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Sustainable Food Production in Africa: Turning African Countries into Development Catalysts, Food Reservoirs and Exporters

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Abstract

The myriad of challenges facing Africa, were considered in this paper, which include the nagging triplet problems of poverty, hunger and diseases. Africa is prominent in the world hunger map of Food and Agriculture Organization. Therefore, this paper identified poorly tapped natural and human resources, uneconomically viable policies and poor management as some of the banes of Africa' setback. This work proffered proactive solutions to freeing Africa from the triplet perennial problems of poverty, hunger and diseases, through intervention in the area of sustainable organic agricultural food production geared towards wealth creation in an integrated community based agriculture. Organic agriculture gives credence to good health, thus is a viable instrument in freeing Africa from diseases. In this paper, the abundance of agrarian ecologies and resources domiciled in Africa, were highlighted and put forth to be harnessed for moving the continent from the present precarious predicament to an enviable status. Empirical information presented in this paper recommended organic agriculture as the panacea to sustainable food production, improved health of the populace, conducive environmental condition and for solving the problem of climate change. Organic agriculture will also facilitate the establishment of bilateral trade agreements, thus boosting foreign earnings of African countries. This will make other nations of the world to be heavily dependent on Africa for raw materials and export of high quality organic food to feed the world. The multiplier effects of these coordinated activities will turn African countries into development catalysts, food reservoirs and enhanced foreign exchange earners.

Keywords: Development, food security, organic agriculture, improved health, triplet problem

1. Introduction

The continent of Africa is the world's second largest and second most-populous continent, being behind Asia in both categories. At about 30.3 million km^2 (11.7 million square miles) including adjacent islands, it covers 6% of Earth's total surface area and 20% of its land area. With about 1.2 billion people as of 2016, it accounts for about 16% of the world's human population (UNDESA, 2017). Food security is when all people, at all times, in a particular location, place or region have physical and economic access to sufficient safe and nutritious food that meet their dietary needs and food preferences for an active and healthy life. World Food Programme Hunger Map 2019 depicts the prevalence of undernourishment in the population of each country in 2016-18. From Africa and Asia

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to Latin America and the Near East, there are 821 million people - more than 1 in 9 of the world population - who do not get enough to eat (WFP, 2019).

Agriculture provides food for the populace, it is fundamental to food security, industrial growth and national development. Arthur Lewis said *"if agriculture remains stagnant, industry cannot grow"*. In Africa there is problem of food security and underdevelopment. Also, in some African countries there has being over dependence on the petroleum sector, and the authors thus postulate that *"The oil wells will not flow forever, however sustainable agriculture is for life"*. There is a salient and silent fact in Africa which this technical paper built on which is, "*every country in Africa has ample natural and human potentials for sustainable and gainful agriculture that could be harnessed for food security"*. There is a clarion global call for food security, human and environmental health improvement and alleviation of poverty. This technical paper provides the panacea which is *Organic Agriculture Based Africa Transformation Project (OABATP). This is a synergy that brings together basic and advanced technologies through the involvement of scientists and coordinated farmers groups made up of youth and experienced farmers, while leveraging on available human and natural resources in each African country and utilization of improved organic farming inputs and practices*. It involves basic and advanced experimentation to deliver technologies that will transform African agriculture, by turning each country into catalyst in the agricultural reaction, geared toward making each country to become food basket and reserve and working out strategies to become organic produce exporter within few years.

The myriad of challenges facing Africa, were considered in this paper, which include the nagging triplet problems of poverty, hunger and diseases. Africa is prominent in the world hunger map of World Food Programme. Therefore, this paper identified poorly tapped natural and human resources, uneconomically viable policies and poor management as some of the banes of Africa' setback. This technical paper gives credence to organic agriculture as a means of promoting good health and reducing poverty to the minimum. Worldwide organic agriculture is associated with provision of chemical residue free food and good nutrition for the populace, through utilization of organically certified best practices in crop, livestock, fisheries and aquaculture production. The exportation of agricultural commodities will serve as foreign exchange earning to each African country and transformation of Africa. This will definitely improve the citizens' living standard and livelihood.

2. Problem Statement and Technical Paper Rationale

Most African countries still remain food insecure nations, conspicuously shown in the hunger map of World Food Programme. Before now, for decades the number of hungry people had been declining – this is not true anymore. More than 820 million people do not have enough food to eat. At the same time, no region is exempted from the epidemic of overweight and obesity. Ending hunger and all forms of malnutrition by 2030 is an immense challenge (FAO, 2019). Many African nations are being trailed by underdevelopment in the various sectors without steady development in agriculture despite the fact that most African nations are an agrarian economy (Okuneye, 2002, FAO, 2015.) The World Food Summit estimated that approximately 840 million people in developing countries subsist on diets that are deficient in calories. Food insecurity exists when people are undernourished because of the physical unavailability of food, their lack of social or economic access to adequate food, and/or inadequate food utilization.

