

Case Report

Advances in Nutrition & Food Science

Africa Should Be Afraid: A Food Plate Of Hazards And Biomass As A Solution

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Submitted: 19 Nov 2021; Accepted: 26 Nov 2021; Published: 04 Dec 2021

Citation: Abiodun Timilehin., Adelugba Adeola. (2021). Africa Should Be Afraid: A Food Plate Of Hazards And Biomass As A Solution. *Adv Nutr Food Sci*, 6(2), 77-82.

Introduction

Sanitary and phytosanitary (SPS) measures are risk-reducing measures aimed at the protection of food safety, plant and animal health, and the natural environment. In the case of agricultural and food exports in particular, compliance with technical requirements is a prerequisite of successful export trade. The danger associated with inorganic farming was what birthed organic agriculture; while this has been around for decades, the prevalence of it in Africa as a continent has been poor due to some factors. Despite the obvious presence of organic farming, there is need for the inhabitants of the continent to be afraid of the food in circulation as majority of the produce termed ‘organic’ are indeed far from it. As many African countries are trying to match up with developed countries in fighting global contemporary issues such as climate change, terrorism, disease outbreak among other threats to humanity; there is an issue, faceless and mighty in disguise, armed without guns and ammunition already harming humans and silently causing the death of millions; consumption of “inorganic organic” food (A food plate of hazard) [1].

The greed of majority of the farmers is to be blamed for the circulation of these contaminated and unhealthy produce. It is true that government policies have also not been favorable to the agricultural sector but prioritizing financial gains over the lives of Africans is not the way to go. Already, all 53 African countries are highly susceptible and vulnerable, with over 760 million people are exposed to both natural and manmade hazards; why do farmers want to be responsible for death, poverty, health challenges and even loss of capital increasingly happening to people in Africa? Because of the increasing human population, there is food scarcity and insecurity and whatever developmental processes farmers are carrying out now should have the safety and health of the consumers as priority, over financial gains. The increase in food production, exploration of organic farming should not make Africans a plate of hazardous meal but a healthy food for bodily and economic growth.

There is an urgent cry to Africans to pay more attention to the food they consume, including the ones bought directly from farmers and markets as many of these produces are not safe for consumption. This confusion of inorganic for organic food has been going

on for a while and unfortunately, the more you see, the less you find out. As a continent, we should be afraid but we need more than fear ; we need change of actions, government intervention through grants, loans and provision of post harvest storage facilities.

Effect Of Chemical Fertilizer And Pesticide On Human Health

Generally, beans are great source of protein for humans and are consumed in various ways such as being cooked with rice, in curry dishes, in desserts or even as a paste. The legume crop, *Vigna unguiculata* also known as cowpea, black-eyed pea, catjang, china-pea or southern-peas are mainly grown in tropic and sub-tropic regions which most African countries belong to (Hassan et al; 2019). This popular legume grown in Nigeria, Africa are usually dried and stored for local consumption or traded and exported to countries across the world, especially the European Union. Unfortunately, the EU has placed a temporary ban on *Vigna unguiculata* originating from Nigeria due to the discovery of dichlorvos pesticides between 0.03mg/kg to 4.6mg/kg and this was contrary to the acceptable limits of chemical residue. Before the suspension in 2013, Nigeria was the largest producer of dried cowpea in the world, accounted for almost half of the global production of beans. The Director General, Nigerian Agricultural Quarantine Service (NAQS) reported through that as a result of this loss in position, the country loses almost \$370m annually. Pesticides are poisons specifically produced to get rid of pests and other related insects. Pesticides are important agricultural management tool; they increase yields and increase protection against insects at pre-harvest, post-harvest as well as during storage. Insect pests such as *Maruca vitrata* commonly known as bean weevils bore holes into the bean pods, thereby reducing the quality of the grain; hence the justification to increase in pesticide usage in bean production. According to Henshaw Uchechi, Okoro Iwu and Iwara Arikpo Iwara, dichlorvos (2, 2-Dichlorovinyl dimethyl phosphate-DDVP) exerts its toxic effects by irreversibly inhibiting neural acetyl cholinesterase. The inhibition provokes the accumulation of acetylcholine in synapses with disruption of nerve function. The short-term and chronic exposures of humans to dichlorvos results not only to the inhibition of the enzyme acetyl cholinesterase, but also with neurotoxic effects including perspiration, vomiting, diarrhea, drowsi-

ness, fatigue, headache, and at high concentrations, convulsions, and coma. Although, no information is available on the reproductive, developmental, or carcinogenic effects of dichlorvos on humans, the chemical residue still upsets the general wellbeing of man. Effects on motor nerve fibers in skeletal muscles can include muscle cramps, muscle fasciculation, muscle weakness and flaccidity. The cholinergic effect in the central nervous system results in drowsiness, fatigue, mental confusion, headache, convulsions, coma and even death [2, 5].

