

## Involvement of youths in soilless agriculture in Ogun State, Nigeria

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### ABSTRACT

The need to make agriculture attractive especially for the youth population is key to achieving food security and eradicating hunger in the nation. This is possible when appropriate technologies are introduced and made available to farmers of all ages, which necessitated this study. This study examined the involvement of youths in soilless agriculture in Ogun State, Nigeria. A multi-stage sampling procedure was used to select 122 youths for the study and data were collected with the use of questionnaire. Results were analysed using percentages, mean and Chi-square. The result shows that 60.7% were male and 45.9% of the respondents had tertiary education. More than half (55.7%) of the respondents had unfavourable perception about soilless agriculture. Insufficient information ( $\bar{x}=1.11$ ), inadequate finance ( $\bar{x}=0.91$ ) and lack of interest ( $\bar{x}=0.75$ ) were the major constraints experienced by respondents as regards soilless agriculture. Involvement in soilless agriculture was low (76.2%) among respondents. There was a significant relationship between the level of education ( $\chi^2=8.826$ ,  $p=0.032$ ) and involvement in soilless agriculture. The study concluded that youths' involvement in soilless agriculture was low and should be improved through publicity and trainings from extension agents and various research institutes.

**Keywords:** Awareness, Involvement, soilless agriculture, Improved technology, Youths

### INTRODUCTION

Agriculture contributes significantly to national food self-sufficiency by accounting for over 90% of total food consumption requirements and also helps to maintain a healthy population (Obisesan, 2021). However, despite these great potentials, it is alarming that most African countries still depend on food importation. Importation of food is expected to increase from \$35 billion to above \$110 billion dollars by 2025 (FAO, 2017). In West Africa, most farming households are purely subsistent in nature producing limited agricultural output for family consumption (Osabohien *et al.*, 2019). Moreover, agricultural labour force is getting older as rural youths are looking for better and more lucrative means of livelihoods than traditional farming, hence there has been an increase in the migration of youth from rural to urban areas despite the insufficient jobs there. Therefore, agriculture remains Africa's inevitable means of growing inclusive economies and answer to unemployment especially among the youths

In Nigeria, agricultural practices remain largely unattractive to people, especially the youths for various reasons, such as their perceptions, lack of interest, inadequate financial resources, availability of better opportunities outside the agricultural sector, poor and limited infrastructures, production inputs and resources, extension services, trainings, among others (Geza *et al.*, 2021). The National Population Commission (2019) estimated that more than half of Nigerian population is made of youths (18 and 35 years). However, it is disturbing that youth unemployment increases as youth population rises. As stated by the NBS (2018), unemployed youths numbered about 20.9 million, while youth

unemployment rate has increased to 23.1%. Agriculture is capable of providing productive employment opportunities for youths and encouraging active youth involvement in agriculture will introduce new strength and inventions into its development in Nigeria. For this to be actualised, utilisation of improved agricultural technology like soilless agriculture, investments from stakeholders, provision of credit facilities, diffusion of adequate information, institutional support, equipping youths with adequate technological skills, must be properly put in place (Geza *et al.*, 2021).

Soilless agriculture is a recently developed technology, although history reveals that it started around early 60s, but was not a commonly used method of growing crops. It connotes agriculture without the soil, which operates under controlled condition in order to obtain higher productivity and income (El-Kazzaz, 2017). It is also referred to as soilless farming. Soilless agriculture can be classified into four types, namely solid media culture, hydroponics, aeroponics, and aquaponics, based on the type of substrates, containers and the nutrient system for the plant and drainage. In the solid media culture, coco-peat, perlite, vermiculite, vermicompost, gravel, tur, rockwool, saw dust, coconut fiber and peat moss are commonly used (Kumari *et al.*, 2021). Initially, only three crop species were grown when hydroponics was applied commercially and these include: tomato, lettuce and herbs. However, in the more recent time, a wide range of crops are successfully grown hydroponically, e.g. pepper, strawberry, cucumber, potatoes and roses, (Jemima *et al.*, 2020).

In Nigeria, it was pioneered by Mr. Adebowale Onafowora, the CEO, BIC Farms Concept in Abeokuta, Ogun State, in 2013 (Tijani, 2022). It is a sustainable agricultural practice that possesses a more sustainable solution to the challenges of soil farming today, because it has several advantages which includes higher productivity, requirement of little labour, not season-bound, low costs of management, no weed competition, no soil-borne pests and disease, water and land conservation, adaptable to areas disturbed by drought, flooding, and other soil-based limitations (Ajibade and Oyeniyi, 2018). It is also a viable means of achieving a world free of hunger by year 2030 (Okemwa, 2015; Kurklu, 2018; Kumari *et al.*, 2021). Soilless agriculture can help address the issue of decline in arable land causing clashes between farmers and herders (Pradhan and Deo, 2019). Furthermore, Mikah *et al.*, (2021) posited that with soilless agriculture, agriculture can be more attractive to youths, increase income, ensures national food security despite limited access to arable land.

The main objective of the study was to assess the involvement of youths in soilless agriculture in Ogun State, Nigeria. The specific objectives were to describe the socio-economic characteristics of respondents, assess their awareness about soilless agriculture, identify channels through which respondents became aware of soilless agriculture, assess respondents' knowledge about soilless agriculture, ascertain respondents' perception about soilless agriculture, evaluate respondents' involvement in soilless agriculture and identify constraints to respondents' involvement in soilless agriculture.

H<sub>01</sub>: There is no significant relationship between respondents' socio-economic characteristics and involvement in soilless agriculture.