Food-insecure people are those individuals whose food intake falls below their minimum calorie (energy) requirements, as well as those who exhibit physical symptoms caused by energy and nutrient deficiencies resulting from an inadequate or unbalanced diet or from the body's inability to use food effectively because of infection or disease. Food is defined as any substance eaten to provide nutritional support for the body. However, contamination of food with agrochemicals is on the increase and this leads to precipitation of chemical residues in food and such food cannot be referred to as wholesome food, because rather than provide nutritional support to the body it leads to discomfort, degeneration of vital body organs and overall pruning of the average life span expectancy. Chemical residues in food are those chemicals and their metabolites which are present due to their use in food production system.

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3. Studied Materials and Methodology

IFOAM Reports

The International Federation of Organic Agriculture Movements (IFOAM - Organics International) is the worldwide umbrella organization for the organic agriculture movement, which represents close to 800 affiliates in 117 countries. Information relevant to organic agriculture along with its best practices world were studied and adapted for Africa development in this technical paper. The declared mission is to, "Lead, unite and assist the organic movement in its full diversity." and vision is the "worldwide adoption of ecologically, socially and economically sound systems, based on the Principles of Organic Agriculture". Among its wide range of activities, the federation maintains an organic farming standard, and an organic accreditation and certification service. The four Principles of Organic Farming are: Organic farming should sustain and enhance the health of soil, plants, animals and humans as one and indivisible. Organic farming should be based on the living ecological systems and cycles, work with them, emulate them and help sustain them. Organic agriculture should build on relationships that ensure fairness with regard to common environment and life processes. Organic farming should be managed in a precautionary and responsible manner to protect the health and well being of current and future generations and the environment.

WFP Hunger Map

The world hunger map produced by the World Food Programme (WFP) was studied and vital information on it was inculcated into this paper. The WFP is the food-assistance branch of the United Nations and the world's largest humanitarian organization addressing hunger and promoting food security. According to the WFP, it provides food assistance to an average of 91.4 million people in 83 countries each year. From its headquarters in Rome and from more than 80 country offices around the world, the WFP works to help people who cannot produce or obtain enough food for themselves and their families.

It is a member of the United Nations Development Group and part of its executive committee. The WFP was first established in 1961 after the 1960 Food and Agriculture Organization (FAO) Conference. The WFP strives to eradicate hunger and malnutrition, with the ultimate goal in mind of eliminating the need for food aid itself. The objectives that the WFP hopes to achieve are to: Save lives and protect livelihoods in emergencies. Support food security and nutrition and (re)build livelihoods in fragile settings and following emergencies. Reduce risk and enable people, communities and countries to meet their own food and nutrition needs. Reduce under-nutrition and break the inter-generational cycle of hunger. Achieve, Zero Hunger in 2030. The WFP food aid is also directed to fight micronutrient deficiencies, reduce child mortality, improve maternal health, and combat disease, including HIV and AIDS.

WHO Reports

Reports of the World Health Organization (WHO) relevant to sustainable agriculture and development were looked into in the conceptualization of this paper. The WHO is a specialized agency of the United Nations that is concerned with international public health. The WHO is a member of the United Nations Development Group. Its predecessor, the Health Organization, was an agency of the League of Nations. Since its establishment, it has played a leading role in the eradication of smallpox. Its current priorities include communicable diseases, in particular HIV/AIDS, Ebola, malaria and tuberculosis; the mitigation of the effects of non-communicable diseases such as sexual and reproductive health, development, and aging; nutrition, food security and healthy eating; occupational health; substance abuse; and driving the development of reporting, publications, and networking. The WHO is responsible for the World Health Report, the worldwide World Health Survey, and World Health Day. As of 2012, the WHO has defined its roles in public health as follows: providing leadership on matters critical to health and engaging in partnerships where joint action is needed. Shaping the research agenda and stimulating the generation, translation, and dissemination of valuable knowledge. Setting norms, standards, promoting, and monitoring their implementation. Articulating ethical and evidence-based policy options. Providing technical support, catalysing change, and building sustainable institutional capacity; and monitoring the health situation and assessing health trends. Civil Registration and Vital Statistics (CRVS) to provide monitoring of vital events (birth, death, wedding, divorce).

The Organic Agriculture Based Africa Transformation Project (OABATP)

Going by the experiences gathered by two of the authors of this paper, while with farmers groups at The Olusegun Obasanjo Centre for Organic Research and Development (OOCORD), an international Non-Governmental Organization (NGO) in Ibadan, Nigeria, the conceptualization of this project was conceived. The idea of *Organic Agriculture Based Africa Transformation Project* was experimented and it proved to be viable. Farmers testified during farmers outreach centres meetings and farmers field days that the idea worked when implemented at micro level with them. This is a synergy that brings together basic and advanced technologies through the involvement of scientists and coordinated farmers groups made up of youth and experienced farmers, while leveraging on available human and natural resources in the community and utilization of improved organic farming inputs and practices. In this approach scientists and farmers will regularly interact on how to solve emerging problems on the farm using biological approaches. These approaches will be laudable and promising. Practices such as: use of neem based biopesticides for pest management, Tithonia based biofertilizer for soil fertility maintenance and incorporation of farm yard manure and turning biological wastes to soil amendment agents among other methods are involved. These biological practices used for soil and pest management apart from converting waste to wealth make the environment a better place to live in.

