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"Agrotechnology and Food Security"- A Virtous Road towards Sustainable Development in Kenya

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Abstract

Food security is a vital element that eradicates poverty, by ensuring that all people at all times have access to sufficient and safe food for sustainable development. Based on Vision 2030 pillars, the economic development of our country may not be realized if there is hunger, famine or starvation among communities, and even vicious cycle of poverty in existence. Organizations for instance: World Health Organization, Food and Agriculture Organization, in collaboration with the Kenyan government are working hand in hand to see to it that there is food security in the country, at large. They have spearheaded various projects across the country that not only act as job creation avenues for the youths, but also helps in the means and ways of feeding Kenyans. The government, through the strategy of revitalizing agriculture and millennium development goals, has undertaken a policy and legal framework to create conducive environment for enhanced agricultural production, and encourage investment in the agriculture sector: Crop and crop-animal farming.

Enhancing knowledge and utilization of skills to farmers, through training and knowledge sharing will make them appreciate farming as a business. Modern agricultural systems should also be embraced by transforming agriculture from low-income, low-efficiency and low technological sector into vibrant modern methods that support value-addition through scientific and technological innovations. These will in turn, enhance food security and maintain sustainable development, and aid in achievement of Millennium Development Goals.

This paper analyzed the current scenario, in terms of accessibility and sustainability of food security in Kenya. Furthermore, the paper proposed some strategies to be adopted in the roadmap towards sustainable development and realization of vision 2030 in Kenya.

Keywords: Food security; Vision 2030; Sustainable development; Millennium development goal

Introduction

Food security is a scenario where all people access sufficient, safe, affordable, nutritious, qualitative and quantitative food at all times, for an active and healthy life. Rapid changes in the global economy in consumption patterns and in population and demographics are having a negative impact on the environment, and affects food security. Continuous population growth in developing countries is adversely affecting the environment, leading to changes in weather patterns that are correlated to availability of enough and sustainable food production for all in a Nation. Food security is a complex sustainable development issue linked to physical and economic health of any Nation, ecological and environmental robust of a Country, small (kadogoo economy) and large scale trade, improved affordable education and technical vocation for all, as well as equality and equity in resource distribution; good and participatory governance.

The following diagram (a) illustrates the interrelationship of food security and sustainable development in a Nation. (Figure 1)

Food security is built on three pillars namely:

Food availability: Sufficient quantities of food available on consistent basis.

Food access: To have sufficient resources to obtain appropriate foods for nutritious diet.

Food Use: Appropriate use based on knowledge of basic nutrition and care, as well as adequate. Sustainable development is built on four pillars namely: Social, Economic, Environment and Culture.

Though very crucial, environmental and economic pillars are building blocks for sustainable development, a pivotal pillar of cultural founding is as necessary for human beings, as biodiversity and nature. The Universal Declaration on Cultural Diversity [1] adopted cultural as a key pillar.

Cultural attributes dictate the ethical orientation, moral, spiritual, intellectual, emotional, values and norms of any society. The Earth Charter embraces cultural attributes while developing educational instrument, and a policy tool for implementation of education strategies towards realization of sustainable development.

To realize these interdependent pillars then, information dissemination, imparting knowledge, integration and participation of the masses in development projects is of importance. This can only be achieved when the nation is healthy and secure, in terms of food availability, affordability, appropriateness, consistency, nutritious and sustainability [2].

Most developing countries are struggling to eradicate the vicious

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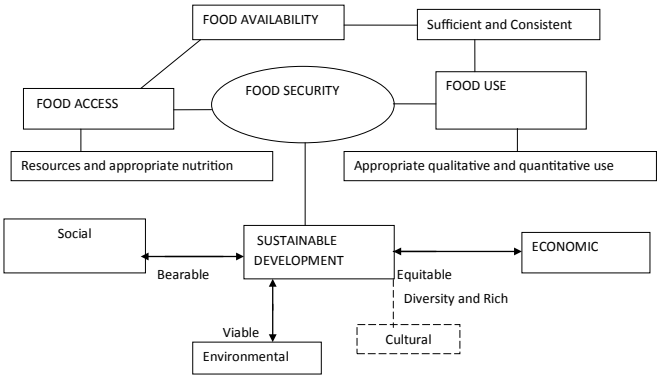

Figure 1: Interrelationship of food security and sustainable development for a healthy nation

