

Farming, Food Safety and Agricultural Sustainability in Africa: Stakes and Prospects

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Abstract: Farming, food safety, and sustainable agriculture are trivial aspects in Africa that play significant roles to guarantee food security, public health, and environmental preservation. This paper aims at uncovering the challenges, limitations, and opportunities connected to farming, food safety, and sustainability in Africa. It highlights the interconnectedness of these issues and portrays the necessity for holistic approaches to be adopted as effective remedial solutions. I reveal that, farming in Africa ranges from small scale subsistence farming to larger commercial activities. Though agriculture is a vital source of income and employment for many Africans, significant setbacks like climatic mutations, soil degradation, limited access to natural and human resources, foodborne diseases, contamination, poor hygiene, limited storage facilities, lack of infrastructure, technology, etc., hinder development, productivity, and sustainability in most regions. I conclude by stating that, food safety concerns require multifaceted approaches and collective efforts from farmers, governments, consumers and other stakeholders charged with monitoring, strengthening, regulating, enhancing, and improving food handling practices. Environmental conservation can be ensured through sustainable agricultural practices such as, agroforestry, organic farming, conservation agriculture, and agro ecological principles expected to enhance productivity, biodiversity, improve soil health, limit the use of chemicals, and conserve water.

Keywords: Africa, African Women, Farming, Food Safety, Productivity, Subsistence Agriculture, Sustainability.

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Introduction

Farming is the bedrock of every economy and a catalyst for economic and rural progress in sub-Saharan Africa and beyond. The significance is evident from the role that African farmers play in the production of fresh, qualitative and quantitative products, which serve as guarantors of food safety and standards of living. However, meeting up with the high demand for farm products and dependence on farming, result to setbacks involving an increase in the use of chemicals such as fertilizers in farm lands, producing health risks after the consumption of food and feed produced. Therefore, farming activities in Africa should strictly take into account various food safety requirements, with more emphasis on food fit and safe for human consumption, duration of contaminated food, world market requirements, easy access to markets, to enhance sustainable farming. Also, higher productivity through farming is determined by the soil quality of African farms, accompanied by weather and climate, crop choices, proper farm preparation, strategies for nutrient management, accessibility to water and more.

It is worth stating that, farming activities in Africa are predominantly spearheaded by women for varied reasons. First, African women are more than men numerically. Second, farming is a major household income generating activity for family sustenance through the selling of vegetables (cabbages, leeks, tomatoes, onions, etc.) and through the rearing of pigs, fowls, goats, among others. Given that the cost of farming products in local markets is relatively cheaper compared to those of international standards, it is recommended that African farmers should implement food safety measures in their farming activities in order to have access to markets (Vrugt, 2016) and to equally facilitate their participation in the world food markets (Malan, 2018). Farming in Africa as a whole impacts the current stagnant economy positively, by reducing the rate of poverty, unemployment, hunger, builds subsistence farming systems, ensures the production of healthy food and fortifies commercial farmers. Consequently, sustainable farming defined as, “an incorporated food production system having long-term benefits” (Gold, 1999) and following the coinage of sustainable farming as “a system that can indefinitely sustain itself without degrading the

land, the environment or the people”, render farming in Africa beneficial.

Crop Choices and Farming Activities Influencing Higher Productivity in Africa

Crop choices greatly facilitate output and productivity as well as timing various farming practices. Determining the type of seeds and crops to be grown are vital criteria in farming. A typical example is the case of some crops having a relatively shorter growth duration which permits their growth in areas characterized by short rainy seasons. So, wherever scarcity of land exists, only special crops endowed with high crop densities should be permitted as supported by Winch (2006). Nonetheless, the act of choosing particular seeds from numerous existing varieties is equally determined by limited seed availability in sub-Saharan Africa, therefore, high quality seeds are rarely grown broadly (FAO, 1998). That notwithstanding, from available crops, farmers can implement the cultivation of many crops simultaneously, given that, intercropping or mixed cropping is predominant in African farming systems. Mixed cropping is valuable because, other crops’ mainly depend on the presence of other crops grown alongside others. In other words, some crop varieties are useful for shading others, some are reliable sources of nutrients to others, while some particular crops are valuable in diverting harmful insects (U.S. Congress, 1988; Winch, 2006).

