

BIOLOGY EDUCATION FOR FOOD SUSTAINABILITY IN NIGERIA

MUHAMMAD DANJUMA

Biology Department, School of Secondary Education (Sciences) Federal College of Education Katsina P.M.B.2041 Katsina, Katsina State.

djbida50@gmail.com

Abstract

The purpose of this paper is to examine the involvement of biology education in achieving food sustainability in Nigeria. The concepts of food sustainability, education, biology education, how biology education could be used to achieve food sustainability. Many facets of achieving food sustainability through biology education were identified and they includes, grafting, cutting, layering, sack farming, room drying as well as storage. Problems militating against biology education for achieving food sustainability in Nigeria like insecurity, inadequate financing of the education sector, absence of fully equipped biology

Introduction

Presently in Nigeria, as much as 39.4% of families in the country are experiencing hunger and acute food scarcity (Osabohien, Ohalet & Osabuohien, 2020a). This alarming increase in hunger and food insecurity faced by Nigerians has made it necessary for government to take prompt action in order to ensure not only food availability but as well food sustainability. This has made Nigerians

laboratories, curriculum review as well as nonchalant governmental attitude towards education in Nigeria were equally identified in the paper. It was recommended that to achieve food sustainability through biology education, there is need for education to be adequately financed; biology laboratories should be fully equipped with modern needed equipment as well as review of curriculum of biology.

Keywords: Education, Biology, Food, Sustainability and Nigeria.

and the government to take feeding the teeming population of the nation seriously. Food provision at all times which is a basic necessity of life, has become pressing in the face of Nigeria's population which is growing at a geometric progression rate which is expected to reach 400 million people by the year 2050 (Amzat & Aminu, 2020), it has therefore become clear that it is only through food sustainability that Nigeria can reduce hunger, undernutrition, diseases which is making Nigeria to be underdeveloped.

Food Sustainability

Sustainability is rooted on a simple principle which is, everything needed for the human survival and well-being depends directly or indirectly on the human environment. Sustainability establishes and maintains conditions under which humans and the biotic world can exist in productive harmony which leads to fulfilling social, economic and other requirements of present and future generations. Sustainability is relevant as it ensures that we have and continue to have food, water, materials and resources to protect both the human existence and their surrounding environment.

The idea of food sustainability lies in how to make food and diets healthier and more freely available, accessible, affordable, safe, and desirable at all times Lang (2021). Several goals of the 2030 Agenda of the 17 Sustainable Development Goals (SDG) are connected to food sustainability and nutrition in one within the 2030 Agenda with its 17 Sustainable Development Goals (SDG). Goal 2, which is Zero Hunger, is the most relevant goal to food sustainability as it aims to “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”. Food sustainability is a concept which ensures provision of food to meet the needs and aspiration of the present generation without compromising the food needs and aspiration of the future generations. Food sustainability encompasses the methods, processes and procedures to establish and maintain a regular availability of food for the present human needs without neglecting or hampering food availability for the future generation of mankind. The concept of food sustainability has gone beyond mere food cultivation but includes food storage, food preservation and anything which minimizes unnecessary food wastage, hunger reduction and malnutrition.

Food sustainability means the ways and methods utilized to produce, provide, store and preserve food for the present mankind without limiting food production, storage and preservation of the future mankind Lang (2021). It is the provision of food on continuous bases for humankind from one generation to another. Awareness and the need for food sustainability is becoming a paramount topic in the 21st century as the human population is increasing without a corresponding increase in land and other resources, this has made it necessary to explore all possible avenues to ensure food availability for mankind on a

continuous basis. One of these avenues is education of the human race about the need and importance of food sustainability.

Nigerians need to be educated as it is only when they are educated that food sustainability can be understood, practiced and achieved. It is a generally established fact that an increase in the level of education could positively translate into a higher level of food security and sustainability.