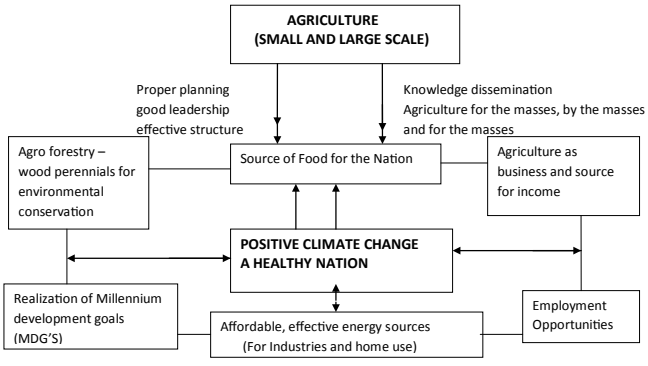

Figure 2: Agriculture for a healthy nation and sustainable development

cycle of poverty; a vice dominating a larger population of the population. Kenya is not an exception.

A healthy nation would simply imply energized society; if well motivated and facilitated, would work hard to realize food security within their community or villages. Small scale farming plays a key role for domestic use, while large scale farming aids trade and economic development.

Famine and drought have been vicious in Kenya and most developing countries over time, low mortality rates and high number of deaths are registered yearly due to food insecurity among communities. Unpredictable rain patterns have resulted into floods over times, leading to mass human eviction, destruction of crop and animals; hence, adverse food insecurity.

Water and Sanitation as Ingredient for Sustainable Development

In the economic pillar of vision 2030, Kenya's economy depends majorly on agriculture and hence, it has to improve on proceeds from agriculture in order to achieve its goals. Kenya's income will rise in agriculture, livestock and fisheries by processing and adding value to its products, before delivery to the market through innovation, commercially oriented and modern methods used. This will lead to better yields in key crops, increased smallholder specialization (2-3 crops per plot), utilization of idle land and cultivation of newly opened lands.

Agriculture remains the backbone for food security in Kenya. Improved agricultural practices and availability of resources, as well as turning small scale farming into business by proving market avenues for the crops and animals product, will enhance food security. The resultant attribute would be sustainable development. Embracing Information, Communication and Technology (ICT), would boost agribusiness; enhance agro forestry and boost agribusiness. The effects of advancement in agriculture would in turn have a positive impact on climate change and improve the health of the nation (Figure 2).

Agriculture as a Source of Food

Agriculture (also called farming or husbandry) is the cultivation of animals, plants, fungi and other products, used to sustain life. The development of agriculture has been driven aided by different climates, cultures and technologies. Modern agronomy, plant breeding pesticides and fertilizers and technological improvements have sharply increased yields from cultivation, but at the same time have caused widespread ecological damage and negative human health effects. In 2007, one third of the world's workers were employed in agriculture sector. [3] In Kenya, the masses rely on agriculture for food consumption.

Agriculture is a source of food and income for the world's poor and a primary engine for economic growth, offers untapped potential for mitigating climate change and protecting biodiversity, and lifting millions of people out of poverty.

Agriculture as a Business

Agribusiness is a generic term for various businesses involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution/processing marketing and retail sales of agricultural inputs.

Kenya's economy is very independent on agriculture, which employs more than 75% of the available workforce in both informal and formal sectors. Agriculture contributes more than 30% to the economy and brings in more than 6% of total foreign exchange earnings. Kenya's horticultural sector is one of the economies fastest growing industries, which has been reflected with yearly expansion and increased exports of fruits, vegetables and flowers [4].

Tea is Kenya's important cash crop and is produced more than any other country in the world, after India and China.

Major challenge is: increasing poverty due to unemployment, which makes individual and nation's income remain low. This affects mostly smallholders who currently supply more than 60% of export production. This is most vulnerable group due to limited access to [5] improved seeds, technical production, which impact consumer prices.

ICT and Agribusiness

Two third of Kenyan population make a living out of farming, as agriculture sector continue to dominate Kenya's economy. E-farming, also referred to as M-farm, is an ICT initiative by Kenya Agribusiness Company, where local farmers received crop prices and market information through an SMS [6] on their mobile phones. Further still, it provides a digital market place in which subscribing farmers can sell their crops easily.

