

## **Attaining Wealth Creation in Biology Using Botanical Gardens**

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### **Abstract**

Biology contributes to the realization of the ultimate goals of education both in all round development of students and as a means of wealth creation through botanical gardens. This is a welcome development because, the global economic recession has posed new challenges to the world coupled with the challenges of new energy technology in response to global warming. This has dwindled the economy of many nations particularly petro-mono economy countries like Nigeria whose revenue base depends mostly on proceeds from crude oil exploration. Overdependence on crude oil is a sign of blunt tentacles of Nigeria's economic prowess to other service sectors such as conservation and tourism for sustainable economic development of which botanical gardens play crucial role as their resources are inexhaustible. The opinion of this paper is that Biology education using botanical gardens can serve as a serious means of wealth creation for national development and solving the problem of unemployment. Wealth creation involves investing for income and long-term capital appreciation. The provisions in the botanical gardens like garden shed, experimental and propagation plot, vegetable plot, ornamental and experimental plot, fruits and economic trees plot, flower plot, lawn, etc. can be used by Biology students for acquisition of entrepreneurial skills which will enable them create jobs for themselves and become self-employed and self-reliant upon graduation. This paper also posits that botanical gardens can be explored to be sources of employment and means of wealth creation both for the institutions and for the nation at large as it serves the basic human needs of education, research, aesthetics, recreation, conservation, tourism, employment, public services and as event centers. These necessitate the need for proper funding and management of botanical gardens.

### **Keywords:**

### **Introduction**

The high rate of depletion of oil reserves worldwide is a cause for worry. Also worrisome is the fact that the Nigerian economy is heavily dependent on the oil sector which according to the World Bank (2006), accounts for over 95% of export earnings and about 85% of government revenues, thus the major wealth-creation sources for the country. This being a problem and source of worry over the years has caused many researchers

to be making a quest for solutions. In the year 2006, World Bank came up with diversification of economy as the only remedy which has caused Nigeria to base their 40% of export on Agricultural produce (in 2006) and this is made possible using the knowledge of biological principles to grow the economic trees (botany). A diversified economy; that is, one based on wide range of profitable sectors, has long been thought to play key role in a sustainable economy because it improves a nation's standard of living by creating wealth and jobs for the country and its citizens and encourage development of new knowledge and technology. Economic diversification can reduce a nation's economic volatility and reverse its "real activity performance" which is believed to be the major reason for unemployment and attendant social vices in Nigeria. One of the ways of achieving this is by making Biology education functional for wealth creation through the use of botanical gardens. The provisions of the botanical gardens can be used to generate business ventures in plants of economic value. These provisions can also be used to generate business ventures in different areas for the acquisition of entrepreneurial skills. The students will therefore acquire both technical biology skills as well as entrepreneurial skills that will enable them to create jobs for themselves and become self-employed. Plants of economic importance and their products can be produced with ease and relatively small capital by the students from the garden. Functional Biology education should develop in the students the right attitude, interest and skills to cope with life around them. To achieve all these, Biology curriculum should be made adaptable, stimulating and relevant to the needs of the students and the society at large. It will be aimed at acquisition of educational principles and knowledge for solving biological problems. Biology education could be made functional and can serve as a serious means of wealth creation for national development and solving the problem of unemployment through the development of botanical gardens. Hence, the call for proper funding of botanical gardens.

### **Concept of a Botanical Garden**

The garden is generally defined as a place for growing flowers, fruits or vegetables. Botanical garden is an educational institution for scientific workers and general public or lay man to awake an enlightened interest in plant life. Hence, a botanical garden is an institution for botanical research especially on the native flora of the region. The botanical garden can also be a reserved area in an institution dedicated to collection, cultivation, preservation and display of a wide range of plants labelled with their botanical names for research or educational purposes and or tourism, as it is

of immense value to the biologists, Biology teachers and students and also to millions of national and international tourists.

