

ANALYSIS OF BIODIVERSITY AND FOOD PRODUCTION IN NIGERIA

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Abstract

The paper is developed around the Year 2013 World Environment Day theme of “Think. Use. Save.” A companion paper to this is devoted to discussing the first keyword in the theme. “Think” The title of the paper is “Thoughts on food-producing plant biodiversity of Nigeria.” This paper is devoted to addressing the other two key words of “Use” and “Save,” with “Use” interpreted to mean Utilize, while “Save” is interpreted to mean “Conserve.” The two have been incorporated into the title of this paper, which is “Utilizing and Conserving Food-Producing Plant Biodiversity of Nigeria.” The paper explains what utilizing foods involves. It also explains the issues that need be addressed in food utilization in a country like Nigeria, which is representative of the countries within the West African sub-region. These issues include getting the best out of the foods, getting the foods at affordable prices, getting them in diverse varieties, getting them to provide adequate nutrients at affordable prices and in diverse varieties, all the year round and getting them in their best forms at all seasons of the year. Comments are made in the paper, on other issues that are germane to adequate utilization of foods in the country. The paper also discusses conservation of food-producing plant biodiversity of Nigeria. This it starts with examining the importance attached to foods and food production. It highlights 3 main issues for effective conservation of food-producing plant biodiversity of Nigeria. These are adequate conservation practices, short-term actions and long-term actions. Each of these issues is discussed, with a view to shedding light on how the country can manage effectively her food-producing plant biodiversity, to feed her teeming human populations on sustainable basis and leave enough to export to other countries of the world, after assuring food security on an equally sustainable basis.

Key Words: Utilizing, Conserving, Food-producing plants, Short-term Actions, Long-term Actions, Sustainability.

IJAFS 4, 2013, 8: 464- 473

Accepted for publication, August, 2013.

Cite as IJAFS 4 (1&2), Pp 464–473

Introduction

With the theme: “**Think. Use. Save**” for the World Environment Day for Year 2013, the United Nations has set the minds of the governments of all nations of the world and in particular, environmentalists thinking about the all-important food issue. This is an issue which will not only embrace the above theme, but cover such other issues as nourishing foods, food security and sustainable human populations, for which food must be provided by the diverse nations of the world.

The first word in the theme: “**Think,**” has expectedly set the minds of people thinking on the food issue. The author has in a companion paper to this one on the title “**Thoughts on food-producing plant biodiversity of Nigeria,**” shed some light on the diversity of food-producing plant diversity of Nigeria, the diverse challenges they are facing and the possible strategies for overcoming the challenges. This has therefore

taken care of the “**Think**” issue of the theme. The other issues of “**Use**” and “**Save**,” have been interpreted in a way that will make them fit appropriately into the title’s focus on Food-producing plant biodiversity of Nigeria. The word “**Use**” is interpreted to mean **Utilizing**, while the word “**Save**” is interpreted to mean **Conserving**. The two have been incorporated into the title of this paper, which is “**Utilizing and Conserving Food-Producing Plant Biodiversity of Nigeria.**”

Following the prompting by the key word “**Think**” in the theme, a deep thought on food issue in any nation must of necessity, extend to how to make the food-producing plant biodiversity attain sustainability, in spite of using them as much as possible. This is what is attended to in this paper, which has its focus on Nigeria, as a representative of West African countries, whose needs for utilizing of foods differ markedly from those contained in the literature on the needs of utilizing foods in the developed countries of the world, as discussed by Taiwo (2013).

Utilizing Food–Producing Plant Biodiversity of Nigeria

In Nigeria, what utilizing foods involves include the following:

- i. Getting the best out of foods, in terms of the appropriate nutrients, in the forms of carbohydrates, proteins, fats, vitamins, minerals and water;
- ii. Getting the foods from affordable sources;
- iii. Getting the foods in diverse varieties to the satisfaction of all the people who eat them;
- iv. Getting them to fulfill the criteria in (i) to (iii) above, all through the year round;
- v. Getting the foods in their best form, all through the seasons of the year.