Strategic Research and Development Projects Activities

1. Identification, registration and coordination of farmers groups in wards, local governments and states of countries.
2. Selection of target crops, animals, fish and aquaculture produce.
3. Acquisition of project sites and drafting of memoranda of understanding.
4. Documentation of available organic pest and soil management procedures and technologies available.
5. Formulation of such products and large scale production.
6. Preliminary farm certification procedure.
7. Sensitization and Mobilization of farmer groups.
8. Establishment of large scale farms in various communities.
9. Regular monitoring of activities and monthly review meetings.
10. Attending to any emerging research problems on the farms.
11. Commercialization of proven technologies.
12. Attending to harvest and post harvest matters.
13. Six months review and report to supervisory bodies.
14. Organic certification process.

15. Ware housing of produce in notable research organizations such as IITA for export purpose.
16. Exportation of first batch of produce.
17. Release and utilization of foreign earnings.
18. Update report to funding foundation.
19. Organizing the British-African summit on organic agriculture.
20. Impact of project assessment and writing of end of project report.

Strategic Business and Developmental Cooperation with United Kingdom
This will be achieved through Organic Agriculture Submit to be hosted in Africa, which will achieve the followings:

1. At the summit solutions will be proffered to world food crises, especially in Africa. This summit will help to mobilize the stakeholders in agriculture, health and governance in Africa at all levels for national development.
2. It will also fostering international partnerships, thus promoting exchange programme and research activities in organic agriculture, between Africa and British government and other nations.
3. The British - African Organic Agriculture Summit will promote current and future commercial activities and trade in all African based crops, livestock, and fisheries production.
4. The result of this meeting will be to fully realize the potential of this crucial crops for poverty alleviation and wealth generation.
5. Exchange programmes in health sector of African economy.
6. Sustainable environmental protection strategies for the British - African governments.
7. Promotion of IITA research activities, African organic agriculture network and capacity building roles of the Africa based organic agriculture institutions.

4. Results

Secondary data from FAO, WFP, World food atlas and WHO were utilized in this paper as sources of empirical scientific information. Prevalence of undernourishment in 2015 – 2018 is presented in Table 1.

Table 1: Prevalence of undernourishment in the world, 2005–2018

	Prevalence of undernourishment (%)					
	2005	**2010**	**2015**	**2016**	**2017**	**2018**
Northern Africa	6.2	5.0	6.9	7.0	7.0	7.1
Sub-Saharan Africa	24.3	21.7	20.9	22.0	22.7	22.8
Eastern Africa	34.3	31.2	29.9	31.0	30.8	30.8
Middle Africa	32.4	27.8	24.7	25.9	26.4	26.5
Southern Africa	6.5	7.1	7.8	8.5	8.3	8.0
Western Africa	12.3	10.4	11.4	12.4	14.4	14.7
Asia	17.4	13.6	11.7	11.5	11.4	11.3
Central Asia	11.1	7.3	5.5	5.5	5.7	5.7
Eastern Asia	14.1	11.2	8.4	8.4	8.4	8.3
South-eastern Asia	18.5	12.7	9.8	9.6	9.4	9.2
Southern Asia	21.5	17.2	15.7	15.1	14.8	14.7
Western Asia	9.4	8.6	11.2	11.6	12.2	12.4
Western Asia and Northern Africa	8.0	7.1	9.2	9.5	9.8	9.9
LATIN AMERICA AND THE CARIBBEAN	9.1	6.8	6.2	6.3	6.5	6.5
Caribbean	23.3	19.8	18.3	18.0	18.0	18.4
Latin America	8.1	5.9	5.3	5.5	5.7	5.7
Central America	8.4	7.2	6.3	6.1	6.1	6.1
South America	7.9	5.3	4.9	5.3	5.5	5.5

OCEANIA	5.5	5.2	5.9	6.0	6.1	6.2
NORTHERN AMERICA AND EUROPE	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5

Source: FAO, 2017

Within the period of review world prevalence in undernourishment had reduced. In year 2015, the lowest value of 10.6% was obtained and it increased slightly in 2016 and had been constant over a period of 2017 - 2018. A similar trend was observed in Africa, however Eastern Africa had the highest prevalence of 32.4%. In Northern America and Europe the value had remained <2.5%. Table 2 established the fact that there is hope for all African countries in Agriculture and mineral exploitation activities. The African countries that were already practicing organic agriculture are presented in Table 3. In Figure 1 Africa is very prominent on the world hunger map, while the number and coverage of individuals that had access to antiretroviral therapy are given in Figure 2 which will definitely have negative impacts on the percentage of healthy people that will be available for agricultural production.