Crop rotation suddenly transforms to mixed cropping system as time unfolds, thereby serving as a panacea for the prevention of soil degradation through erosion as well as nutrient depletion (Chiras, 2009). The crop rotational system of African farming also serves in eradicating pests, weeds and various diseases affecting plans. Aside the practice of planting varieties of seeds, other farming activities responsible for higher yield involve; farm preparation, the use of fertilizers, pests and weeds controllers, thinning, water management, and harvesting. For example, an authentic justification of this statement is grounded by Shemdoh *et al.* (2009) when they state that, based on a statistical analysis on the impact of traditional tillage (the act of manipulating the soil so as to set the seedbed ready for sowing, fertilization, and reduction of weeds), the data collected from farm field trial in over two farming seasons in Central Tanzania, indicate higher productivity thanks to the use of manure (cover placed around the plants and on the soil to control weeds and mulching, which boosts soil fertility and limits water loss).

The introduction of nutrient management is essential in attaining higher yields from farming activities, since they constitute an integral part of the soil. Fertilizer application enhances plant growth, notably in cases where the nutrient level seems insufficient. Here, the most applied type of fertilizers are “mineral fertilizers”, also referred to as “chemical fertilizers”, which serve as a direct inculcation of nutrients by plants. Other commonly used fertilizers in this context are “organic fertilizers”, consisting of organic manure or compost, efficient in improving on soil quality and nature whose nutrient assimilation relies on the duration of decomposition by organic matters (Morris *et al.*, 2007). Consequently, soil and plant fertilization are necessary to realize productivity, efficient tool in prevention soil nutrient degradation. Again, it is remarkable as it guarantees and preserves good soil quality which affects future soil quality and productivity significantly.

Constraints of Farming Activities in Africa

It is worth pointing out that, the excessive use of fertilizers in farming produces harmful effects on both plants and humans. African agricultural yields are usually lower than those of other parts of the world, due to relatively lower use of fertilizers in the entire continent. The low use of fertilizers is partly justified by the following hypotheses: First, due to very limited supply of fertilizers in African markets. Second, the financial incapability of most African farmers to afford and in great quantity. Third, According to Morris *et al.* (2007), “the cost price of fertilizers is usually higher than the price of crops to be sold”. Similarly, there is very limited assimilation of organic manure being useful in supplying the necessary required nutrients from good soil quality and higher yields. Another burden is the existence of insufficient labor and lack of competition in the domain of land occupation for both farming and cattle rearing activities as confirmed by the International Institute for Tropical Agriculture (I.I.T.A., 1992). Following the above, Alemu *et al.* (2003) concur that, “output is supposed to be diametrically linked to crop price changes”, since in Africa, most research related to farming focus principally on export and cash crop. However, the application of fertilizers is mostly suitable in moist soils than on rain fed crops in very dry areas. According to the F.A.O (2004), the assimilation of fertilizer in sub-Saharan Africa may not increase drastically even in the next twenty years.

Living organisms like pests, diseases, weeds, are responsible for producing harmful effects on plants. For example, Winch (2006) estimates that, weeds are accountable for approximately 16 percent of total crop productivity losses in African farming. In most cases, weeds extract water from crops, deprive crops of access to sun, and assimilation of required nutrients for growth (Peterson & Higley; 2001). To add, some varieties of weeds produce very toxic substances that perturb the growth of other plants. However, some crops are more vulnerable to pests and diseases than others. For instance, cassava is an example of a crop that is not easily destroyed by pests, while maize is more vulnerable and can be easily destroyed by more than two hundred different species of insects (Yamoah *et al.*, Malone *et al.*). Millet and sorghum are examples of crops that are seriously damaged by birds. Diseases affecting plants do vary as determined by the crop type. Many crop diseases affect maize yields and are accountable for about ten percent of productivity losses in the world. To a similar extent, diseases affecting cassava yields derive from viruses. Diseases that are peculiarly destructive in hot and humid areas, equally affect sorghum.