Furthermore, pesticides have been reported to cause several adverse health issues, though this is dependent on the exposure level and duration. Some of the health complications ranges from mild allergies, skin rashes to difficulty in breathing, Alzheimer, Parkinson, amyotrophic lateral sclerosis, asthma, bronchitis, infertility, birth defects, attention deficit hyperactivity disorder. Pesticide exposure has been linked to cancer of various types such as brain tumor, leukemia, breast cancer, colorectal liver, lungs and, prostate cancer. Excessive usage of chemical fertilizers is harmful to human health. It runs off into surface water and seep into the soil and drinking water source. High levels of nitrates and nitrites in synthetic fertilizers have been associated with diseases like hemoglobin disorders, and diabetes.

In some other countries in the world, there have been reports of chemical residues detected on food that exceeded the Maximum Residue Limit values. One example of this is in India; over 15% of vegetable samples that were tested for presence of insecticides exceeded the MRL. In addition, Brazil has also recorded that about 3% of food samples had chemical residue which surpassed the MRL on two different occasion of Brazilian pesticide residue monitoring program. In Poland, a little less than 40% of samples of Polish cereal grains had pesticide residue with 3% of the samples contained residues above the MRL. Pesticide residues were also found in children's fruit snacks in Chile [6, 7].

In 2013, a total of 24 Nigerian agricultural produce were rejected by the United Kingdom; this figure almost doubled in 2014 and in 2016, more agro-produce were rejected. This called for an extension of the EU ban which was supposed to expire in 2017. Due to the observed non-compliance to the pesticides and other related chemicals minimum acceptable residue level of 0.01mg/kg; the European Union has extended the ban twice, first till 2019 and then, till 2022 making the country count more loss on exportation. It is uncertain that before 2022, there would not be an extension of this temporary suspension as not much has changed about the agricultural practices in Nigeria.

Case Study (Nigeria)

On the 22nd of August, 2021, a Nigerian print media company reported that agricultural commodities exporters and other stakeholders in the second largest sector of the country have bemoaned the continuous rejection on some of the country's agro-products which they attributed to the alleged ineptitude of the regulatory agencies. Some of the rejected goods include beans, sesame seeds, melon seeds, dried fish, dried meat, peanut, groundnut, palm oil and yams. These food produces were banned by the European Union (EU) for not meeting the required standard due to a claim that constitutes danger to human health due to high presence of pesticide and chemical residues. Few weeks later, on September

1st 2021, another media house, Sahara Reporters, reported that the United States along with some EU countries rejected agricultural exports from Nigeria because the produces exceeded the maximum residue limits. This claim buttresses one of our researches that revealed that majority of the vegetables in the Nigerian markets are high in cancerous substances which could be linked to inorganic fertilizers and synthetic pesticides.

Case Study (Kenya)