Education

People's power to transform their society is greater now than ever before. The global fact that effective education can help to "ensure a wealthier, healthier, safer and sustainable development" calls for a serious and conscious action by all stakeholders in education, this is because education lies at the heart of promoting behavioral change in man, and it has been identified as an instrument of cultural, socio-economic, political and overall transformation and therefore, education is the key to sustainable development (Ofojebe, Chukwuma & Onajike, 2014).

Education is a process which is deliberately planned by which individuals are assisted to attain the development of their potentialities, through education, individuals acquire the necessary knowledge and skills needed for "lifelong sustainability and development of the society. Education is a fundamental human right and is very crucial for the well-being of individuals and societies. Georgewill (2006), defined education as simply the development of the totality of man and the natural world, the first world of man; implies that, through education, man develops mentally, physically, morally and spiritually. Education is one of the instruments by which individuals are equipped to participate in the socio-economic and political life of a community and to make their contributions to the promotion of social change. In supporting this, Dambazau,

(2014) stresses that education is used more as a strategic tool for advancement of technology needed for nation's economic and socio-cultural and sustainable development.

Uwadia (2010) viewed education as a process by which an individual acquires physical and social capabilities demanded by the society in which he/she is born into to function. Parankimalil (2012), opined that education as the systematic process through which a child or an adult acquires knowledge, skills, experience and sound attitudes. Amoor (2015), defined education as the tool which facilitates economic, social, political and technological advancement in all human societies. Education is the spring board for societal and global development and it brings about substantial and meaningful changes. Ibezim (2001) viewed education as a discipline comprising a body of knowledge, skills, values or experiences designed to be learned by members of the society in order to guide them in the socially approved direction and enable them to achieve their goals and aspirations. Education is the spring board for societal and global development and it brings about substantial and meaningful changes.

From all perspective it is an accepted fact that education is an indispensable concept to human beings. Education has been the tool used by mankind to achieve any level of growth and development. It is through acquisition and application of knowledge acquired from education that people achieve economic, social, political, technological and sustainable development. Amoor (2015). Education is the key to solving present problems and preventing future problems for mankind. It is this fact that leads to global demand on education that will sustain development. Developments in this 21st century are controlled and achieved by science education (biology education inclusive). Science

Education is particularly important because there is no one aspect of everyday life that science has not touched.

Biology Education

Biology is a subject which addresses majority of human needs through its relevance and functionality in contents, practice and applications. Biology education is aimed at training, acquiring and practicing of essential skills for the wellbeing of man, his productivity, development and sustainability. Araoye (2015), defined biology education is a typical education which aims at training and marketability of essential skills for the well-being of man.

Omiko (2005), opined that biology education ensures that graduates are productive and functional in a changing society, by acquiring the right attitudes, habits and saleable skills. Biology education is the act of teaching and learning in order to inculcate or transfer the knowledge of biology to the students (Okenyi, 2012). Biology education has therefore become a subject matter of great significance and concern to all. . Biology Education therefore is education in biology which is generally aimed at training individuals to understand him/her, the parts of his/her body and how the body part functions as well as the environment . Nwagbo (2009), views biology education as the branch of science education that prepares and equips individuals with scientific knowledge and skills to participate in the socio-economic and political life of their community. It is the application of principles of education in teaching and learning of biology. Biology education is an established discipline and a profession concerned with facilitating the meaningful acquisition of biological knowledge, method, and philosophy by the learners and the general public. Biology education assists in the

promotion of economic development, elimination of poverty and in the introduction of social welfare. Biology education ensures the steady production of generations of research scientists in the field of biology and equips citizens with biology literacy required for making informed decisions on personal and societal issues based on sound biological knowledge Nwagbo (2009).

From the above, it is clear that biology education is an education which equips humans with the knowledge, attitude, skills, technology and processes to solve human problems at any time. It is a study which can ensure the solving of problems in continuous ways scientifically. Biology education is a subject which can teach Nigerians on ways, methods and practices of food production, preservation, storage and as well as food sustainability which is a big problem presently in Nigeria.

