

SOILLESS FARMING FOR FOSTERING SUSTAINABLE FOOD PRODUCTION: EXPLORING ECONOMIC OPPORTUNITIES FOR YOUTH IN NIGERIA.

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Abstract

Soilless farming is slowly gaining grounds among young persons in the agricultural sector to meet the rapid demand for food in Nigeria. With an increasing population in the country, there is the need to address the challenges in food production by seeking alternative sustainable medium.

Despite the vast amount of arable land in Nigeria, agricultural production remains below potential due to several factors some of which are the problems of soil degradation, declining soil fertility, soil erosion, flooding, desert encroachment and drought. Hence, this has become a major challenge facing land use for food production and has worsened by the effect of climate change.

Soilless farming possesses a potential method of growing plants without the use of soil; in which the nutrients required for growth are supplied through other means. Soilless farming is a sustainable way for youth especially in populated urban areas with interest in the sector to explore because it has proved to be less rigorous, more efficient, high yielding and supports non-seasonal food production- through the inclusion of technology and artificial intelligence. This will no doubt create more interest among youth in farming as well as be helpful in the actualization of SDGs Goal 1, 2, 8, 9 and 12.

This research paper will use mostly secondary data gotten from already existing studies and research work done on soilless farming.

It will provide an understanding about the concept of soilless farming, how soilless farming can promote sustainable food production, what economic opportunities are available which youths can tap into so as to create income generating activities, the challenges and way forward for soilless farming in Nigeria.

Keywords: Soilless Farming, Sustainable Food Production, Economic Opportunities, Youth

Introduction

Addressing the need for food requires the ability to increase agricultural output, through adopting more technological advanced systems of food production which will cover the demand for food while utilizing lesser cost and reduced natural resource consumption. Developing countries with specific reference to Nigeria struggle the most with food insecurity as a result of several factors. Despite decades of several development interventions and programmes aimed at increasing agricultural productivity, there has continuously been a dearth in optimal food production which has resulted in lower yield, poor quality of food produced and reduced income for farmers. This has undoubtedly reduced the enthusiasm and interest for young people to key into the diverse opportunities available in the agricultural sector.

With the rise in climate change, there will be a direct effect on the availability of food through its increasingly adverse impacts on crops and animal productivity and health, and fish stocks, especially in sub-Saharan Africa and South Asia, where most of the world's food insecure live (FAO). There is a potential impact of climate change on soil properties. Countries have begun to experience its effect which manifest as land degradation, low soil fertility, desertification, soil erosion and severe weather conditions; hence the need for soilless farming as a medium for sustainable food production.

Soilless farming in simple terms is growing of crops without soil, it is important to note that soilless farming isn't a way to replace soil but rather to complement soil (Ogbole,2019). There are different methods of soilless farming which are hydroponics, aeroponics, aquaponics.

Hydroponics- The definition of hydroponics has been broadened to mean “the cultivation of plants without soil” (Soreno, 2009). In hydroponics, plants are grown in an inert medium such as rocks or coco coir fibre, and they are fed a solution containing a perfected mix of primary, secondary and micro-nutrients. Almost any kind of plant can be grown hydroponically, including veggies, herbs, fruits and flowers (Kazzaz et al, 2017)

Aeroponics- Aeroponics is the process of growing plants in an air or mist environment without the use of soil or an aggregate media. This is an alternative method of soil-less culture in growth-controlled environments. Aeroponics system refers to the method of growing crop with their roots suspended in a misted nutrient medium (Chiipanthenga et al 2012).

Aquaponics- Aquaponics is a combination of aquaculture (fish farming) and hydroponics (plant growing without soil). It is a closed-loop recycling fresh water system between fish and plant (Kyaw et al 2017). Aquaponics provides a solution to the main issues these two systems face; the need for sustainable ways of filtering or disposing of nutrient-rich fish waste in aquaculture and the need for nutrient-rich water to act as a fertilizer with all of the nutrients and minerals needed for plants grown through hydroponics (Surnar et al 2015).

In a research carried out on Comparison Between Growing Plants in hydroponic System and Soil Based System by Gashgari et al, 2018) show that hydroponic planting system has a better effect than traditional soil system as it makes plants heights grow faster. On the other hand, the planting system has no significant effect on the length of leaves. Moreover, seed type and the interaction between seed type and the planting system have no significant effect on plant growth. This is an indication that an enhanced farming system will contribute to improved economic development, providing food security and improved land management

The increasing number of youth population in Nigeria poses a great challenge of increased demand for food and resources, lack of employment, increase in social vices etc. It is asserted that an increase in the youth population of Nigeria without adequate social and economic investments to harness their potential could result in a demographic disaster rather than demographic dividend (Oluwasola et al). According to Bloomberg news, Nigeria's population reached 182 million in 2016 with more than half its people under 30 years of age, putting a severe strain on a nation suffering from a slowing economy and declining revenue (Mbachu, Alake 2016). The threat of an increasing youth population without adequate structures on ground to provide social and economic standing can be mitigated if adequate resources are invested into developing human capital, enhancing market relevant skills through quality training and providing support needed for job readiness or to start up their own enterprises.