### **Components of botanical Gardens**

- The botanical gardens should have morphological gardens to display seed dispersal in plants, genetic or breeding gardens to display the laws of heredity and a taxonomic garden to display plant families.
- There should be arboretums - a section of economic plants, green houses and nurseries for propagating and cultivating exotic, genetic and delicate plants.
- There should be herbarium, library, photographic studies, lecture pavilion and recreational facilities, etc.

In fact, all the fundamental and applied aspects of botany come within the purview of botanical gardens and become centers of cultural activities of the region in which they are situated. The botanical gardens are the natural sources of science and culture.

According to Gankon (2015) in Kurawa (2016), a typical biological garden has provisions for the following:

- Garden shed: Is used for storing garden tools, fertilizer, etc.
- Experimental and propagation plot: For nursery beds to produce seedlings and for preparation of potted plants.
- Vegetable plot: For the production of vegetables.
- Ornamental and experimental plot: For ornamental plants.
- Fruits and important economic trees plot: For planting trees e.g. citrus plants, mango, guava, pawpaw etc.
- Flower plot: Is used to grow different types of flower.
- Lawn: For growing local grasses.
- Animal section: For keeping animals such as guinea pigs, rabbits etc.
- Fish pond: for fish farming.

All these provisions, except the last are found in the botanical gardens. In the opinion of Kurawa (2016), the provisions in the biological gardens like garden shed, experimental and propagation plot, vegetable plot, ornamental and experimental plot, fruits and economic trees plot, flower plot, lawn, etc. can be used to generate business ventures in different areas for the acquisition of entrepreneurial skills. Operating in the gardens will help students to acquire both technical Biology skills as well as entrepreneurial skills

that will enable them create jobs for themselves and become self-employed and self-reliant upon graduation.

### **Important Functions of Botanical Gardens**

Botanic gardens perform the following functions:

#### **(A) As an Institution**

1. Biological gardens serve as centers of gene pool or germ plasm bank of wild relations of economically important plants.
2. They are established as nature centers and youth museums to focus attention on destruction of tropical and temperate ecosystems and environmental degradation.
3. They are used to conduct research in environmental biology etc.
4. They are used for organizing educational programmes to create environmental awareness among children, students and train teachers in environmental education.
5. They serve as pollution indicator centers by growing susceptible plants.
6. Most of the economic plants were originally introduced and distributed to the other parts of the world through botanic gardens.
7. They provide serene sites for relaxation.
8. Advanced or aged people find a great solace in lovely botanical gardens.
9. The landscape gardens are becoming quite popular and hence a great force to the adjoining building like laboratories, museum, sport ground etc.

#### **(B) As a Reserved Area in an institution**

1. Botanical gardens act as out-door laboratories for students
2. They are used for studies on the tropical and temperate ecosystems and their biota before they are lost to science and preserve such systems.
3. They are used for maintaining less attractive and abandoned ornamental plants.
4. They are used as training centers by arborists in the trees plantations in urban areas.
5. They serve as centers of conservation of endangered and rare species.
6. Botanical gardens provide living plant materials for research.
7. They inspires poets, literatorsetc by providing aesthetical pleasure.
8. They are used in garden therapy for eye-sight, mental stress relief etc.

9. They conserve the flora and fauna in natural habitats.

### **The Role of Botanical Gardens in Wealth Creation**

Having seen the need to diversify the economy and the relevance of botanical gardens to education and other sectors, it is therefore no doubt that botanical gardens can be explored to be means of wealth creation both for the institution and for the nation at large as it serves the basic human needs of:

- Education /Research
- Aesthetics/Recreation
- Conservation/Tourism
- Employment
- Public services/Event centers

#### **1. Botanical garden as a means of wealth creation through education or research**

A well improved botanic garden is a center for education and research, being designed and implanted with different kinds of plants species which are labeled indicating the botanical names of the plants, their families, endermic originsetc such that a visitor or researcher receives the necessary information about a particular plant through the labels.