Prioritization of Soil Quality in African Farming Systems

Based on an agricultural connotation, soil quality is determined by soil productivity (Carter *et al.*, 1997). That is, the ability for a particular soil quality to ease crop growth as provided by a specific soil type and content. Nutrient insufficiency and soil toxicity adversely affect soil types such as sand, silt, clay, and other organic substances. The adoption of a particular soil type for crop growth varies depending on the crop. An example is that, maize and cassava easily grow in numerous soil types, whereas, millet grows better in sand, sorghum thrives in heavy soils (IITA, 1992; Winch, 2006). Though the soil is naturally endowed with a wide range of nutrients-nitrogen, phosphorous, potassium, etc., necessary for plant growth, each crop requires a specific nutrient.

This justifies why good and high maize productivity is determined by fertile soil. Cassava, on the other hand, grows well in less fertile land. Millet grows in infertile soils as well as in soils unsuitable for sorghum. Hence, smooth plant growth is hampered by the inadequacy of nutrients to provide enough and necessary crop growth conditions. Soil acidity which is caused by leaching or eluviation (when water penetrates the soil extracting soil substances from its surface), causes soil toxicity. Crops like cassava and maize intermediately adapt to, and endure soil acidity. Fairly acidic soil, on the other hand, provides smooth conditions for millet growth. Again, the degree of soil salinity (salt concentration in the soil as determined by wind, temperature, and rainfall), varies in crop production. Here, salinity is suitable for sorghum growth, moderate salinity good for maize and millet, while salinity disfavors cassava growth.

Furthermore, water is another prerequisite for crop growth and yield. Irrigation is required to meet up crops water quantity, to realize higher productivity in case of insufficient or absence of rainfall. Too, a decrease in production variability is dictated by the degree of irrigation practices as Cleaver (1993) admits that, "Productivity in Sub-Saharan Africa witnesses a 3.5 times increase on irrigated land than on rain fed land", adding that, accessing many irrigation technologies by smallholders is easy and possible in Sub-Saharan Africa. From this perspective, it is worth underscoring that, apart from the most common traditional irrigation technologies in Africa involving ground water irrigation, more efficient technologies have evolved, though, mainly used by rich farmers and the cash crop producers (Kay, 2001). To FAO (1995), it is estimated that about 30% of irrigated land is attributed to rice production in Africa, 34% to other types of cereals, 8% to vegetables, 15% to fodder, 8% to industrial crops, and 5% to arboriculture. These statistics depend on the specific geographical areas. For example, in sahelian regions, about 18% of irrigated land is attributed to other cereals and Eastern Africa grows vegetables on 35% of irrigated land. Nevertheless, due to the complex nature of irrigation systems and data collection in Africa in general, the exact possible attribution of irrigated land and crops in every region or country is undetermined. This partly explains why data from Kay (2001); FAO (1986b); Gleick (2000) show that, only 2% or a minimum piece of land in sub-Saharan Africa was allocated irrigation in 1982. Moreover, most Africans experience very low irrigated lands undergoing cultivation of about 9%, excluding Swaziland with the highest irrigated portion in sub-Saharan Africa with 32%, followed by Gambia with 11% (Kay, 2001). Unfavorable market conditions, institutional policies, topography, inapplicability of techniques to improve on soil quality and productivity, are factors that negatively affect the usage of irrigation systems in Africa.

To Faures & Santini (2008), "an urgent and fast change should not be expected because only about 3% of cultivated land in sub-Saharan Africa is allocated for irrigation". Several farm determinants constitute grounds in prescribing the types of incentives required to acquire high crop production. The farm size should take into account the available economies of scale. Unfortunately, a majority of empirical studies on African farming systems do not provide any significant economies far from cases of very small farm size, mostly due to lack of advanced mechanization and water control (Barrett *et al.*, 2001: 323). Soil conservation and quality can only be boosted if land tenure, water rights protection stakeholders invest on soil by providing

incentives of various natures. Accessibility to credit through collateral security should be provided by property rights sectors. To Platteau (1995), in the past decades, land tenure agreements were limited to the corporate or communal ownership, nowadays; they have been mostly directed toward individualization.

