

Food Security and Technology Development in Africa

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Abstract—The numerous positive changes that will evolve in the area of food security in Nigeria, Africa and the world at large when there is a proper synergy between Technology development and Human Empowerment are properly highlighted in this article. Technology Entrepreneurial development with regards to Food security is a vast and new field of study with quite a large number of untapped resources yet to be identified. This article defines and describes the application of this field and also shows how its application can lead to improvement in Food Security.

Keywords—Food Security, Technology, Entrepreneurship, Human Development

I. INTRODUCTION

When you think of Food Security, a few other terms quickly come to mind. These are terms that are closely related to the word in focus. Agriculture is one of such terms as well as Human, Technological and Entrepreneurial Developments. We will critically but briefly look at these concepts in order to heighten our understanding of these concepts.

Agriculture is known to have become one of the major sources of funds as well as employment for a very large number of the African populace. Quite an appreciable number of this teeming population is sustained by Agricultural products while a few others go into it for commercialization. The larger part of agricultural practices in African continent is majorly local and depends solely on the rainy season for planting. This method is easily exposed to unpredictable Climate induced hardship in form of extreme dry season, lack of rain in its season and other extreme weather events that may likely occur.

This particular situation is more common in the dry parts of the African continent. This area in question is inhabited by not less than 250 million people. Agriculture in the African continent in this present age is being faced with quite a significant number of challenges which includes partly on the need for improvement in the quantity of food produced and how to effectively distribute same while trying so hard to adapt to changing climatic conditions and ensuring a lasting sustainable environment. In a bid to tackle these Agricultural challenges in Africa, there is need to mechanize, innovate and take advantage of existing technological advancements in this field.

A. FOOD SECURITY

Food security is generally defined as the ability to have access to quality and healthy food. In clearer details, it has been defined by the World Food Summit of 1996 as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”. The Food Security Network (FSN) also has it that Food Security occurs when all people at all times have physical and economic access to adequate amounts of nutritious, safe and culturally appropriate foods, which are produced in an environmentally sustainable and socially just manner, and that people are able to make informed decisions about their food choices.

B. TECHNOLOGY ENTREPRENEURSHIP

This terminology was derived from a combining two words from two varying academic fields; Technology was gotten from the field of innovation while the term Entrepreneurship was gotten from the field of business. This term as defined by Prof Tony Baillet (2012) is an investment in a project that assembles and deploys specialized individuals and heterogeneous assets that are intricately related to advances in scientific and technological knowledge for the purpose of creating and capturing value for a firm. It is an integration of technological and entrepreneurial realms.

C. HUMAN DEVELOPMENT AND EMPOWERMENT

This is ultimately defined as an individual condition of gaining the power to control and modulate changes in one's own life, if not in a complete sense, at least, in a significant and focal manner in areas that are considered important to one's identity and adjustment in life. This is majorly concerned with the development and empowerment of oneself with regards to the group which the individual belongs to in the society. Human development as well as his/her empowerment comes through providing opportunity structures for people to achieve, through education, entrepreneurship and employment gain access to greater social control over resources, along with increased responsibility in the utilization of those resources [1].

II. RESOURCES USED

This article made extensive use of secondary data emanating from the Internet, journals and such other related literatures on food security, Technology Entrepreneurship and Human Empowerment. Having acquired an in-depth understanding of the various terms that were used in this paper

in the previous section, we will at this point review different literatures consulted and similar work already done in this area.

According to the World Health Organization report in 2015 on food security, several health challenges in most countries are dietary excess related and therefore, constitute an ever increasing threat to such countries' population. Malnutrition, water and food borne diseases have become huge unbearable burden to several African countries as well as other developing countries. In order for a country to have food security, certain factors must be duly considered. These include;

- Food availability: The quantity of the food available for consumption on a consistent basis must be sufficient enough.
- Food access: This factor has to do with having sufficient resources so as to enable a country or individuals acquire sufficient appropriate foods for a healthy meal.
- Food use: This considers the usage of food based on the understanding of basic nutrition and care, as well as adequate water and sanitation.