Soilless farming and addressing the SDGs

Enhancing sustainable food production plays a key role in achieving some of the Sustainable Development Goals (SDG). The SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity (UNDP). The adoption and investment in soilless farming will play a major role in ensuring that the SDGs which aims to end poverty and hunger by 2030 can be achieved especially in Nigeria and other developing countries. The goals such as Goal 1- No poverty, Goal 2- Zero hunger, Goal 8- Decent work and Economic growth, Goal 15- Life on land; shows the importance of how promotion of sustainable agriculture can better enhance livelihood especially in the age of technological advancement.

Soilless farming touches on the three dimensions of sustainability which are; economic, environmental and social. “A sustainable farming system should be a profitable

business that creates mutually beneficial relationships among workers and the surrounding community, and contributes to the sound management of the land and other natural resources". To achieve the SDGs, emphasis should be placed on the importance of adopting innovative and technologically driven solutions to agriculture especially farming.

According to the FAO, Sustainable food and agriculture have great potential to revitalize the rural landscape, deliver inclusive growth to countries and drive positive change right across the 2030 Agenda (FAO, 2018).

Challenges faced by youth in exploring soilless farming in Nigeria

While developments in more advanced countries show that they have moved beyond mechanised farming to technology-driven farming, Nigeria still largely depends on rudimentary farming appliances such as hoes, cutlasses and others to carry out farming activities. Despite the effort of the government to import farming machineries, some of these implements are not climate smart, as carbon emission from these machines has an adverse effect on the environment.

Nigeria's inability to develop technologically in the agricultural sector is as a myriad of challenges affecting the country. Some of which includes:

- i) **Poor infrastructure:** Lack of infrastructure has greatly hindered the development of Nigeria. One of the major infrastructural challenges that will greatly affect the involvement of youth in soilless farming is lack of stable power supply. Nigeria has continued to suffer from epileptic power supply and this poses a threat to running a successful soilless farming business. In as much as soilless farming uses lesser energy to run, it requires stable power supply to run certain equipment especially air pumps or water pumps (Tajudeen et al, 2018). Presently, the state of electricity supply in Nigeria is still low and this will hinder the successful running of the business.
- ii) **Initial cost of investment:** Despite how potentially lucrative soilless farming can be, it is quite capital intensive especially for young people who have not grown their capital to a certain level. This challenge is further emphasised by the limited number of funding opportunities available for young people to access loans, grants or other funding facilities. This is especially true for agribusiness and crop production in particular because of its high risk nature. In an interview with Ventures Africa, Alhaji Bello a fish farmer in Ibadan noted that installing a fully functioning hydroponics farm requires a certain amount of dedication and money. "Set-up cost two million naira (about USD 5,500) for an 8 x 30 meter space" (Runsewe, 2018).
- iii) **Technical Know How:** soilless farming requires a good level of technical and scientific knowledge to successfully carryout crop production, however there is a shortage of skilled personnel to address this. This implies that transfer of knowledge and practical skills in this area will be challenging.

Future for soilless farming in Nigeria

Despite the challenges and limitations involved engaging in soilless farming, there are still prospects for young people to explore the soilless farming space. For remarkable progress to happen in the agricultural sector, there is need for a transition into a more technological advanced and sustainable farming system. This can be achieved through collaboration of different stakeholders in the sector who are willing to invest the adequate resources required

as this is a huge investment. The government, private sector and non-governmental organizations have a role to play in ensuring this is achieved.

The government in its bid to diversify the economy and re-focus on the non-oil sector should create an enabling environment for businesses to thrive. This can be achieved by ensuring agri-friendly policies which will ensure that bottlenecks and bureaucracies that frustrate prospective investors are removed. According to the FAO, a fundamental premise for delivering sustainable food and agriculture is the creation of an enabling policy environment and the need for sectoral ministries to change the way they work and coordinate policies across government. In addition, infrastructural development such as electricity and means of transporting farm produce should be worked on. Nigeria can tap into the large scale investment in renewable energies as a means to produce electricity for businesses and individuals.

Private investors can get involved in this sector can invest funds to start up or scale up farms already practicing. This can be done through venture capitals and agricultural incubation hubs to ensure that funds available go to the right people. The private sector can further support in the provision of grants and loans; which is already happening but on a small scale. Also, private manufacturers can get involved by locally producing or fabricating equipment required for farming. This will reduce cost of importing and also create jobs for local manufacturers.

Non-profit sector can provide donor support by collaborating with government and private sectors in the building and transfer of skills and knowledge. Also, they can be involved in upscaling innovation, supporting research and development, advocate for suitable agricultural policies, ensure collaboration among stakeholder.

The opportunities are diverse within the Soiless Farming value chain. More jobs can be created directly or indirectly in training and capacity building, sales of input, farm production, farm support, facility maintenance, research and development.

This farming system will make agriculture more youth friendly, less dependent on weather, more healthy food growth, increased economic gain which will lead to more jobs available and most of all improving livelihoods for farmers.

Conclusion

Nigeria is a country currently facing the effect of climate change. Desertification, land degradation, flood, erosion among other natural disasters is affecting the yield and productivity of farmers who make up the bulk of the population; hence decreasing the income of farmers and negatively affecting their livelihood. To ensure food security, it is important that collaborative effort is made by all stakeholders to ensure that the future of farming is protected. Soiless farming is the future for agricultural revolution and youth inclusion in farming for Nigeria.

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