Snap bean (*Phaseolus vulgaris*) production in Kenya is largely produced exportation to the European Union. Overall, snap bean accounts for one quarter of Kenya's vegetable exports. It is worthy of note that Kenya is the second-largest exporter of green beans to European countries, however, there are produce quality concerns and this include the presence of pesticide residues, and noncompliance with the technical standards among other factors. These chemical residues emanate majorly from the application of restricted and banned pesticides. Several pesticide ingredients, including dimethoate, abamectin, beta-cyfluthrin, chlorpyrifos, cypermethrin, chlorpyrifos + beta-cyfluthrin, and diazinon are now restricted or banned in the production of snap beans yet some are still being used in crop protection. In a study carried out in Kenya in 2018, the nitrate content in fruit and vegetable samples ranged from 100–160 mg/100g fwb in amaranth, 180-200 mg/100g in kale, 120-180 mg/kg in tomato and 195-210 mg/100g in mango sold in the peri-urban and urban retail outlets. Kale, one of the most consumed vegetables in Kenya recorded the highest content of 200mg/100g fwb in Nairobi urban retail outlets. The study determined the daily intake of nitrates from kale to be 400mg, an amount which is far much higher than the maximum safe daily intake of nitrate recommended by WHO for adults, pegged at 220mg. Heavy use of pesticides in tomato, kales and amaranth production was also evident in the foods as indicated by the high level of pesticide residues some of which were above the recommended maximum limits. The same study by Kuyanga, showed that there is lack of compliance to food safety standards and hygienic practices, thus predisposing consumers to health risks. As a guest writer on foodtank.com, the British agro-ecologist, food activist and enthusiast, Edd Colbert who works for Feedback wrote an article, "Rejected: Almost Half of Food Grown in Kenya for Europe is wasted". According to Colbert, there is food wastage in Kenya and it is not as a result of spoilage but because these produces were grown for Europe and about 45% ended up not meeting up with the specifications of European retailers.

Case Study (Cameroon)

Cameroon is one of largest cocoa producers in the world and it exports about 75% of its production as raw beans which are produced mainly by small-scale farmers; who are guilty of using synthetic agrochemicals to maximize profits. Cocoa is an important source of State revenue and of economic activity in rural areas. The implementation of the EU regulation has led to a 41% fall in West Africa's exports to the EU compared to non-EU countries.

Vanguard Newspaper, a print media in Nigeria, West Africa published in 2013 that Cameroon's cocoa harvest was rejected by the European Union (EU). Specifically, it reported that about 2000 tons of cocoa beans failed to be certified due to high level of chemical residue found in the products which are considered harmful to the health of consumers.

The effect of rejected food and why Africa should be afraid Why should Africa be afraid?

Climate Change

As in Kenya's case, rejection of agricultural produce causes food wastage. While some of the rejected produce land on someone's table, others get spoiled and are dumped in the landfill as food waste. The decomposition of these wastes contributes to the generation of Green House Gases (GHGs) which are the main culprits of ozone layer depletion, climate change and environmental pollution. Methane gas is produced from the decomposition of these decayed agricultural produce and it finds its way into the environment. Agriculture is the predominant source. At least 25% of today's warming is driven by methane from human actions. Methane is produced through the decomposition of organic waste under anaerobic conditions typically found in landfills and large dump sites; with indiscriminate disposal of waste, most especially food wastes, methane is everywhere in Africa. CH₄ is 87 times worse for the environment than CO₂. It is therefore appropriate to state that agricultural produce rejection plays a major role in environmental pollution and climate change.

Poverty

A metric done on Macrotrend website confirmed that majority of Africans live below poverty line; live on less than \$5.50 daily. It is understandable that rejection of food exports would worsen the situation of farmers and the citizens of the continent. Since the Vigna unguiculate export ban in 2013, Nigeria has been losing hundreds of million dollars on exportation. This enfeebles the economy and the country's GDP. The farmers' frustration to make it out of poverty is a major reason they have adulterated the organic farming system to achieve more yield and consequently, more profit. Unfortunately, there is not enough awareness and enlightenment to reveal the vicious cycle to them. Rejection of food exports means little or no return on investment, why would they not sell these 'inorganic' organic food crops to Africans at the local markets? Their choices are between being depressed, mentally and psychologically impaired or at worse, death and being instrument to increasing terminal illnesses in our overpopulated, sub-standard hospitals by selling agricultural produce with chemical residues that are more than the acceptable levels. This difficult choice is a top factor dissuading African youths from delving into practice of agriculture, hence, taking the continent farther from achieving, Sustainable Development Goal 'Zero Hunger'.

Hunger

Eradicating hunger in Africa is getting more difficult to achieve despite the aids and support from developed countries and international organizations. Climate change is a reason why food shortage is prevalent in Africa. In recent years, the productivity pattern has changed with rainfall and water being less predictable than before. This has affected planting seasons as well as agricultural yields and profits. Prices of food have increased significantly, leaving most Africans struggling to get daily meals. As of 2019, World Vision estimated that about 234 million sub-Saharan Africans were chronically malnourished, more than in any region of the world. Malnutrition can lead to decreased energy levels, delayed maturation, growth failure, impaired cognitive ability, diminished capacity to learn, decreased ability to resist infections and illnesses,

(Fawole et al., 2015) shortened life expectancy, increased maternal mortality, and low birth weight. Nearly 20% of the continent's population is hungry. This will cause for desperation and irrational actions that seeks self before others.

