20-34 years own a mobile phone. This poses a great opportunity for information sourcing and carrying out various transactions e.g. mobile money transfer, linking with buyers, input providers and also getting technical information from the internet or friends.

(i)Applications and agricultural information dissemination

Application software, also known as an application or an "app", is a computer program designed to help people perform an activity. An application can manipulate text, numbers, graphics, or a combination of these elements. Some application packages offer considerable computing power by focusing on a single task, such as word processing. Applications can

also be classified by delivery devices such as mobile apps for mobile devices. Mobile applications, also called mobile apps, are software applications, usually designed to run on internet enabled phones, Smartphone's and tablet computers.

Mobile apps were originally intended for productivity: email, calendar and contact databases, but public demand caused rapid expansion into other areas such as mobile games, factory automation, GPS and location-based services, banking, order-tracking, ticket purchases and most recently agriculture. There has been innovative applications development in the world and most notably in Kenya with the award winning iCow application.

Table 1: innovative mobile apps in the agricultural sector in Kenya

Application	Brief summery
iCow	This is an application designed to track individual cows per farmer to maintain all relevant information specific to each cow. It will give the farmer access to: comprehensive gestation calendar, health information services, Nutrition information services, disease services and costs of production customizable calendar and calculator
m-Farm	M-farm limited is a software solution designed to get the farmers information pertaining to the retail price of their products ,input costs directly from the manufacturers, and find buyers online
Maarifa centres	This is a room or a fabricated shipping container where communities access information resources. It is equipped with computers and internet access. These centres have a rich information resource base that includes publications, newsletters, audio visual materials and compendiums, and information on CD ROMs.

The I cow innovation posses the following advantages; it is personalized to individual needs each farmer can customize the application to maintain all the relevant information about his cow, easily accessible through mobile phone, and internet, potential to cover a wider geographical area at low cost, relevant and appropriate information is shared promptly, reduced cost of transport in search of information and delays in information transfer are reduced. However this application must be used by someone who has basic writing and reading skills and is able to operate a mobile phone or internet. Most young people are exposed to mobile phones and with the introduction of free education it is mandatory for all citizens to attain primary education. Good returns in the dairy industry stand as the main

driving force attracting investors' in this sector and with readily available information, young people could reap huge benefits in this enterprise. In addition they can be involved as service providers e.g. veterinaries, input providers and suppliers of the network, and information, and support for the other farmers.

The m-farm application links buyers and sellers from various towns online, Covers a broad range of crops, Costs and prices are adjusted real time. The information is accessed through the mobile phone or internet; this reduces the cost of acquiring market information. Information asymmetry has been a major factor for farmer's exploitation. With this new innovation farmers are aware of where they can best sell their produce and at what prices hence involvement of young people can give them a better bargaining power.

There are however, young people who have no access to internet or telephones, and hence the Maarifa centre are used to access the information either in hard copy e.g. magazines or in softcopies or both. They also have personnel who provide personalized information on the various enterprises one may be seeking information on. This also gives farmers a platform to meet face to face and exchange ideas, share experiences and learn from each other. Services are devolved to the community level reducing the cost of access. The Maarifa centres provide a platform where one gets information on multiple issues

(ii)Social networking sites

Social networking sites have gained popularity in Kenya over the years with Kenya being rated number 72 worldwide in Facebook use. Of all the social networking sites Facebook is the most popular in Kenya with 96% of all the people in social networking having a Facebook account. This can be used to disseminate agricultural information, and technologies. 41% of the Facebook users are between the ages 18-24 and 34% are between ages 25-34 Years (IEA, 2010). These gives the young people a great platform to exchange ideas meet with peers and share experiences in various aspects of life.

Facebook used as a tool of information dissemination on the effects of climate change and how sustainable consumption patterns can increase awareness, in addition sustainable and innovative farming methods can be shared among users.

Internet is accessible to Kenyans largely at their main interaction at work place 66% and mobile phone 68% as a backup (IEA, 2010). This shows that internet is largely accessible at user's convenience. Hence checking up agricultural information does not necessarily mean moving out of the area one is working at

Table 2: Initiatives in Kenya on the social sites

Site	Brief summery
Organic farmer	This is a platform where farmers interested in organic farming engage and share information on the various enterprises they are engaged in, challenges they face and various requirements to access markets. Professional information on agronomic practices and certification requirements is availed through a link with KOAN and Biovision.
Farming Kenya	This is a group of young Kenyan farmers that facilitates information sharing on various enterprises including dairy, poultry, and farming of various crops,. It also forms a platform to discus current and important agricultural topics like GMO, markets and deficit areas and products.