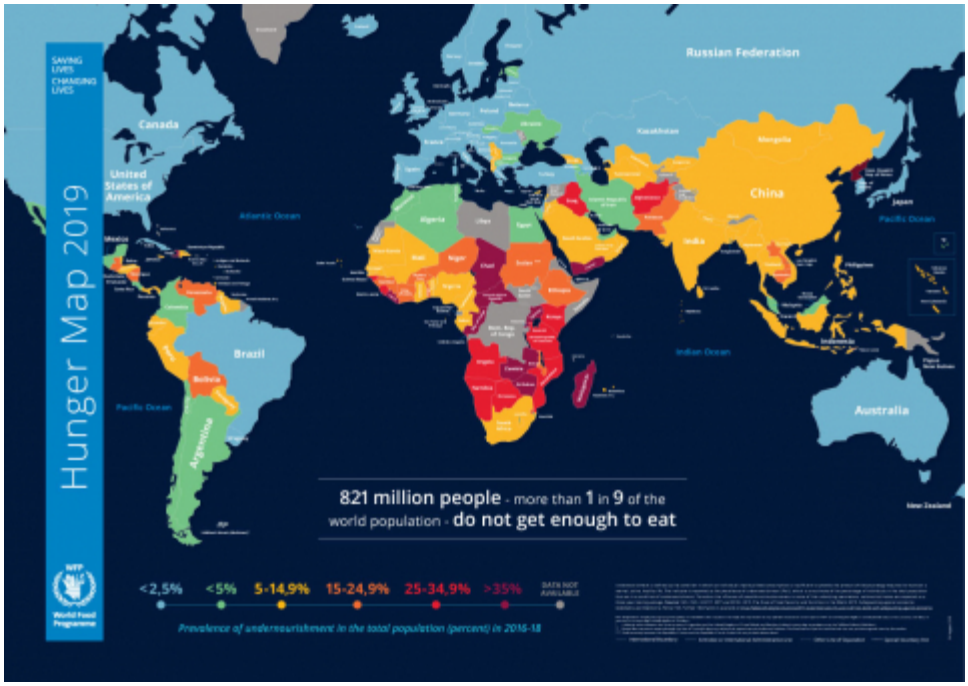

Figure 1: World Hunger Map 2019.
Source: WFP, 2019

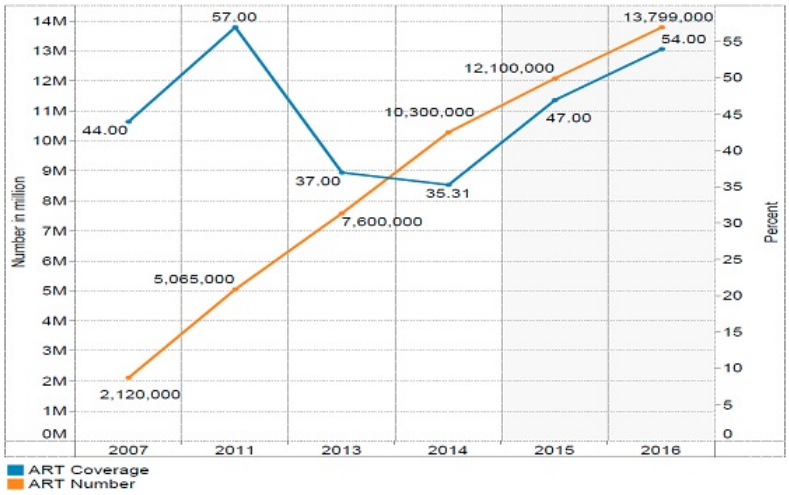

Figure 2: Number and percentage of HIV infected individuals receiving antiretroviral therapy in Africa.
Source: WHO, 2015

Table 2: Agricultural and mineral potentials of African countries that could be exploited for development