Diseases

When food products are rejected by International bodies, these agro-products find their way into the local markets; and end up on people's plates. The effect of consuming such foods poses as a risk to the health of consumers due to contamination and ingestion of toxic chemicals. There are acute and chronic diseases associated with the ingestion of pesticides and chemicals through food and they have been earlier stated in this paper.

Have you wondered why people who are perceived to eat healthy still develop terminal diseases?

Why are terminal illnesses increasing despite eating healthy?

It has been repeatedly said that we are what we consume and we should watch what we eat closely but how far can we really see? Do we all start growing our own food in our houses or do we still have to trust the poor, frustrated and desperate rural farmer? Can we identify the fruits, vegetables and food crops with pesticide residues by mere sighting? Definitely not! We might continue to feed on 'plates of hazard' as most agricultural produce contain chemical residues from use of pesticides pre-harvest and postharvest during storage. The beans that are being preserved using a common insecticide, Sniper cannot look different from the one free of pesticide usage. What should Africans do in order to cease living and eating in fear?

Biomass: A Solution To Africa's Fears

Biopesticides And Biofertilizers: The Solution To Africa's Agricultural Issues

Bio-pesticides are natural, biologically occurring compounds that are used to control various agricultural pests infesting plants in forests, gardens, farmlands, etc. There are different types of bio-pesticides that have been developed from various sources (Kumar et al., 2021). The only solution to ensuring food security and eating unadulterated organic foods is by formulating effective biological pesticides and fertilizers to replace synthetic chemical usage. This would not only preserve human health but also lengthen life expectancy, protect the environment, reduce GHGs and provide a sustainable economic development. There are potential alternatives such as *Tithonia diversifolia* and *Eichhornia crassipes* for production of biological fertilizers and pesticides.

Tithonia Diversifolia As Fertilizer And Pesticide

T. diversifolia, also known as Mexican Sunflower despite originating from Mexico has been reported in Kenya, Malawi, Nigeria, Rwanda and Zimbabwe. In addition, it is also known to occur in Cameroon, Uganda and Zambia. It is a source of nitrogen, phosphorous and potassium for the healthiness of crops. It is a shrub in the family Asteraceae, and the plant is widely distributed along farm boundaries in the humid and sub-humid tropics of Africa. The green biomass of *Tithonia diversifolia* has been effective in nutrient source for *Oryza sativa* in Asia and more recently, for green vegetables and maize in some parts of Africa (Jama et al., 2000). Its biomass decomposes rapidly after its application into the soil. In a study carried out by Jama et al., it was established that Phos-

phorus release from soil incorporated green biomass of tithonia is rapid, and it can supply plant-available P at least as effectively as an equivalent amount of P from soluble fertilizer. Green biomass of tithonia contains as much K as N. Tithonia biomass can effectively supply K and thereby overcome K deficiency and increase crop yield. Green biomass of Mexican Sunflower is undoubtedly a potential source of N, P and K for crops. Micronutrients are supplied by tithonia mulch which resulted in better shoot and root biomass as well as yield.

Additionally, *T. diversifolia* doubles as a fertilizer as well as a pesticide as it has an insect removal action when planted in a hedge around the crops. This plant is invasive and in abundance in Africa, especially in Nigeria, and should be tapped into, researched and formulated into organic fertilizers and pesticides as a replacement to synthetic agrochemicals.

Eichhornia Crassipes

Water Hyacinth also known as *Eichhornia crassipes* is one of the most obnoxious aquatic weed and is ranked eighth in the world (Viveka and Beslin, 2020). It poses lots of problems to humans and aquatic animals but it also possesses fertilizing abilities. The excess fertilizer demand is met by imports, but the import of fertilizers is expensive and synthetic in origin (Naika and Gracy 1996). Water hyacinth is utilized as a helpful plant instead of a disturbing weed. It is used as a fertilizing agent, input to biogas plants, animal feed, etc. (Mukhopadhyay, 1980). In African countries, *E. crassipes* are in abundance and are been disposed of. Studies have shown that they have more potential than most invasive aquatic plants that have been studied for biofuel usage. The aquatic plant can be either used directly as harvested or dried to be used to mix with the soil or as mulch. It breaks down quickly and can be mixed with ash, other soils and some animal manure to increase soil fertility and crop yield. Also, it does not take much capital to produce large quantities to useable fertilizer in areas with poor soil. The byproduct of the biofuel process is slurry which has been reported to be rich in N.P.K. for soil conditioning.