Biology Education for Food Sustainability in Nigeria

One undisputable reality of the 21st century is that, the century is having more mouths to feed arising from unprecedented geometric increase in global population. This comes with important implications for the education sector as it is charged with the responsibility of solving human problems. Biology education and the education industry in general now must train students who can think deeply on critical matters, and be able to creatively solve problems especially as it regards food production, preservation and storage as with hunger people can't achieve any meaningful development in fact without food sustainability there would not only be hunger but humans will face health challenges which is detrimental to development. Students should be innovative, and be able to produce new useful products or services (Thoughtful

Learning, 2017). Some of these modern creative, innovative ways, skills, strategies in biology education to ensure food sustainability includes:

Sack/Vertical Farming: This is a cultivation technique for many agricultural products especially tuber crops like yam, cocoyam and potatoes. It requires little land as the cultivation is done in sacks which can be placed in gardens, rooftops, boxes and even backyards. With sack farming, people living in cities and urban areas can produce their own food at any season in the year. This ensures availability and accessibility of food for individuals throughout the year thus ensuring food sustainability. By teaching our students the technique of sack farming, it will go a long way to boost the quantity of food produce, reduce hunger, increase their income and improve upon their creativeness.

Grafting: Is a method of producing food plants used in biology education, which involves adding the living tissue from one plant to another living plant. The tissue of plants have the ability to grow new vascular tissue and farmers take the advantage of this ability through grafting to increase the final outputs (yields) of the product to increase the quantity of food available for consumption. Grafting entails binding two different plants together to produce a better plant both in terms of quality and quantity. This method, when taught to students will enable them grow many plants specially fruits in larger quantities and at the same time with higher quality, thus providing more food to reduce hunger and improve food sustainability for the populace.

Layering: This is one of the simplest methods of boosting the production of food without necessarily having to plant from seedling. With layering, it does not require special controlled environmental conditions, requires little space and increases harvests. In this technique, stem of a plant is bent down and dug to the ground to form a new plant capable of

producing yield which is identical to the initial plant and the initial plant will equally produce its product thereby multiplying the output of the crop or plant. This will increase food availability and serves as a sustainable way for reducing hunger.

Cutting: One of the ways to ensure food sustainability in Nigeria through biology education is through teaching students and individuals the cutting method of plant cultivation. This process involves cutting off a portion of a growing plant and re-planting this “cutting” to produce another new roots, stems, leaves and eventually becomes an independent plant which produces yields like the original plant. One advantage of layering is that the new plant from cutting matures faster and thus it gives output at a shorter period of time before the initial plant, thus ensuring food availability with increased supply.

Room Drying: Teaching our students simple room drying method of storing food stuff is equally another way to ensure food sustainability for Nigerians. Many farm products are wasted due to lack of proper storage methods and facilities awareness and thus causing food insecurity and hunger. Room drying of many farm products like tomatoes, chillies, spinach, will ensure nutritional detainment and after proper drying they should be properly bagged and stored in well aerated spaces. This will ensure continuity in their supply and availability long after their season and thus promotes sustainability of food for Nigerians.

Processing, Storage And Packaging: Another simple way in which biology education can ensure food sustainability for Nigerians is by teaching students simple methods of processing, storing and packaging foodstuff to ensure availability. Grains like maize, millet and guinea corn should be properly dried before storing and processed into

powder/flour form, this can be properly packaged in different airtight containers to prevent insects from infesting the flour. Furthermore crops like beans can be properly dried and stored in airtight drums to prevent weevils from destroying the beans (it can also be processed into bean flour and stored). This stored foodstuff should be room dried once in a while to ensure they are in good condition.

Fish and meat can be processed and stored using methods like, salting, smoking and even roasting after which they are all properly stored in empty cartons, and containers followed by proper reheating at regular time intervals. All these simple methods will ensure continuous supply, availability and sustainability of food and reduce hunger.