Other issues that the keyword “**Eat**,” interpreted to mean **Utilization** imply, include:

- a) Buying what the family requires for a certain period;
- b) Cooking what the family can eat at a time;
- c) Preserving what can not be finished at a time;
- d) Disposing of what can not be preserved properly;
- e) Packaging the food materials properly, to make them appeal to consumers of these food materials.

These issues are regarded as the most prominent of all issues involved in food utilization in a country like Nigeria. They are attended to in turn in the write-up below:

Getting the best out of food

Foods are known to provide the body with certain nutrients that make for adequate growth and development of the body. They also help in warding off certain deficiency diseases in the body, relating to deficiencies in vitamins and mineral nutrients. Lucky enough, Nigeria is blessed with diverse groups of food-producing plants, that can supply the body with these nutrients, which must be present in the diets of the people in adequate forms and in proper proportions, to make such diets balanced. This is what a large percentage of the people lack. This lack can in most cases be attributed to ignorance of most people in what to eat in their daily diets, to obtain balanced diets. This is where the need for appropriate education on foods and diets comes in. The general public, many of whom are still illiterate, need be properly educated in what to eat daily to get the best out of the foods.

Getting the foods from affordable sources

What this implies is getting the foods at prices that are pocket friendly. This can only be possible when the foods are produced massively locally, without being imported. The foods are also likely to be cheaper, if the costs of production are cheap, as well as the costs of their transportation to the buyers. These are areas in which adequate government actions come in, together with better methods of transportation and available infrastructural facilities that aid transportation and food preservation.

Getting the foods in diverse varieties

This implies that the people are not forced to source their food nutrients such as carbohydrates, proteins, fats and oils and others, such as vitamins and minerals, from the same source for each of the nutrients. For example, the carbohydrates need not be from cassava meals alone. Similarly, people should be able to source the diverse food nutrients from as many of the different food items from which they are got in the country, without much stress. This is again where proper education of the people in feeding on diverse varieties of foods, comes in.

Getting the foods to provide adequate nutrients, at affordable prices and in diverse varieties, all the year round

These are all possible where the food policies on these issues are put in place. One of such policies is that of encouraging irrigation of farmlands in all parts of the country and establishment of silos in all parts of the country, to store the storable foods in locations that are easily accessible to the people in all parts of the country. With these types of policies coupled with available hands to produce the diverse foods on a large scale, all the year round, foods that are capable of providing adequate nutrients, at affordable prices and in diverse varieties, can be available all the year round in Nigeria.

Getting the foods in their best forms at all seasons of the year

This is a possibility when the food crops are either produced all through the year, or are stored properly and made available in the best forms all through the year. These are all possibilities when irrigation and proper storage facilities are put in place at all parts of the country.

Comments on other issues involved in adequate utilization of foods in Nigeria

As in other countries of the world, some losses do occur to our foods in Nigeria. However, most losses occurring to foods in a country like Nigeria, are either at the production centres – the farmlands, along their transportation to buying centres and during storage, prior to sales. This is particularly true of perishable food items like vegetables, condiments and fruit drinks, such as mangos, oranges, banana and pine apples. Loss of foods at the family level once they are bought is very minimal in Nigeria. Losses of foods may however occur when families buy foods and use them for catering for large crowds of people in ceremonies and parties. But then, such ceremonies and parties are only the exclusive preserves of families who can afford them. Even then, such families are those that usually have the equipment to store such perishable foods that are in excess of immediate need. They are also the group who can afford to dash out such excess perishable foods when cooked, to the needy around them.