Country	Selected Agricultural produce	Mineral(s) availability
ALGERIA	wheat, oats, olives	petroleum
ANGOLA	coffee, bananas, maize	petroleum, diamonds
BENIN	coffee, cocoa, yams	petroleum
BOTSWANA	maize, sorghum, livestock	diamonds
BURKINA FASO	ground nuts, cotton, sorghum	manganese, limestone
BURUNDI	coffee, cotton, maize	gold
CAMEROON	coffee, cocoa, cassava	petroleum, aluminum
CABO VERDE	bananas, maize, fish	salt
CENTRAL AFRICAN REPUBLIC	cassava, millet, cotton	diamonds
CHAD	cotton, millet, sorghum	uranium
COMOROS	vanilla, copra, bananas, fish	____
CONGO (Brazzaville)	rice, groundnuts, maize	petroleum, diamonds
CONGO (Kinshasa)	cassava, maize, coffee, rubber	copper, diamonds, cobalt, gold, zinc
COTE D'IVOIRE	coffee, cocoa, timber, maize, rice	petroleum, diamonds, manganese
DJIBOUTI	sheep, goats, fruit	____
EGYPT	cotton, rice, maize, fruit	petroleum, iron ore, phosphates
EQUATORIAL GUINEA	timber, coffee, rice, yams	petroleum
ERITREA	sorghum, lentils, fish, livestock	gold, potash, zinc
ETHIOPIA	coffee, tiv, pulses, livestock	gold, copper
GABON	cocoa, coffee, oil palm, cassava	petroleum, manganese
GAMBIA	groundnuts, millet, sorghum, rice	_____
GHANA	cocoa, cassava, groundnuts, maize	gold, bauxite, manganese
GUINEA	rice, coffee, pineapples, cassava	bauxite, iron ore, uranium
GUINEA-BISSAU	rice, maize, cassava, fish	bauxite, phosphates
KENYA	coffee, tea, maize, sugarcane, livestock	limestone, soda ash, rubies
LESOTHO	livestock, maize, sorghum	water (hydro)
LIBERIA	rubber, timber, rice, cassava	iron ore, diamonds
LIBYA	wheat, olives, dates	petroleum, gypsum
MADAGASCAR	coffee, vanilla, sugar, timber	graphite, chromite, coal, bauxite
MALAWI	tobacco, tea, maize, cassava	limestone
MALI	cotton, livestock, millet, rice	gold, phosphates
MAURITANIA	fish, livestock, millet, rice	iron ore, gypsum, copper
MOROCCO	wheat, barley, citrus, dates	phosphates, iron ore, manganese
MOZAMBIQUE	cotton, cashew nuts, maize, cassava	coal, titanium
NAMIBIA	millet, sorghum, livestock	diamonds, copper, uranium, gold
NIGER	cotton, millet, sorghum, cassava	uranium, coal, iron ore
NIGERIA	cocoa, groundnuts, palm oil, maize, sorghum	petroleum, tin, columbite, iron ore
RWANDA	coffee, tea, sorghum, beans, bananas	gold, tin ore
SAO TOME & PRINCIPE	fish, palm kernels, bananas	_____
SENEGAL	cotton, groundnuts, sorghum, rice	phosphates, iron ore
SEYCHELLES	coconuts, cinnamon, vanilla, cassava	_____
SIERRA LEONE	rice, coffee, palm kernels	diamonds, bauxite, iron ore
SOMALIA	bananas, sorghum, fruits, livestock	Uranium
SOUTH AFRICA	maize, wheat, sugar, fruits, livestock, poultry	gold, diamonds, uranium, chromium
SUDAN	cotton, sorghum, millet	petroleum, iron ore, copper
SWAZILAND	sugar, maize, fruits, timber	asbestos, coal, clay
TANZANIA	coffee, tea, cotton, maize, cassava	tin, phosphates, iron ore, diamonds
TOGO	coffee, cocoa, yams, cassava, maize	phosphates, limestone
TUNISIA	olives, dates, citrus, wheat	petroleum, phosphates, iron ore
UGANDA	coffee, tea, cassava, maize, bananas	copper, cobalt
WESTERN	fish, livestock	phosphates, iron ore

SAHARA		
ZAMBIA	maize, sorghum, groundnuts	copper, cobalt, zinc, lead
ZIMBABWE	cotton, tobacco, maize, livestock	coal, chromium ore, asbestos

Source: Exploring Africa.

Table 3: Top ten African countries involved in Organic Agriculture

R	Country	Organic Area (hectares)
	Uganda	231,157
	Tanzania	186,537
3	Ethiopia	164,777
4	Tunisia	137,188
5	Egypt	82,167
6	Sudan	54,845
7	DR Congo	51,838
8	South Africa	43,170
9	Madagascar	30,265
1	Ghana	28,161

Source: WorldAtlas, 2018.

5. Discussion

In Nigeria for instance about 60% of Nigerians are employed in the agricultural sector. Agriculture used to be the principal foreign exchange earner of Nigeria. Perhaps, one of the most daunting ramifications of the discovery of oil was the decline of agricultural sector. So tragic was this neglect that Nigeria, which in the 1960s grew 98% of his own food and was a net food exporter, now must import much of the same cash crops it was formerly famous for as the biggest exporter. Agricultural products include groundnuts, palm oil, cocoa, coconut, citrus fruits, maize, pearl millet, cassava, yams and sugar cane. It also has a booming leather and textile industry, with industries located in Kano, Abeokuta, Onitsha, and Lagos.