The Predominance of African Women in Farming

Historically, the role of African women in farming activities has always been noticeable compared to men. African women are in most cases considered as major caretakers of their families, which justifies their involvement in activities that support and enhance their productive and reproductive duties, especially farming. African women extract natural resources principally for human consumption, medicinal purposes, and for wood (Vedder, 1928). Though women are accorded lesser status and rights than men since their authority and control were limited in most cases. Women involvement in farming depended mainly on familial relations and labor. Men, on their part, concentrate more on fishing, mining, and industrial jobs to sustain livelihood and income, which occupies them out of home. (Lebert, 2005). Most women started farming (tilling, sowing, milking, lambing, harvesting, etc.) at a tender age with their mothers. A minority of African women engage in livestock farming partly because the majority are physically weaker than men. Examples of farming activities predominantly reserved for women include; vegetable gardening (tomatoes, onions, beetroots, pepper, cabbages, huckleberry, carrots, ginger, etc.), fruits cultivation like; water melons, fruit trees, and small stock farming involving the rearing of sheep, goats, fowls, rabbits, guinea pigs. Though Africa is very vast in terms of landscape, most of the food produced are mostly meant for household consumption and a little is reserved for sell. Farming in Africa is mainly subsistence in nature, partly justified by degradation and overgrazing, resulting to lack of qualitative livestock.

Despite the setbacks encountered by women through farming, it is beneficial in providing basic needs like paying fees, buying clothes, and in improving the livelihood of the entire family, just like examples from Concordian and Spoegrivier women indicate:

Through farming, we always have food on the table and we are able to help others. At Christmas, we are able to slaughter goats and fowls and we give to our children too...it is life. If you have vegetables, you use it or sell it for money. Land is important to women, we raise our children through it (Lebert, 2005: 20).

Emphatically, the value of subsistence agricultural activities mostly practiced by women guarantee stability and continuity in case wage earnings usually from men no longer exist, due to death, dismissal, or retirement. In such a situation, sheep, goats, fowls, vegetables, among others, can be sold to sustain the family. Similarly, it is easier to till, plant, irrigate, harvest, and sell farm products to other women in other communities as a dependent source of income which could still be saved and invested for future expenditures. Still, many African widows solely depend on farming (land) as the major source of income because, through farming, it is needless for them to buy meat or vegetables, or bread from others, since they easily get them from their farms. Based on an interview carried out by Lebert (2005), with a widow in Concordia about the economic value of farming, her sentiments were expressed as follows:

It is much cheaper to farm because in the good times, we have enough for the pot, we also sell, and we give away to the neighbors, friends, and family. Even if we are only able to grow and slaughter for the pot, it is still better. Some families don't have anything or a regular income and they live off the land. But that is how nature works, it gives a lot and after a while it expects you to give a little bit more (p. 21).

To buttress the above, African women generally believe in the value of farming, since it embodies most of their lifestyles and a source of food, soap, flour, butter, milk, porridge, vegetables, income, and many more. However, despite the economic value and tenability of farming, some African women hold the view that, farming is too costly and even disabling. The costs is because they spend more on farming than what they get out of it, which results to the practice of independent/individual farming. The reasons for independent farming are varied, ranging from the belief that, each woman has her own unique manner of farming, women's voices are usually neglected and hardly taken to account when crucial issues related to land are concerned. Also, access to farm land is always decided by familial or marriage ties, equally understood as a source of security to African women as the experiences of subsistence farmers in Namaqualand indicate: "I would always want to have access to our farm. That is our family's land and I would like to keep a few livestock later in life" (Lebert, 2005: 16). Some older African women portray interest in engaging something with their land different from farming like business, tourism or source of employment. The desire for a greater recognition of women's rights to land is also highlighted by a Concordian woman through the following declaration:

We want to be reckoned as women in our right. We need to prove ourselves. Talking doesn't work...if I can make an income out of farming, I wouldn't even need a husband. Men have so little trust in us, they believe we would destroy a farm. Our fathers and brothers also make judgment mistakes but they are allowed to do that. Can't we make mistakes and learn from that? There is no Namaqualand without farming and simply no farming without women. Tradition has it that women must stand behind their husbands and support them to keep the farm running. But we sometimes stand stronger when they are not around (p. 12).