In spite of the above comments on how food materials are utilized in the country, the following pieces of advice are still relevant, on how best the people can utilize their foods in this era of austerity, when the money to buy the foods are not only scarce, but having a lot of other equally demanding issues on which they can be spent. The pieces of advice include the following:

- i. Each family should ensure that it buys what it requires for a particular length of time. This implies not buying on impulse (Taiwo, 2013). This implies not buying because you see such items in the market in a large quantity at a time, or because you have some extra amount which you can afford to spent on such foods at such a time.
- ii. Each family should cook only what it can consume at a time, not allowing for left-overs.
- iii. Where food materials are bought in quantities much beyond what can be readily consumed over a period of time, or are cooked beyond what can be readily eaten at a time, such extra foods should be preserved, using the best methods available to such families. Such methods may include refrigeration. They may even involve adding some preservatives such as salt to such food items, before covering them with adequate materials such as polythene bags.
- iv. Where left-overs of food materials can not be preserved properly, such left-overs may be given to domestic animals kept by that family, or used as manure for the garden that is maintained at the back of the house.
- v. People who are involved in marketing the food materials, should take advantage of modern technology to package the food materials in such a way that will make them appealing to consumers of these food materials. This is particularly so for the diverse easily-perishable food materials. Transparent polythene bags and plastic containers are now available in different sizes that can be used to keep these food materials and make buyers see through such containers, to view the food materials before ever buying them.

Conserving Food-Producing Plant Biodiversity of Nigeria

While it is true that all forms of plant biodiversity of Nigeria are in need of conservation, the food-producing plants because of their unique importance in the economy of the country, deserves a priority attention, which must be focused, in order to justify the rating attached to it in the scheme of things in Nigeria. This unique importance attached to foods and food-production, stems out of the following:

- i. Foods are needed to feed the ever-growing population of Nigeria, whose rate of growth is put at 3 percent per annum;
- ii. Foods are needed to feed the equally ever-growing populations of livestock species, farm animals and poultry species of Nigeria;
- iii. Food-production locally within the country, in sustainable quantity, will not only help in redeeming the image of the country from one that depends on massive food importation to sustain its population, it will also enable the country to save its scarce foreign exchange being currently expended on massive food importation, which is put at 11 billion dollars annually (The PUNCH, 2013);
- iv. Massive food production locally, will make the country meet her immediate food needs and also leave some, which can be stored for future use or exported to earn foreign exchange currency for the country;
- v. Massive food production will help in engaging the unemployed youths of the country in this productive sector of the economy, that has a potential for sustainable growth, which through such growth can continuously provide means of livelihood and employment for the massive population of the country;
- vi. Massive food production will help in putting into profitable uses, the hitherto-minimally utilized land resources of the country, which can now have their potentials fully exploited for cash and food-crops production, as well as have

their pastures managed profitably, to solve some social problems of transhumance of Fulani graziers and their livestock, across the country.

Towards Effective Conservation of the Food-Producing Plant Biodiversity of the Country

To go about conserving the food-producing plant biodiversity of the country effectively, three strategies are being proposed. These strategies involve:

- i. Conservation Practices;
- ii. Short-term Measures;
- iii. Long-term Measures.

Adapting Conservation Practices for food-producing plant biodiversity in Nigeria

Conservation of natural resources which involves “carefully planned scientific management of the natural resources” (Fatubarin, 2009a), involves a number of activities. These activities (Fatubarin, 2009a) noted, as including following:

- i. Investigating the natural resources;
- ii. Protecting the natural resources;
- iii. Repairing the natural resources;
- iv. Maximizing the use of the natural resources;
- v. Upgrading the natural resources.

The food-producing plant biodiversity of Nigeria, include plants which are part of the natural vegetation of Nigeria and those that are planted either as food crops or cash crops. Those that are components of natural vegetation of the country, include some vegetables, some condiments and a number of edible oil- producing plants. There are also some edible fruits and seeds, got from some plant species existing as components of natural vegetation. There are also the animal live foods in form of pastures, such as grasses and legumes and the browse plants, which are all components of the natural vegetation of the country, which are natural resources, as defined above.