Health of the citizen play vital roles in development and Agriculture. The 2018 edition of the Atlas of African health statistics describes the health situation and trends in the WHO African Region. Analysis is based on standardized data from the World Health Organization and other agencies of the United Nations, such as UNICEF and the World Bank. The focus is on the progress and performance of key health indicators during the last 5–10 years. Current or disaggregated data were not available for some of the indicators, which underscores the urgent need to strengthen data systems to improve the availability and quality of health data in the African Region.

The progress and performance of each indicator is presented for the Region and by country and, when relevant, by other equity stratifiers such as age and sex. Disaggregation of results by country and equity stratifiers was done to identify those countries and key population groups that require special efforts to achieve parity and improve the national and Regional averages. *The Health of the People* is the first report to focus on the health of the 738 million people living in the African Region of the World Health Organization. While acknowledging that Africa confronts the world's most dramatic public health crisis, the report offers hope that over time the region can address the health challenges it faces, given sufficient international support.

It provides a comprehensive analysis of key public health issues and progress made on them in the Africa Region.

- HIV/AIDS continues to devastate the WHO Africa Region, which has 11% of the world's population but 60% of the people with HIV/AIDS. Although HIV/AIDS remains the leading cause of death for adults, more and more people are receiving life-saving treatment. The number of HIV-positive people on antiretroviral medicines increased eight-fold, from 100 000 in December 2003 to 810 000 in December 2005.

- More than 90% of the estimated 300–500 million malaria cases that occur worldwide every year are in Africans, mainly in children under five years of age, but most countries are moving towards better treatment policies.
- River blindness has been eliminated as a public health problem, and guinea worm control efforts have resulted in a 97% reduction in cases since 1986. Leprosy is close to elimination—meaning there is less than one case per 10 000 people in the Region.
- Most countries are making good progress on preventable childhood illness. Polio is close to eradication, and 37 countries are reaching 60% or more of their children with measles immunization. Overall measles deaths have declined by more than 50% since 1999. In 2005 alone 75 million children received measles vaccines.

While drawing the world's attention to recent successes, the report offers a candid appraisal of major hurdles, such as the high rate of maternal and newborn mortality overall in the Region. Of the 20 countries with the highest maternal mortality ratios worldwide, 19 are in Africa; and the Region has the highest neonatal death rate in the world. Then there is the strain on African health systems imposed by the high burden of life-threatening communicable diseases coupled with increasing rates of non-communicable diseases such as hypertension and coronary heart disease. Basic sanitation needs remain unmet for many: only 58% of people living in sub-Saharan Africa have access to safe water supplies. Non-communicable diseases, such as hypertension, heart disease, diabetes and are on the rise; and injuries remain among the top causes of death in the Region.

The report stresses that Africa can move forward on recent progress only by strengthening its fragile health systems.

The World Bank projects that agriculture and agribusiness in Africa will grow to be a US$1 trillion industry in Africa by 2030. To promote this outcome, the continent must review its incentive structures.

Agriculture averages 24% of GDP across the continent. With post-harvest activities taken into account, agriculture-related industry accounts for nearly half of all economic activity in sub-Saharan Africa.

The region holds about half of the world’s fertile and as-yet-unused land – and yet it spends US$25 billion annually importing food. It also uses only a tiny percentage of its renewable water resources.

Impact of Small and Medium Scale Agribusiness Enterprises

The potential growth of Africa’s food and beverage markets will only be possible with adequate investment in small and medium-sized agribusiness enterprises. Small African firms engaged in agribusiness greatly outnumber the large players. Former Malawian president Bingu Wa Mutharika observed: “In West Africa, 75% of agriculture-related firms are micro or small enterprises, 20% are semi-industrial, and 5% are industrial.”

Value chains in many African countries feature an informal chain that serves lower-income consumers and a formal chain that caters for high-income domestic consumers or exports. In many sectors the vast majority of the volume moves through the smaller, less formal businesses. More than 95% of the fruit and vegetables produced in Kenya move through smallholders and small and medium enterprises (SMEs). Policymakers need to support agribusiness and technology incubators, export-processing zones and production networks. They must also sharpen the skills associated with these sectors.

Banks and financial institutions also play key roles in fostering technological innovation and supporting investment in homegrown businesses. Unfortunately, their record in promoting technological innovation in Africa has been poor.

Capital markets have played a critical role in creating SMEs in developed countries. They bring money to the table and also help groom small and medium-sized start-ups into successful enterprises. Venture capital in Africa, however, barely exists outside South Africa.

African countries also need to make a concerted effort to leverage expertise in the diaspora. This cohort provides links to existing know-how, establish links to global markets and train local workers to perform new tasks.

Much is already known about how to support business development. The available policy tools include:

- direct financing via matching grants;
- taxation policies;
- government or public procurement policies;
- advance purchase arrangements; and
- prizes to recognise creativity and innovation.

These can be complemented by simple ways to promote rural innovation that involve low levels of funding, higher local commitments and consistent government policy. For example, China's mission-oriented "Spark Program", created to popularize modern technology in rural areas, had spread to more than 90% of the country's counties by 2005.