Presently, Agriculture is amongst the largest employment sector in Africa and also in most developing countries. Agricultural agreements between countries help the food security level of any country. Quite a number of criticisms have been made in this regard arguing that trade liberalization may possibly reduce or hinder a country's food security by subsequently reducing the level of agricultural employments. Concern about this has led a group of World Trade Organization (WTO) member states to recommend that current negotiations on agricultural agreements allow developing countries to re-evaluate and raise tariffs on key products to protect national food security and employment. They argue that WTO agreements, by pushing for the liberalization of crucial markets, are threatening the food security of whole communities.

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This proposed definition of technology entrepreneurship is based on some elements:

1. Ultimate outcomes. Value creation and capture are identified as two outcomes of technology entrepreneurship because the sources that create value and the sources that capture value may not be the same over the long run.
2. Target of the ultimate outcomes. The firm is identified as the target organization for which value is created and captured.
3. Mechanism used to deliver the ultimate outcomes. Investment in a project is the mechanism mobilized to create and capture value. A project is a stock of resources (i.e. specialized individuals and heterogeneous assets) committed to deliver the two ultimate outcome types for a period of time.

According to Hugh M. Lewis in [2], it is majorly a case of offering individuals the means to empower themselves, or to realize a form of self-empowerment that is largely independent of any external structures that are coercive or obligatory in some manner that enforces conformity. This is as true on an individual level, as it is true on a collective or even a global level of articulation. It makes sense therefore than any program promoting human empowerment that is consonant with larger meta-systemic frameworks, will work positively toward the promotion of human and systems development in the larger meaning of the term, and that human empowerment therefore is one of the principle objectives of any proposed human development program.

Technological development in Agriculture tends to discuss the various approaches adopted by individuals or a group of individuals in order to improve the yield or result of Africa's and global Food Security. This could be in form of Machineries or GMO (Genetically Modified Organisms)

III. DISCUSSION

In this section, considerations will be on the different approaches that can be employed in order to achieve Food Security with major interest on Technology entrepreneurship and Human Empowerment.

In the first place, a closer look will be on revisiting the keywords; Food Security, Technology Entrepreneurship and Human Entrepreneurship. The Food Security Network (FSN) defined Food Security as a situation whereby those that are responsible for the production of these consumables are capable of also living decently while carrying out the various processes associated with the production, distribution and subsequent consumption of food. Most importantly, food security is also responsible for the availability of healthy and nutritious food for the teeming (African) populace. Accessibility to food as well as the availability of food is said to be at par with the provision of such, therefore, the topic under discuss (food security and technology development in Africa) is solely a product of a healthy and a sustainable system of supplying food.

According to [2], there are about five factors that make up the food system. These factors are; acquisition, production, processing, distribution, marketing, and consumption of food. When technology (innovation) entrepreneurship (business) and human empowerment synergizes with the above processes of food system components, the challenge of food security will almost if not be a completely forgotten issue. It is worthy of note, the fact that every healthy as well as sustainable food system must have its full attention the following factors enumerated below;

- *Healthy Environment*: This aims at ensuring that the process of producing and/ or acquiring food for human consumption does not hamper or compromise any part of the environment such as the trees and lands or bring about the pollution of the air or water. This problem should be completely avoided both presently and in the near future.

- *Vitality in the Economy:* This particular factor ensures that whereby those that are responsible for the production of these consumables are capable of also living decently while carrying out the various processes associated with the production, distribution and subsequent consumption of food. This ensures the continuity of the food production process.
- *Health and Social Equity:* This factor makes community development and good health disposition of the members of the community of utmost importance. It also ensures that foods that are healthy are available both physically and economically to the members of the community. These foods should as well be accessible.

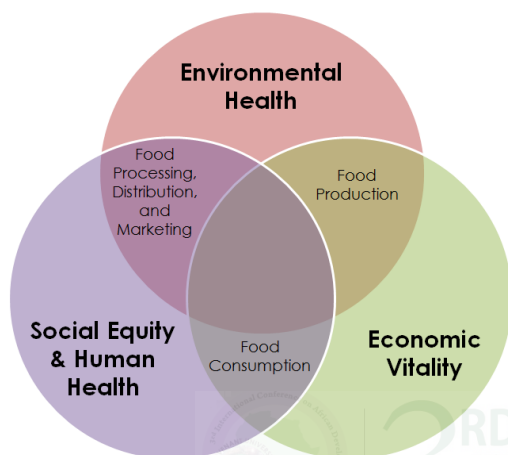


Fig. 1: Food System Diagram

The level of food in any given environment can be measured according to household and individual level consumption. Regularly-used indicators include;

- The number of meals per day,
- Diversity of diet (the number of different food items per day), and
- The frequency of consumption of the most common foods.