There are also the food crops such as the root crops, the stem tubers, the cereals and the legumes. Others include many vegetable species, a large number of condiments and some edible oils and spices. There are also the fruits drinks, the wines and beer-producing plants and some edible fruits and seeds. These food crops as well as the cash crops in such plants as cocoa, oil palm, ground nut and sugar cane, are all plants which though are grown in monocultures are semi-natural ecosystems. They too form part of the plant biodiversity of the country. They all need to be properly investigated. Such investigations must specify their **types** as classified above, their specific **locations** in the country and the **abundance** in the diverse locations. Such investigation must also extend to their **management needs** to **multiply them** in these locations and possibly **extend their geographical range** over a larger area than where they exist at present.

Protection of the food-producing plant biodiversity of Nigeria

This is a conservation practice that is aimed at ensuring that these plants are not misused or destroyed or over-exploited, thereby reducing their number in terms of species or their productivity.

Repairing the food-producing plant biodiversity of Nigeria

This is a conservation practice aimed at restoring any of the groups of plants involved in food-production, to its original production capacity, prior to such damage. Such species identified as needing such repair, may be fertilized or subjected to any other treatment that may restore their productivity.

Maximizing the use of the food-producing plant biodiversity of Nigeria

This is a conservation practice aimed at achieving the optimum possible in terms of benefits from these plants. This management practice underscores the fact that conservation does not in any way, connote “non-use” of the resources. This understanding is possibly what makes United Nations include “Use” as a key word in the theme “**Think. Use. Save.**” for the World Environment Day of Year 2013. However, the concept “Use” when applied to our diverse food-producing plants in Nigeria, should not be construed to mean “over-use,” as in the case of over-cropping and over-grazing and such other human-induced activities, that tend to reduce the productive capacity of these food-producing plants. Hence, the concept of maximizing the use of these food-producing plants, has to be applied judiciously. One such judicious approach, is to ensure that part of the funds generated from the use of these resources, is ploughed back into improving their productivity, extending their spread geographically and improving on their quality.

Upgrading the food-producing plant biodiversity of Nigeria

This is a conservation measure, aimed at improving the productive capacity of all our food and cash crops in Nigeria. For instance, the vast lands of savanna region of Nigeria, noted for the poor quality of their woody species, can have their productivity boosted, by planting them with suitable high breed food-producing plants which are not only of high quality but also disease-resistant. This can also be done with the pasture lands, through the introduction of high breed species of grasses and legumes.

Other Actions capable of assisting with the Management of Food-producing Plant Biodiversity of Nigeria

I. Adopting Short-Term Actions on Specific Issues on Food-producing Plant Biodiversity of Nigeria

A number of short-term actions need be put in place, to tackle the all-important “food-issue” of Nigeria headlong. These actions are called short-term actions, because they are actions which could commence immediately, while further strategizing is being done on the long-term actions (Fatubarin, 2009). Prominent among the short-term actions needing immediate deployment are:

- i. Encouraging the establishment of large-scale crop-producing centres all over the country. The ideal thing would be to have as many local governments that have suitable lands for crop production, reserve some of such lands for this purpose.
- ii. Ensuring that crop production is skillfully integrated with forestry (otherwise known as silviculture). This practice is known as agro-silviculture.
- iii. The Federal Government should continue with the Presidential initiatives of making every zone of the country, pick a few crops and produce these massively, both for local consumption and for possible exportation of the surplus.
- iv. The primary and secondary institutions of the country, should be encouraged to go into suitable agricultural activities, that are convenient for their location. This used to be the practice in the distant past. It will help to engender in the pupils, a love of agriculture, through being encouraged to grow with it while in the schools.

- v. The governments at all levels, should do whatever lies in their power to encourage farming activities in the country, though massive assistance in the following:
 - i. Making land acquisition for agriculture easy for genuine farmers;
 - ii. Making access to agricultural loans easy for genuine farmers;
 - iii. Rendering assistance in the supply of agricultural inputs;
 - iv. Facilitating mechanization of agricultural activities;
 - v. Provision of adequate storage facilities in all parts of the country;
 - vi. Intensification of irrigation system in all parts of the country, not limited it as it is the present practice, to only one part of the country;
 - vii. Adopting the best weed control measures within the country;
 - viii. Embracing organic manures in crop production, in preference to dependence on artificial fertilizers which are having some adverse consequences;
 - ix. Intensification of plantation agriculture, involving not only the food crops but also plantation crops, such as cocoa, oil palm, ground nut, among others;
 - x. Adopting and adapting all good agricultural practices noticed in other parts of the world.