Specialized information on organic farming and other enterprises is offered. This mode of communication is accessible through internet and has the Potential to cover a wider geographical area at low cost, Relevant and appropriate information is shared promptly and delays in information transfer are reduced.

(iii) Mass Media

Mass media refers collectively to all media technologies which are intended to reach a large audience via mass communication. The media is a very important tool in communication and shaping/ changing mindsets. This case below illustrates well how young people under their own volition get involved in the agriculture sector and influence many others in a positive way. James brings out the fact that involvement in the agriculture sector is not only at the farm level this is evidenced by his involvement at the service level. James agrees that agriculture is transforming and more advanced technologies are now available however not many farmers are aware of them one of his major driving force to engage in agricultural reporting.

BOX 3: Role of Media in agriculture through involvement of the youth

Last year at the international conference on Innovations in Extension and Advisory Services Conference held in Nairobi, a young Kenyan journalist won the CTA (Technical Centre for Agricultural and Rural Cooperation) Award in East Africa for reporting on the role of extension in Agriculture. James Karuga is a trained computer scientist but his love for writing saw him get a job in the media industry he has developed a niche in reporting issues on agriculture, green energy, health and clean development Mechanisms for the last three years. In the first two and a half years of his career in Journalism James worked for a News Agency that contributed stories to Business Daily Africa.

He however is now a freelance journalist. James majorly relies on international magazines to publish his stories and articles. He reckons that the international publications pay better from Ksh. 15,000 to Ksh. 40,000 per story depending on the magazine. Though their Editorial Professionalism standards are high, with three or four stories in a month he is comfortable to pay his bills and be left with some saving. He supplements' his income in engaging in competitions. These pay slightly better and that money can be used in other investments in his recent win he got 1000 Euro from CTA.

His greatest concern is that most of the great stories that he does are not read locally majorly because local media houses are not inclined towards printing stories in the agriculture sector and also those who take his stories locally pay as little as Ksh. 3,000 per story or offer nothing but a publication promise. James thinks that media has a major role in eradication of hunger and achieving food security in the country. He says technologies and success stories that are working in one part of the country can be highlighted and other areas can adopt the technologies.

Media also plays a huge role in identifying areas of surplus and deficit commodities hence trade is facilitated. It also plays a major role in behaviour change especially in consumption patterns through advertisement. James has trained through apprentice and short courses on agricultural reporting organized by international organization both locally and abroad. To him this training is instrumental to his career since it has largely improved his quality of work. He thinks the Kenyan government and the ministry of agriculture should invest more in the training of journalist in the agricultural sector. Majorly because there is a lot of information and success stories in the country that have not been shared with the farmers that could be instrumental in improving their mode of operation, efficiency and incomes.

To attract more youth in this sector though there is need to invest in training in agricultural reporting and have an incentive for their stories to be published in local publications. This will have a wider coverage and will have a positive effect in the sector. The sector should also be re-branded and not regarded as one that takes up people who fail in the academics as previously perceived by many Kenyan youth.

Media also acts as a tool to shape the mind set of many young people whose consumptions and lifestyle patterns have a great effect on the environment. information can be disseminated in terms of songs and other creative arts a case in point is Julius Owino (Juliani) who is a gospel musician and doubles up as the Climate Change ambassador in Kenya he has composed songs that have a climate, he seeks to create awareness on climate change, mobilize support, seek forums to meet and interact with government officials and other world leaders to discuss positive and progressive ways for youth of Africa to engage with climate change. He seeks to reach to the Kenyan youth through music one of his songs *"Rauka ama hatuta survie*" loosely translated "Be cautious or we will not survive" seeks to sensitize Kenyans on land degradation, deforestation and efficient and sustainable use of resources for the sake of future generation

4. Enabling environment

(i) Policy environment

Policy environment has a major role in the adaptation of youth to climate change in the agri-food sector. Required policies to foster investment and protect the development of the informal sector and entrepreneurship will go a long way to help young investors venture in the agricultural sector. Kenya's overall development agenda is outlined in the Vision 2030 policy document. Which aims at making Kenya, "a globally competitive and prosperous country with a high quality of life by 2030" This will be achieved by transforming Kenya into "a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment (GoK, 2007)

The thrust of the ongoing Agricultural policy reforms will focus on Institutional Reforms in Agriculture; The main priority will be (1) the enactment of the Consolidated Agricultural Reform Bill to provide the necessary legal framework for the desired change in the legal framework governing agriculture. (2) Increased Agricultural Productivity (3) Transforming Agricultural Land Use (4) Agricultural Marketing and (5) ASAL development.