With the knowledge, many institutions take their students on excursion to visit these gardens for a clearer view of what is being taught in the classroom. Researchers also visit the gardens to carry out an out-door research on particular plant species all of which generate wealth for the institution and the nation at large because they pay for the services rendered.

#### **2. Botanical Garden as a Means of Wealth Creation through Serving the Role of Aesthetics/Recreation**

The separation of man from nature increases their yearning to nature as open green space can be planned and managed as botanical garden to enable people spend time on nature and answer their recreational needs, thus enabling psychological relief of people who feel the need to move away from their environment. This generates money for the institution managing them and for the nation (if government funded) as people visit them to see the aesthetic value of the gardens and pay money to these institutions who in turn pay tax which adds to the nation's revenue purse.

### **3. Botanical Garden as a Means of Wealth Creation through Conservation/Tourism**

Botanic gardens (including arboreta and associated research facilities) are one of the main institutions involved in ex-situ conservation of wild species with 30% of known plant diversity accounting for 105, 364 species held in the world's botanic garden (Maunder, Haven, Vitt, Guerrant, and Dixon, 2006) and these conservation sites are tourists' centers.

The tourists not only generate money for the botanical gardens but also increase the rate of a country's economic growth. Tourism is a viable part for wealth creation in Nigeria and is referred to as "largest industry in the world" because over the past six decades, tourism has experienced continued expansion and diversification, becoming one of the largest and fastest growing economic sector in the world. This implies that a country cannot just entertain tourists but empower her economy through tourists' expenditure.

Tourism is an important economic sector to be developed as one of the alternatives for bailing the country out of economic depression and hence is a reliable alternative for diversification of Nigeria economic base from petroleum to other sectors. This is because the industry can be developed and sustained from resources within the country since it consists of natural fauna and flora. Thus botanical gardens play an important role as a means of revenue generation for a nation or an institution as millions of people travel just to view the natural endowment of the important designated places.

Tourism also increases the foreign exchange earnings of most countries which is required to purchase goods and other important essentials for development of the nation. Thus, tourists' receipts form one important source of foreign exchange.

In Nigeria, based on statistical account of tourists, expenditures by international tourists that has direct impact on the national economy was estimated at ₦1.35b in 2005, ₦2.2b in 2006, ₦2.69b in 2007, ₦6.8b in 2008 and ₦53.5b in 2009 (CBN Account, 2005-2009). From the above statistics of tourists' expenditure, tourism would gradually boost the economy if only adequate attention will be given to this sector through funding conservation of botanical/biological gardens.

### **4. Botanical Garden as a Means of Wealth Creation through Employment**

Diagnosing wealth creation through botanical garden focuses on how people have been economically empowered through it. Activities of tourists begin and end with expenditure. This implies that tourism offers diverse

employment opportunities to the unemployed not minding the nature of the job or the qualification of the unemployed. For example, the services of guards, cleaners and patrol officers are indispensable in all tourist attractions like forest reserves, national parks, etc. More so, it promotes the growth of small scale industries (craft industry) and production-might of other sectors like agriculture and all these industries and the employed individuals pay tax into the nation's revenue purse. Therefore tourism is a source of employment as well as sources of wealth generation. To this, World Travel and Tourism Council (WTC, 1993) in cooperation with Whaton Economic Forecasting Association (WEFA) group reported that tourism provides direct and indirect employment for more than 200 million people, one in every nine workers globally.

### **5. Botanical Garden as a Means of Wealth Creation through Public Services/Event Centers.**

Biological gardens play diverse functions in our communities and throughout the world as many botanical gardens, even those with a primary scientific function have reached beyond their traditional audiences through outreach efforts such as festivals, special events and special sales.

Inevitably, because the gardens must be fertilized with money from visitors, they are also places of entertainment as the garden schedule of events rarely fails to include annual occasions and events of home-grown interest such as quit shows and local festivals. Many dot their landscapes with situary for their customers to admire who in turn pay for the services rendered. Therefore the gardens thus funded and maintained, become sources of wealth-creation not only for the institutions but the nation at large.