With intensive research, the wealth in every waste would be discovered. *T. diversifolia* and *E. crassipes* are mostly unwanted, invasive, disturbing plants in the environment but there are hidden potentials attached to both plants to help with healthy living and food security in Africa. An award-winning journalist, Esther Omopariola stated that water hyacinth is not a pleasurable experience for most rural shanties along the coastline of Lagos, the economic hub of Nigeria; as this aquatic weed interferes brutally with the daily living of the occupants in these communities. In addition, she pointed out how this plant encourages the growth of mosquitoes which causes one of the deadliest sicknesses in Africa, malaria. Just as *E. crassipes* is disturbing the water environment, tithonia is taking over the farmlands as weeds; however, if these two plants are intensively researched, and their advantages harnessed, then Africa will be producing its own sustainable biological fertilizers and pesticides; thereby staying away from use of inorganic fertilizers and pesticides. Africans would eat healthy and organic crops, put a stop to rejection of export crops and as a result grow their economic standards.

Where are the African scientists, agronomist, horticulturists, and botanist?

It is worthy of concern that yearly, ten thousand of university graduates bag a degree in Agriculture yet issues such as food rejection by international bodies due to chemical residue continue to linger. Poverty and bad governance has taken the attention, zeal of those with the basic knowledge of agricultural affairs and replaced it with the instant gratification to make gains. If it is not happening in their sector, they would rather be where the money is. Little did they know that the search for solution to contemporary issues such as this is sustainable. A population struggling with poverty, hunger among other basic needs of life is expected to be desperate about finding alternatives to means of livelihood not saving the world. In Nigeria, for example, more than half of the graduates in agricultural sciences have diversified into being artisans, fashion designers, banking, entertainment, teaching among others. Only few are willing to practice agriculture, and they are disadvantaged because of the stiff government policies to support young farmers and researcher. In as much as the educated persons are out there chasing money, the production of our food will continue to be in the hands of the inexperienced or the vulnerable, frustrated rural farmers.

The Role Of Ignorance

The role of ignorance cannot be overemphasized. There is an inadequate rural extension education, a responsibility of the government and the Ministry of Agriculture. A whole lot of farmers as well as consumers are not enlightened. Consumers need to be aware of the kind of soil enhancements used to make the food they eat, while farmers should know about clean alternatives, considering the human health and environment when choosing their farming methods. The people should know enough to request of the government storage facilities, financial grants and loans for researches, extension education, and awareness to help battle ignorance as well as agricultural issues in the continent and encourage healthy farming.

The Will To Trend And The Greed To Make Profit At The Expense Of Life

Greed At The Expense Of Human Lives

In a bid to make excessive profits off ignorant consumers, some greedy farmers showcase aesthetically beautiful inorganic, sometimes, hybrid agricultural produce to unsuspecting Africans. This group of farmers toy with the lives of humans, making their precious lives insignificant by producing for them foods that can harm their body. They believe they would not make as much if they practice 100% organic farming, hence, they prefer the consumer's ignorance as it is the strength of their own sales. Africans should really be cautious of what they ingest until the usage of organic fertilizers and pesticides is prevalent in the continent.

Production of organic fertilizer and pesticide: how cheap and sustainable?

Not only is the production of organic cheap, it is also sustainable as we have abundance of potential nutritive plants in Africa. However, farmers need to be willing and open to alternatives and flexible in their approach to finding solutions. One of the major steps

into producing this bio-pesticide and bio-fertilizer is setting up an anaerobic digester with locally fabricated materials for digestion of the plants. During the process of using this digester, biofuel is produced while the byproduct; slurry and liquid left will be a quality organic fertilizer, considering the right materials composition [8-35].

Conclusion

While Africa continue to fight poverty, climate change, diseases, endemics, terrorism; we must also put in front of us urgently, the issue of being continuously served the 'hazardous organic food' being rejected by international bodies.

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