Challenges Militating Against Biology Education for Food Sustainability In Nigeria

Insecurity: Activities of bandits, kidnappers, herdsmen/farmers clashes cattle rustlers have left many people dead. Additionally, many farmers have been killed slaughtered like rams right on their farmlands while they were actively in the processes of food production. Many farmlands have been burnt down by these ill elements which have led to discouraging many people from embracing farming thus reducing the quantity of food available for consumption and this in turn has led to hunger and food insecurity in Nigeria.

Inadequate Financing of Education: For biology education to enable Nigeria achieve food sustainability, it requires huge funding from the government; unfortunately this finance is not allocated to education sector (biology education inclusive) in optimum quantity. The government does not allocate funds for the education sector in Nigeria

in the needed quantity and this has led to the sector not being able to achieve the desired result.

Absence of Well- Equipped Biology Laboratories: Biology education as a science subject entails a lot of practical and experimentations which can only be practiced and taught to students inside laboratories. However, it is pertinent to know that many high institutions that teach biology education in Nigeria presently have no well-equipped laboratories to carry out their practical lessons which are needed to discover new methods, techniques for food production, storage and preservation to ensure food sustainability for Nigeria and its citizens this has further compounded to the challenges of biology education for food sustainability in Nigeria.

Problems of Biology Education Curriculum: There is need to review and update the curriculum of biology education taught to Nigerian students to make it relevant to achieve the goals needed. The updated curriculum should contain more of practical than theories or written components as the solution to food insecurity and hunger lies more in practical than in writing or theories. Inadequate practical aspect of biology in the present curriculum used in teaching biology education is a major challenge to utilizing biology education for food sustainability in Nigeria.

Political/Government Attitude towards Education in Nigeria: Successive Governments in Nigeria have shown a lukewarm attitude towards education sector. The salaries of many academicians has been made to be discouraging by governments in Nigeria and this meager entitlement is paid at irregular time intervals thus making the teachers in the education sector (biology education inclusive) not to be teaching

at their optimal desired level, thus further escalating the challenges of biology education for food sustainability in Nigeria.

Conclusion

Nigeria is presently experiencing hunger and food insecurity like never before; this is in spite of the fact that education has been globally acknowledged as a tool to solve human problems. Biology education is a means of ensuring food sustainability and hunger overcoming crisis in Nigeria as it involves all aspects of food sustainability i.e. production, storage, as well as preservation. Therefore all hand must be on deck to eliminate the challenges biology education is facing so that food availability is ensured for the present Nigerians without restricting the availability of food for the future Nigerians.

Recommendations

There is a strong relationship between food sustainability and education, especially biology education. Therefore, in order to enhance biology education to achieve food sustainability in Nigeria, the following are recommended:

- ✓ The government at all levels in Nigeria must ensure the safety and security of life of all Nigerians, farmers must be protected as they partake in their occupation, farmlands ,barns, food stores, and all properties must be secured special security forces should be provided to the farmers on their farms and the farmers should be taught self-defense techniques.
- ✓ There is need for upward allocation of funds for financing the education sector in Nigeria by the government, budgetary allocation to education must be reviewed upwards so that the

sector will make its needed contribution effectively and efficiently.

- ✓ Government should collaborate with philanthropic Nigerians and companies in such a way that these companies are made to construct and equip modern laboratories needed to carry out practical and researches which are needed to ensure progress, growth, development as well as discoveries which will eventually lead to achieving food sustainability in Nigeria.
- ✓ There is every need to comprehensively review the biology curriculum taught in Nigerian schools by the government. This should be done by strictly involving experienced biology teachers and not involving politicians who have no knowledge and experience about biology and how it should be taught; there should be no political motive in the process of curriculum review.
- ✓ Government at all levels as a matter of fact desist from playing politics with the education sector in Nigeria, this it should do by remunerating teachers adequately and it should pay them as at when due, this will go a long way to ensure quality and efficiency in the education sector.

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