The government has increasingly encouraged the participation and partnership of the private sector and other stakeholders. Private public partnerships are evidenced in the *agrivijana*

loan where the Kenya youth fund in partnership with Amiran Kenya seeks to offer support to young entrepreneurs. With this kind of partnership chances of sustainability are higher. Other sectors specific policies in the country are now incorporating the aspect of the youth in them e.g. the Horticulture policy among others.

The Kenyan government has also engaged as a signatory to regional and global agreements that are beneficial to Kenyan youth if well exploited. This includes the Conference of the Parties (COP) which is the supreme body of the United Nations Framework Convention on Climate Change. At COP 15 for the first time, youth were officially recognized as a formal constituency (albeit on probationary terms), legitimizing their status as stakeholders. Over a thousand young environmental activists from approximately 100 countries attended COP 15 (UNFCCC Youth Constituency, 2009a), participating not only in formal interventions but also in activities such as workshops, media events, and silent demonstrations

In particular, young people can support and contribute to efforts aimed at ensuring that new mechanisms and financial facilities are put in place for transferring and providing access to modern and more efficient technologies. Youth can also play a role in implementation and monitoring of specific initiatives within this framework and other policy arrangements in the country.

The main Challenges in Policy and Regulatory Framework in agricultural development include: (1) Current policy environment not fully supportive of private sector led agricultural development. (2) Current laws and regulations in the sector not properly aligned for investment in a liberalized economic environment. (3) Most of the state corporations undertake conflicting roles of regulation and competition with budding private sector players; furthermore they are inefficient and rely heavily on government subsidy. Addressing these challenges will highly improve the enabling environment and increase youth participation in the agri-food sector in Kenya.

(ii) Infrastructure

Enabling infrastructure (public utilities, public works, transportation, and research facilities) is essential for agricultural development. Infrastructure is defined here as facilities, structures, associated equipment, services, and institutional arrangements that facilitate the flow of agricultural goods, services, and ideas. Adequate infrastructure is needed to enhance agricultural productivity and to harness the power of science and innovation to meet sustainable development objectives.

The government is investing in the laying out of ICT infrastructure with every constituency scheduled to have a digital village. Other initiatives include the *Tandaa* Local Digital Content Grant which is a grant to support ICT in Kenya. It is seed funding for companies entering new media and ICT. In particular, the grant seeks to support products and services developed for the Internet and mobile phone. Young people in Kenya have the opportunity to use this to their benefit by developing innovative ideas in ICT useful in the agri-food sector. Physical infrastructure such as roads, post-harvest processing capacities, cooling facilities, rural markets also need to be enhanced to increase production and agricultural transactions and profitability.

Funding is important the government and other donor agencies have been largely involved in the agri-food sector. The ministry of Agriculture and the Kenya Agricultural Research Institute are involved in funding and training of various youth groups in the agri-food sector. Funding has also been available from the international organizations like IDRC, Ford Foundation, and USAID among others. There is however need to have objective and coordinated funding to avoid multiplicity and achieve greater impact in the agri-food sector in Kenya. The private sector is also exploring options of funding the agri-sector though it has been shy in the past due to the high risks involved in this sector. Options in index- based insurance are being explored and possible involvement of the private sector.

Conclusions and recommendations

Innovation is paramount in agricultural transformation and to better adapt to climate change and variability. There are many initiatives by individuals that have been successful however may lack financial capacity to be done at a sustainable scale. Some of these initiatives have been funded by donor agencies but some are still underutilized, there is need for the government to support those initiatives and facilitate rolling out of the successful ideas to all parts of the country to enhance impact and sustainability in the agri-food sector.

To achieve impact young people must change their perception of the agricultural sector. There is need to view agriculture as a business not simply as subsistence enterprise, Skill and proper training is needed to achieve this transformation. Further timely information exchange is paramount to reap maximum benefits this can be facilitated by timely communication via internet, mobile phones and mass media.

With enabling policies and good infrastructure that facilitate funding and access to markets, Private public sector partnerships like the *agri-vijana* loan are innovative initiatives that contribute largely to the future of agriculture. Implementation, up-scaling and efficiency

should be key pillars to achieve success. There is need for periodic participatory monitoring and evaluation and action to improve on the lessons learned and upgrade to higher levels. Private sector to engage in high investment areas, and lower the transaction costs

With an agriculture sector that is efficient and that is well adapted to climate change, the youth and the country stands to reap major benefits including increased employment, increased incomes enhancing poverty reduction and increasing GDP, Increased foreign exchange, growth of the manufacturing and services sector, food security and in-turn national security.

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