### **Wealth Creation in Biology Using Botanical Gardens**

Biology plays a vital role in the economic development of the nation (Osuafor and Amaefuna, 2016). Biology education is a typical education which aims at training and marketability of essential skills for the well-being of man. Thus, Biology education is the education that will empower Biology graduates for application of Biology knowledge and skills acquired in solving the problems of unemployment for oneself and others. This will increase the income generation capacity of Biology graduates. Kurawa (2016) observed that many school leavers and graduates of higher institutions roam the streets jobless and are predisposed to depression and different social vices. High rates of unemployment is one of the reasons for current extreme poverty, hunger and violence and leading insecurity in the country. This necessitates the need to complement Biology education with

Entrepreneurship Education to equip our graduates to be self-employed, self-reliant and secured.

One of the required facilities stipulated by the NCCE (2012) Minimum Standard for Biology Education is the Provision of biological gardens in schools where Biology Education is taught and learned. In the opinion of Kurawa (2016), the provisions in the biological gardens like garden shed, experimental and propagation plot, vegetable plot, ornamental and experimental plot, fruits and economic trees plot, flower plot, lawn, fish pond etc. can be used to generate business ventures in different areas for the acquisition of entrepreneurial skills. Operating in the gardens will help students to acquire both technical Biology skills as well as entrepreneurial skills that will enable them create jobs for themselves and become self-employed, self fulfilled and self-reliant upon graduation and also become employers of others and contribute optimally for the development of the nation. Thus, Biology education contributes to wealth creation for its graduates and then the nation at large. Consequently, our graduates who are gainfully employed will be busy, engaged and productive and hence not be involved in social vices.

According to Nayak (2003) and Kurawa (2016), some of the various Biology topics and fields (associated with botanical gardens) that can help students acquire entrepreneurial skills and therefore wealth creation include, but are not restricted to:

- Apiculture - For raising of honey-bees for honey and bee wax production.
- Aqua - culture - Comprising fish farming, prawn farming and crab culture. It also includes sea weed culture for the production of agar, agarose, thickening agents etc.
- Aquarium - Students could be taught how to maintain the aquaria for commercial fish production. This is now a very lucrative business with export markets.
- Control of insect pest - For increase of agricultural yield.
- Ecotourism - This helps students to develop skills that will enable them guide both foreign and domestic tourists to the bio-diversity prevailing in the country e.g. caves, museums, water falls etc.
- Floriculture - This is for growing of ornamental plants and flowers for export as well as for domestic market.
- Horticulture - For growing of fruits and vegetables for export and domestic use.



- Mushroom culture - This is a good business with high export value. Mushroom could be raised as a good source of protein.
- Preservation of soil fertility and prevention of desert encroachment using biological methods like afforestation and erosion control schemes.
- Botany: This is the study of plants and involves growing of plants of economic importance under it which can be studied.

These fields when properly practiced can increase the economic growth rate of Nigeria and are also capable of creating job opportunities for those who studied them and hence are reliable means of wealth-creation for the biology graduates in particular and the nation at large.

## Conclusion

Botanical gardens maintain a wide range of species of living plants, in seed banks and tissue culture. Thus botanic gardens contain collections of plants for education, scientific purposes, recreation and display. Thus when the gardens are funded they become means of wealth creation for an institution or a nation due to its important role in diversifying the nation's economy. These are possible because it is a conservation site which offers job opportunities and increases a nation's revenue generation.

## Recommendations

The following recommendations are made to address the challenges of gardens as institutions and/or a reserved area in an institution:

1. Seminars, workshops should be held to create awareness on the need for botanical gardens, their usefulness in diversification of economy and their roles in conservation of plant species.
2. Botanical garden should be adequately funded either by institutions or the government as it is a means of wealth creation generating revenue through research, tourism, recreation through which other sectors are promoted.
3. Trained personnel and technicians in the area of botany should be employed for proper maintenance of the botanical gardens so that the objectives of its establishment could be attained.

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