Lessons from China's Economic Transformation Agenda

There is growing evidence that the Chinese economic miracle is a consequence of the rural entrepreneurship which started in the 1980s. This contradicts classical interpretations that focus on state-led enterprises and receptiveness to foreign direct investment.

Millions of township and village enterprises were created in provinces like Zhejiang, Anhui and Hunan. This played a key role in stimulating rural industrialization. Over the past 60 years, China has experimented extensively with policies and programmes to encourage the growth of rural enterprises. These include providing isolated agricultural areas with key producer inputs and access to post-harvest, value-added food processing.

By 1995, China's village enterprises had helped bring about a revolution in the country's agriculture. They had evolved to account for approximately 25% of GDP, 66% of all rural economic output and more than 33% of total export earnings. Most of them have become private enterprises that focus on areas outside agricultural inputs or food processing.

China's initial rural enterprise strategy focused on the so-called five small industries it deemed crucial to agricultural growth:

- chemical fertilizer;
- cement;
- energy;
- iron and steel; andfarm machinery.

With strong backward linkages between these rural enterprises and Chinese farmers, agricultural development in China grew substantially in the late 1970s and 1980s. This happened through farmland capital construction, chemical fertilization and mechanization. This expansion, coupled with high population growth, led to a surplus of labour and a scarcity of farmland. As a result, China's rural enterprises increasingly shifted from supplying agricultural producer inputs to labour-intensive consumer goods for domestic and international markets.

From the mid-1980s to the 1990s, China's township and village enterprises saw explosive growth in these areas. At the same time they continued to supply agricultural producers with access to key inputs, new technologies and food-processing services. The most successful were those with strong links to: urban and peri-urban industries with which they could form joint ventures and share technical information; those in private ownership; and those who were willing to shift from supplying producer inputs for farmers to manufacturing consumer goods.

China's experience provides a mechanism for enhancing rural access to agricultural inputs such as fertilizers and mechanization, as well as post-harvest food processing. Rural enterprises may make the most sense in areas where farm-to-market roads cannot be easily established. Along with sparking agricultural productivity, rural enterprises may also help provide employment for farm labourers who have been displaced by agricultural mechanization. By keeping workers and economic activity in rural areas, China has helped expand rural markets and limit rural-urban migration. This has also helped create conditions under which it is easier for the government to provide key social services such as health care and education. Township and village enterprises enjoyed government support, but retained a degree of autonomy in their operations (WEF, 2016).

The Impact of Organic Agriculture on World's Economy

We know that organic products often cost more than their conventional counterparts at grocery stores and local farmers' markets, but does that mean that organic agriculture is more costly than conventional overall? The answers that experts have found, though multifaceted and complex, are surprisingly consistent. For the most part, organic agriculture appears to be a more efficient economic system, both for generating profit and reducing the sort of environmental impacts (often thought of as "hidden costs") that end up costing consumers in other ways.

One of the most persistent myths such studies consistently debunk is that organic systems are incapable of reaching the same yields as conventional systems. After a transitional period of 3 to 5 years, organic systems can produce up to 95 per cent of conventional yields. Additionally, organic farming is less dependent on fossil fuels, expensive inputs, and annual loans, making it less vulnerable to financial market fluctuations (West, 2017).

Organic is a low-waste system that emphasizes quality over quantity, meaning it uses less land for the same profit. Conventional crop subsidies exacerbate the problem, incentivizing farmers to grow more than they can sell, which causes excess pollution, overuse of resources, and food waste.

In classic economics, capital is defined as money, machinery, tools, or other physical assets that help increase an entity's wealth. In the case of an investor, that would just be money used to buy stocks or bonds to grow the initial investment over time. In the case of a farmer, capital means tractors, greenhouses, or hand tools – things that can be used again and again to facilitate profit and growth.

There's a new branch of economics that would like to recognize the ways we benefit from natural systems as a form of capital, which they've dubbed *natural capital*. Natural capital includes a mind-boggling array of ecosystem services and resources provided by the natural world, some of which we have yet to discover. Think: trees making oxygen and capturing pollutants from the air, wetlands filtering water, insects pollinating plants, and the incredible biodiversity of a place like the Amazon rainforest generating new medicines. Mother Nature does a lot for us, and the natural capital movement would like to quantify those values in order to more easily incorporate them into the traditional economic schemes that do not account for them.