A. Technological Development and Food Sustainability

It is pertinent; the need for technological development in agriculture in order to achieve sustainable and positive strides on the agenda of governments and international bodies as regards Food Security. At the center of the European Union (EU) 2020 strategy is innovation and diverse levels of technological improvements in order to yield better agro products. New technologies and their adoption by farmers are key drivers in maintaining agriculturally competitive atmosphere in a global world. While the potential of technological development for sustainability of agriculture is acknowledged, it is equally worthy of note, the fact that there is a global trend towards increased regulation of new technologies in agriculture, particularly bio-technologies that result in genetically modified organisms (GMOs), be it for concerns about their safety or ethical and societal concerns.

Applying new and innovative ideas as well as advanced technologies and machineries in Agriculture is occurring at a very fast pace. However, with the various level of advancement in the world, particularly in the area of innovative breeding (new plant breeding techniques) and also other new technologies such as nanotechnologies and improved machineries. Some machineries are shown below;



Fig. 2: Agricultural Machines for Improving Production

With necessary actions in the area of capacity building as well as developing the required (human and capital) resources, some other factors like human empowerment, infrastructural development, determination and ultimately, self-motivation can help in cultivating and developing an achievement oriented mindset in food production processes.. This will as well lead to improved quantity and quality of food produced. Certain environmentally induced situations can either make or mar a person's worth and achieved goals. On the other hand, the absence of the factors mentioned earlier, there is no level of innovation or resource development or any other external facility will produce the required result. For instance, younger minds when given the necessary required support and guidance alongside an enabling environment will mostly try very hard in order to produce the expected innovative results. The major reason behind this is not that of independence, it is rather due to their dependence on certain models, goals, response patterns and motivations of their significant care-takers as well as their immediate environment. Recent giant strides recorded so far in this field with the sole aim of improving product yields and to provide better working conditions were results of inquisitive minds aiming at solving disturbing global challenges.

Another important technological development factor with respect to food security is the modification of seedlings for improved yield. Certain breeds of some crops, tubers and

plants have been recently genetically modified in order to produce better results than the original one.



Fig. 3: Genetically Modified and Unmodified Foods

B. The Role of Technology Entrepreneurship for Improving Food Security

It is increasingly being recognized by development organizations, the masses and government agencies that entrepreneurial skills are necessary in order to achieve an acceptable and appropriate level of food security in Africa and the world at large. Technology Entrepreneurship can be understood as a key mechanism for improving the level of productivity of agricultural products and to also develop the market at both the domestic and international levels. According to Eenhoorn (2007), "it has now been established that in the short run, sustainable food security for the poor can be best enhanced by, in the first instance, concentrating on the subsistence smallholder because they form the majority of the rural poor and their development is the fastest route to food security for the rural masses".

A report published in 2008 by the World Development Report team completely recognizes the fact that African smallholder (agricultural) development (which is Human Empowerment) is the quickest and most efficient way out of poverty." The result of this will be improved employment opportunities for the teeming African youths, Research opportunities for Researchers and other accompanying benefits that this will bring as well as the ultimately desired food security.

IV. CONCLUSION AND RECOMMENDATIONS

In conclusion, I strongly agree that Technological, Human and Entrepreneurship Developments are key factors towards attaining Food Security in Africa. These afore mentioned factors are necessary tools required driving the nation's economy and improving job creation. It also helps in reducing the high rate of rural-urban migration in such affected countries hence, tackling the challenge of overpopulation and subsequent pollution in urban areas. From the discussions in the previous section, it is also obvious that the role of Human Empowerment in enhancing Food security cannot be over emphasized.

Having made the above conclusion, I hereby recommend that agriculturally minded individuals and organizations to work with the government to ensure the aim of Food security is achieved.

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