II. Adopting Long-Term Actions on Specific Issues on Food-producing Plant Biodiversity of Nigeria

Besides the earlier outlined short-term actions on some issues affecting food-producing plant biodiversity of Nigeria, are the long-term actions, which will require longer planning to implement them. These issues include the following:

- i. Planning for adequate food security in Nigeria;
- ii. Adopting a coordinated interdisciplinary approach to solving environmental problems affecting food production in Nigeria;
- iii. Planning for the ever-increasing human population;
- iv. Human Capital Development in food producing issues.

Planning for adequate food security in Nigeria

This is an issue that is of vital importance. It is also pertinent on the important issue of managing food-producing plant biodiversity of Nigeria. The truth that we in Nigeria must appreciate is that for any nation to be truly great, much attention must be paid to the issue of guaranteeing food security for the people of the country, irrespective of the population of such a country. It is also equally true to remark that the larger the population of a country, the more serious the challenge of guaranteeing food security for such a country.

Nigeria is a peculiar country for several reasons. She has a large population, which makes it the most populous black nation in the world (Fatubarin, 2012). Nigeria is a growing power block in the West African sub-region. Because of the size of the country and its location, she has become a place where many people from the neighbouring countries run to, when ever there are turmoils and wars in such countries. As at present, Nigeria is rated as the third country in the world, with a high rate of annual increase in population, which is put at 3 percent per annum. Only India and China come before Nigeria in this. If countries with massive human populations like India and China, can cope adequately with the feeding of their own populations, Nigeria should be able to do this. This assertion is made, considering the enormous potentials of the country in terms of natural resources, human resources, as well as vast land with rich soils and favourable climate.

Our governments should rise up to the challenge of putting in place long-term action plan, in guaranteeing food security for the nation. For such an action plan to be useful and serve the needs of the country in adequate food security, it must incorporate the following:

- i. Need to ensure that the food-producing plant biodiversity of the country has its sustainability assured.
- ii. Need to practice agriculture in all parts of the country in the modern ways, that can assure sustainability of the techniques.
- iii. Need to put an end to all primitive age-long activities of practicing agriculture in the traditional non sustainable ways. Examples of such age-long activities of traditional agriculture, include shifting cultivation, use of fire in clearing the lands and use of primitive technology involving hoes and cutlasses.
- iv. Need to assure sustainability in all-the-year-round agricultural production through irrigation.
- v. Need to encourage commercial (large-scale) farming in all geographical zones of the country, with each zone concentrating on crops that are most appropriate to them.

Adopting coordinated inter-disciplinary approach to solving environmental problems affecting food production in Nigeria

The issue of food security as well as that of providing solutions to the environmental problems affecting food production in Nigeria are issues much beyond the competence of a single specialist, no matter how vast in knowledge such a specialist is. World reknowned thinkers have posited that the 21st century is a knowledge-based century (Adelegan, 2009). Food security and environmental problems impacting food production are issues that will attract in-depth knowledge that will have to be contributed by diverse professionals. Notable among such professionals are agriculturists, soil scientists, food and seed storage experts, agro-silviculturists, plant protection experts and economists. All the diverse experts are spread all over our Universities, agric-based research institutes as well as other agric-based institutes, such as Stored-products research institute of Nigeria. All the federal government needs do through its relevant agencies of government, is to pool these experts, charge them with specific assignments, fund them appropriately, coordinate their efforts effectively and encourage them as much as possible, to find lasting solutions to all these issues, which are portraying the country in bad light.