As we have discussed, organic farming can stand its ground under traditional economic evaluations, but when you also start to incorporate natural capital values, organic becomes the clear winner for long-term profitability. Let us consider a few examples of how organic utilizes and increases various natural capital functions:

- Adding organic matter to the soil each year (a foundational organic practice) increases the soil's ability to store carbon dioxide. While conventional farming has long been the recipient of federal crop subsidies, there is a new trend toward paying farmers for carbon sequestration, effectively acknowledging the economic benefit of high-organic-matter soils.
- Organic matter in the soil also increases the soil's water holding capacity, reducing pressure on water resources and making organic farms more resilient to drought. Since water costs money (and increasingly so), drought tolerant farming systems mean cheaper food production over time.
- Biodiversity on organic farms offers myriad financial benefits. A diverse crop system means a succession of blooms that can feed insect populations (and provide them with habitat) year-round. These beneficial insects help to keep down populations of harmful insects, reducing or eliminating the need for pesticides, and providing pollination services to increase harvest yields.
- Genetic diversity on organic vegetable and seed farms acts as a well-endowed gene bank for potential new varieties that will be resilient against future environmental changes, insect populations, and diseases – a service that is essential to global food security, not to mention tasty food!

And that's just the beginning of the list. Natural capital is a relatively new field of study, and economists and scientists are just beginning to unpack the ways we can attribute values to it within agricultural systems. As we learn more about the economics of natural capital and organic agriculture, we will convince more farmers to make the switch, increasing the world's profits of biodiversity, nutritious food, and healthy ecosystems, farm by farm (West, 2017).

The Panacea

Some non-profit organizations and foundations are experimenting with promoting rural entrepreneurship by donating cows or other livestock to rural communities. Organizations like Heifer International provide cows, along with training about how to raise them and profit from animal husbandry but the impact of these programmes is relatively limited. In Malawi, for instance, Heifer International is implementing a programme alongside USAID that is designed to stimulate a dairy industry. But it serves only 180 smallholder farmers (USAID, 2019).

Reinventing agricultural policies guided by widespread and inefficient interventionism, sustainable change in the agricultural sector to meet the region's challenges requires massive government investment in the sector and in food security – that is if Africa really has the ambition and the will to end hunger and dependence and feed its population with dignity. The role and method of intervention by states and regional could be worked out. What role must governments play? The public sector must drive the political ambition and develop policies structured around three main intervention areas:– The production of public goods, mainly by investment in trans-port and communication, energy and market infrastructure; the deployment of efficient services (support and advice, for example), investment in research, and knowledge management, etc.– The use of economic policy instruments with the capacity to guide strategies for economic producers and stakeholders. This mainly involves credit policies and risk management. The agricultural programme is centred specifically around three components: i) economic policies, institutions and leadership; ii) knowledge and experience sharing, and iii) financing, these key issues must be looked into. Africa spent US$35bn on food imports (excluding fish) in 2011, only 5% of it related to trading within the continent. An increase in productivity, matched with the right set of policies and investment, could revert this situation. Africa could replace these imports with their own produce, which would in turn reduce poverty, enhance food and nutrition security, and provide sustainable growth to the respective societies.

A broader economic transformation is necessary to shift the current paradigm facing agriculture in Africa. In most of the cases, urbanization and economic growth have resulted in new opportunities for local agricultural producers. However, in Africa, this share of the market mainly belongs to foreign companies. Imports of food staples have been rising sharply, and domestic agriculture has so far failed to increase supply in response. Raising productivity in agriculture is vital to transformative growth, not just because it has the potential to expand markets by displacing imports, but also because agricultural growth is twice as effective in reducing poverty as growth in non-agricultural sectors.

6. Conclusion

The lesson from China's experience is that development must be viewed as an expression of human potentialities, not as a product of external interventions. Mobilization of all the stakeholders involved in agriculture to ensure food security in Nigeria through grass root Integrated Community Based Agriculture is essential. The project will give credence to organic produce thus making safe, healthy and nutritious food available to all. The British-African summit will be a landmark programme in the history of agriculture in Africa which will transform African agriculture. Generations to come will benefit from it, our nations will be moved to a higher pedestal. This project will transform African agriculture starting with the grass root stakeholders and the rural dwellers, making them free of hunger and empowering every country in Africa to become agricultural produce exporters. This technical paper proffers proactive solutions to freeing Africa from the triplet perennial problems of poverty, hunger and diseases, through intervention in the area of sustainable organic agricultural food production geared towards wealth creation in an integrated community based agriculture. Organic agriculture gives credence to good health, thus is a viable instrument in freeing Africa from diseases. In this paper, the abundance of agrarian ecologies and resources domiciled in Africa, were highlighted and put forth to be harnessed for moving the continent from the present precarious predicament to an enviable status. Empirical information presented in this paper recommends organic agriculture as the panacea to sustainable food production, improved health of the populace because it is sustainable. It will create conducive environmental condition for solving the problem of climate change. Organic agriculture will also facilitate the establishment of bilateral trade agreements, thus boosting foreign earnings of African countries. This will make other nations of the world to be heavily dependent on Africa for raw materials and export of high quality organic food to

feed the world. The multiplier effects of these coordinated activities will turn African countries into development catalysts, food reservoirs and enhanced foreign exchange earners.

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