Towards an Intensification of Food Safety and Sustainable Farming in Africa

According to the World Health Organization (2016), many countries are concerned about the control and management of food safety related matters of certain products originating from developing countries, especially perishable products, such as; fruits and vegetables meant for exportation to other non-third world countries. The principal justification advanced for food safety control and management is to prevent health risks of consumers, to intensify food sanitation and trade relations through the respect of exportation policies and food safety principles. Most cases of food contamination and complications in Africa result from the stress on farming, excessive use of pesticides and fertilizers due to the high demand for food among the African population. Moreover, the Food and Agriculture Organization (2016) is considered as the regulator responsible for nutrition and food qualities (World Bank, 2005), enhancing poverty reduction, economic management, and

rural development of developing countries including Africa. This motive is aimed at providing supplementary guidelines related to the production and safety of food, as well as confirm that, farm products are safe for human consumption and are void of contamination (WHO, 2016). Developing countries have tremendously accelerated the production of food and vegetables following the requirements of consumers and the dictates of the global markets. The constant export of farm products overseas has increased the concern for food management, food safety, and consumers' health exigencies. Risks related aspects like plant pests, animal diseases, insecticides, bacteria, pathogens, have been standardized, since they constitute dangers to international trade standards. So, food safety concerns are prioritized in Africa, especially whenever trading in high worth farm products are concerned.

Moreover, the exportation of fruits and vegetables to countries of the European Union must be in compliance with good farming practices and standards (Chemitz, 2011). According to WHO (2010), there exist minimum rules that guarantee food safety before exportation to markets in the United States of America, Australia, and Europe. The possible global criteria on food safety being, all farming-related practices such as; the health of workers, methods of farmland management, irrigation, soil management techniques, production of food varieties, and harvesting. Similarly, good manufacturing activities entail minimum standards by food processing industries to prioritize food and industry hygiene, to prevent any sort of contamination which might cause sickness when consumed (Directorate Market, 2012). Therefore, it is vital for farms to apply only minimum pesticides to avoid affecting consumers' health negatively. So, products that exceed the MRL limits should be withdrawn from the markets. Better till, rigorous verifications and checks should be carried out on food before being sent to the markets, added to the provision of evidences about food spraying methods and conformity certificates, issued by competent food control authorities, ensuring compliance of food and vegetables labeling and parking under hygienic requirements. The ministries of agriculture in various African countries are hereby charged with the task of preventing, controlling, and eradicating new diseases emerging from poor food safety standards affecting consumers, state economies, animals, and nature as a whole. Concerning livestock farming, transportation and disease management, the sale of animals could be eased by setting up systems to facilitate access to markets without contaminating humans with animal diseases like the case of South Africa (Department of Agriculture, 2013), being a typical example of a sector that defines the roles and responsibilities of domains concerned about food. In the same vein, the Nigerien government has introduced national policies addressing food safety concerns through the National Agency for Food and Drug Administration (NAFDAC) as indicated by Olaito (2013), and every country within sub-Saharan Africa possesses particular standards of food safety which facilitates both national and international trade (Buzby, 2003).

Conclusion

Farm productivity in Africa is influenced negatively by the lack of financial means to afford the high costs of fertilizers, food safety certificates, and laboratory analysis of farm products that guarantee food safety standards. In addition, commercial farmers cannot compete with others from a global context due to their low quality of production resulting from financial constraints and lack

of proper private farming standards. Consequently, the presence of high production cost, paired with low income markets in Africa, grossly affect sustainability adversely. Also, stringent advisory services are lacking in Africa to ensure the respect for crop choices, soil management, use of appropriate qualitative and quantitative pesticides and fertilizers, coupled with the absence of smooth access to the international markets. Ignorance of food safety legislation equally contributes to the misunderstanding and misinterpretation of certain food safety measures. That notwithstanding, most countries have adopted very strict measures for the importation of fruits and vegetables to prevent diseases and loss of lives by sensitizing farmers, consumers, governments, of the presence of unsafe food in markets and the desire to destroy such harmful foods. It is worth considering that, access to markets reduces poverty since it's a source of revenue that eases stable income flow. In fact, sustainable farming and food production strategies like dependence on crop choices and appropriate applications are prerequisites for sustainable food and extra income.

Finally, the communication department of every African country should assist African farmers with the provision of new knowledge, updates, and required national and international standards of farming systems related to food safety regulations, legalization, importation, and exportation of food to other national and international markets. Trainings, seminars, conferences and workshops should be organized regularly, in order to monitor and assess farming activities, so as to implement more efficient measures ensuring higher yields and meeting up market demands with emphasis on phytosanitary needs. Again, local and national laboratories and supervisory organs should be established to evaluate the effects of chemical applications on crops, farming practices, food safety strategies, as well as in providing grants and subsidies to African farmers.

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