Planning for the ever-increasing human population of the country

The importance of the “food factor” in human population growth can not be under estimated. It is an issue which was brought to the front burner some centuries ago in Revered Thomas Robert Malthus Theory of Population (Fatubarin, 2011). This theory, now popularly referred to as Malthusian Theory of Population or Malthusian “Population Trap,” relates human population growth to food production. In modern times, it is realized as Malthus did some centuries ago, that except food production keeps pace with the rate at which human populations are growing, there is likely to be starvation and poverty.

Measures that will make production increase tremendously; have been put forward in the short-term and long-term actions, earlier articulated in this paper. It is however important that Nigeria does something concrete about her growing human populations, so that the measures being recommended to increase food production, can achieve meaningful results of not only providing enough food in appropriate quantity and quality for the people, but also assure sustainability of food security.

While large human population in a country has some advantages (Fatubarin, 2011), it is highly desirable that such a population must be controlled. This is because uncontrolled increases in population, can have negative impact not only on the environment in general, but more particularly a pronounced negative impact on the food-producing plant biodiversity of the country. This is not to talk of the negative impact such a large population can have on the social services, among others. It is therefore important that Nigeria ensures that the growth of her population in Nigeria, is controlled. This implies that all those socio-cultural practices that are encouraging population growth in the country, are cautiously regulated. Fatubarin (2011), listed such practices as are noted in Nigeria.

The truth is that governments can only plan for a population whose figure is authentic. Where unpleasant occurrences within the neighbouring countries are encouraging illegal migration of people in large numbers into the country, there will be undue pressure on food reserves in the country. Similarly, where the population of the country is increasing at an alarming rate, it is the available food reserves that will bare the brunt of this. There is therefore the need for effective management of human population growth in Nigeria. This is important to guarantee adequate food security in the country.

Human capital development in issues pertaining to food production in the country

Issues pertaining to food production are like other issues of the environment, relevant issues that require massive investment of all governments. This is particularly so in the area of human capital development. While it is true that much is currently known about our food-producing plant biodiversity in Nigeria, much more still remains to be known. Such areas required deployment of specialized knowledge-the type of which requires modern laboratories, with sophisticated equipment and deployment of sophisticated information technology. These as earlier remarked, are the requirements for outstanding achievements and successes in any area of human endeavour, in the 21st century world. Nigeria can not be an exception. It is therefore important that our country invests massively in human capital development, in issues pertaining to food production in the country. As expected, the governments should take a lead in this area.

What is expected of governments include the following:

- i. Encouraging students to develop keen interest in programmes that are relevant to diverse aspects of the environment that relate to plant biodiversity, particularly, the food-producing plant biodiversity;
- ii. Encouraging students at post-graduate levels in agro-based programmes, towards specializing in core issues relevant to food-producing plant biodiversity;
- iii. Encouraging post-doctoral training in new techniques in food production, through sponsorship for such training. Example of this are biotechnology and genetic engineering;
- iv. Encouraging research activities in Universities in programmes related to food production and particularly, those that will enhance conservation of food-producing plant biodiversity;
- v. Develop our agro-based specialized research institutes, to world class standard and fund them adequately, to make them deliver on mandates relating to food production and biodiversity conservation.

All the above, are part of what our governments and other relevant establishments should do, to fast-track production of appropriate personnel needed in the specialized assignments involved in food production and biodiversity conservation.

In conclusion, it must be emphasized that though Nigeria has an abundant food-producing plants biodiversity, this biodiversity has to be managed effectively to assure its sustainability, both in terms of quantity and quality. This can only be done if the country effectively harnesses her human resources for this purpose. There is no doubt about the fact that the massive population of the country has to be fed adequately. Therefore the country must ensure that food security is ensured on a sustainable basis, so that the country can be relevant as a force in the sub-region of West Africa. It is also through such that the country can be reckoned with as a dependably ally in the comity of nations. Only nations that can feed their people on a sustainable basis and have enough food materials in their food reserves on sustainable basis, can truly lay claims to genuine independence and authentic self pride. The time for action in this all-important food-issue, is now for Nigeria.

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