M-farm is where a local exporter enters into contract with M-farm and buys produce directly, using their mobile devices. This is not only reliable to farmers, but there is reduced transaction costs which makes the farmer remain with more profits. Since it was initiated in 2010,

2000 farmers in Kenya have so far been benefited. M-farm provides market place for farmers for just an SMS away, and many investors are supporting it hence, it is expanding rapidly.

Agro-Forestry-Wood Perennials (Integration of Crops and/or animals)

This is the growing of trees and agriculture/horticultural crops, on the same piece of land. This is for people to benefit from two things at the same time; food and forests since they provide trees and other crop products and at the same time protect, conserve diversity and sustain vital economic, environmental, human and natural resources. It differs from traditional forests and agriculture, since it focuses on the interaction among components rather than just on the individual components, themselves. Research in the past twenty years shows that agro forestry is more biologically productive, more profitable and more sustainable than forestry or agriculture monocultures.

The following are some agro forestry practices that could be embraced by farmers in Kenya.

Silva pasture: Wood/field crop, intercropping or alley cropping-mixing trees and arable or horticultural crops. 8.2) Forest farming: Cultivating high value products within forested areas. This could also be termed as "The Shamba system".

Forest gardening : Initiating complex forest ecosystems to produce many products, wind breaks/riparian buffer strips/contour planting for soil erosion control and fertility plantings, hence, reduce water loss/soil material, organic matter and nutrients.

Aquaculture: According to UNFAO, 540 million people worldwide rely on fisheries and aquaculture.

Participants emphasized the contribution of fisheries to the three pillars of sustainable development [7]. The pillars are the fisheries current ability and future potential to support vulnerable communities, provide food and nutrition security and reduce poverty, which is a resource as well as an opportunity. Most small island developing states and coastal developing nations depend on fisheries as a source of food, employment and national income.

Effective fisheries management and governance to ensure that future fish stock is maximum and negative environmental impacts at a minimum, has been a concern to the participants.

Climate Change and Agriculture

Climate change can either improve or endanger the conservation of natural ecosystems, and the sustainability of socioeconomic systems. It has affected many areas including biodiversity and ecosystems, fresh water resources, human health, human settlement and mitigation patterns, the conservation of natural & cultural heritage properties, peace and prosperity. Climate change initiative has been launched by the Director General of UNESCO to reinforce scientific mitigation and adaptive capacities of countries and communities that are most vulnerable to effects of climate change. The Climate change Education for sustainable development program by UNESCO provides a policy and planning advice to the Ministry of Education. It also develops and encourages innovative educational approaches, to help particularly the youths understand, address, mitigate and adapt to the impacts of climate change.

To encourage changes in attitudes and behavior of the masses, there is a need to put the world on a choice towards sustainable development path, and to build a new generation climate change i.e. aware the citizens.

Agriculture for a Healthy Nation

Health and food security are necessary to human life. This is to feel physically good, able to act and react according to some resemblance of a reasonable self image, and remaining fit in a passable manner. Good health is the ability to withstand the effects of exposure to illness and injury, and hence, the connection between nutritious food and health status is fundamental. Nutrition is paramount to health and survival, yet individuals and families struggle to maintain a healthy diet, especially those with low incomes.

Children who live in food-insecure households experience impairment in their status, making them less resistant to illness and becoming hospitalized at frequent times.

Physicians, nurses, dieticians and other health care workers can also help address food insecurity issues, by educating patients on how to choose nutrient dense foods in a cost-effective way.

For poor families, people are anxious about running out of food and at the next stage, they compromise on quality of food by eating what they can afford.

As resources get scarce, they sometimes go without a meal and this makes them negative psychologically, socially and physically, which is hazardous to their health.

Conclusion

New technological development and utilization of ICT in the agriculture sector will enhance and facilitate the processes of achieving sustainable, affordable and consistent food security, among the masses in Kenya. The "Shamba system" could be well planned and implemented, to promote environmental conservation by planting trees and food availability among citizens. In Kenya, readily adopted with certain measures of control, agribusiness and technology through affordable education would in term improve Kenyans life, with several inter-related concepts that include: interdependence, citizenship and stewardship, needs and rights of future generations, diversity improved quality of life, sustainable change-uncertainty and precaution, affordable environmental friendly energy sources, understanding human impact on environment, embracing ecological principles and empowering citizens for local knowledge. Thus new technology in agriculture, agro forestry, agribusiness and affordable agriculture is a timely virtue, to embrace in realization of millennium development goals (MDG's), achieve vision 2030 and thus, realize and maintain sustainable development.

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