## METHODOLOGY

The study was carried out in Ogun State. Ogun State is a state in South western Nigeria, bordered by Lagos State and the Atlantic Ocean to the south, Oyo State and Osun State to the north, Ondo State to the east and the Republic of Benin to the west. The vegetation is typically rainforest. The state has a tropical climate with mean annual rainfall of about 1,500 millimetre and temperature range of 25 to 35 degree Celsius. Commonly cultivated crops are maize, yam, plantain, beans, rubber, palm tree, sugar cane, kola nut, citrus, cassava and vegetables. Its natural resources include extensive fertile soil suitable for agriculture and mineral deposits. Abeokuta is the capital of Ogun State as well as its largest city and a vibrant market centre in the state. The state is further divided into four agricultural zones namely; Abeokuta, Ikenne, Ijebu Ode and Ilaro by Ogun State Agricultural

Development programme (OGADEP). The population of the study included all youths in Ogun state.

A multi stage sampling procedure was used to select respondents for the study. In the first stage, Abeokuta agricultural zone was purposively selected because it houses the two major soilless agriculture Farms in the State, which are BIC farms concept and Soilless farm Lab. BIC farms concept and Soilless farm lab offer training opportunities for youths in the state which makes them suitable to be chosen for this study. At the second stage, simple random sampling was used to select 60% of the local government under the zone, which are Odeda, Abeokuta South and Ewekoro Local Government. At the third stage, two major towns were randomly selected from each local government, making a total of 6 towns; Odeda (Camp and Osiele); Abeokuta South (Adatan and Asero); Ewekoro (Awowo and Obada-oko). At the last stage, systematic random sampling was used to select respondents proportionate to size to make a total of 122 respondents: {Odeda: Camp (22) and Osiele (21)}; {Abeokuta South: Adatan (20) and Asero (19)}; {Ewekoro: Awowo (23) and Obada-oko (17)}.

Level of involvements in soilless agriculture was operationalised by asking respondents if they were involved in any of the three major types of soilless agriculture (Hydroponics, aeroponics and aquaponics). This was measured on a three point Likert-type scale of not involved (0), partially involved (1) and fully involved (2). Respondents were asked to indicate their knowledge about soilless agriculture by providing them with statements that describe soilless agriculture, and this was operationalised as correct (1) or incorrect (0). Respondents were also asked to indicate their perception to certain statements which was operationalised using a five point Likert-type scale of Strongly Agree (SA)-5, Agree (A)-4, Undecided (U)-3, Disagree (D)-2 or Strongly Disagree (SD)-1 for positive statements and reverse for negative statements. Also, constraints to involvements in soilless agriculture was operationalised on a three-point Likert-type scale of not a constraint (0), mild constraint (1) and severe constraint (2). Data were collected using a structured questionnaire and analysed using frequencies, mean, percentages and chi-square.

## RESULTS AND DISCUSSIONS

### Socioeconomic characteristics

Table 1 shows that 60.7% of the respondents were male, while 39.3% were female. This implies that male youths were more involved in agricultural practices than female. The finding aligns with Osabohien *et al* (2021) that male participation in agriculture was

higher than that of female in a similar study in Nigeria. The less participation by female might be due to involvement in non-farm activities or the rigorous work of agricultural activities. Also, 45.9% had tertiary education while 43.4% had secondary education. This could strongly impact involvement in soilless agriculture activities, as majority of the respondents would have access to information on modern agricultural technologies from a wide range of sources. In addition, 46.7% and 21.3% were artisans and students, respectively. This result shows that only few of the population were into agricultural activities as their primary occupation. This corroborates Osobohein *et al* (2021) that most youths engaged in

non-farming activities. Most (83.6%) of the respondents earned about ₦30,000 monthly. This finding aligns with Maisule *et al* (2023) who noticed a higher percentage of youth earns below ₦30000 on a monthly basis. This low earning and financial constraint could affect youth involvement in agricultural technology- driven activities like soilless agriculture. Respondents were wage earners (35.5%) and 20.5% sourced for income from family and friends. This suggests that respondents' source of income were from personal savings from their earnings and loans which is seemingly inadequate to fully take up technology-driven agriculture.

**Table 1: Socioeconomic characteristics of respondents**

Variable	Percentage	Mean	SD
<b>Sex</b>			
Male	60.7		
Female	39.3		
<b>Level of education</b>			
No formal education	3.3		
Primary education	7.4		
Secondary education	43.4		
Tertiary education	45.9		
<b>Primary occupation</b>			
Farming	8.2		
Artisan	46.7		
Civil servant	12.4		
Student	21.3		
Trading	11.5		
<b>Monthly income (₦)</b>			
0-30000	83.6	₦21696	₦147.30
30001-60000	13.1		
60001-90000	0.8		
90001-120000	0.8		
<b>Source of income</b>			
Wages	35.5		
Family and friends	20.5		
Salary	23.8		
Others	20.3		

Source: Field Survey, 2022

#### **Awareness of respondents about soilless agriculture**

From Table 2, 47.5% of the respondents were aware of the hydroponics technology, aeroponics (14.8%)

and aquaponics (22.1%). The findings support Mikah *et al* (2021) that there existed low awareness on soilless agriculture in Ogun State. The low awareness among respondents could be attributed to inadequate information, exposure and financial constraint.

**Table 2: Awareness of respondents about soilless agriculture**

Variables	Percentage
Hydroponics	47.5
Aeroponics	14.8
Aquaponics	22.1
Total	100.0

Source: Field survey, 2022

#### Channels of information about soilless agriculture

The findings from Table 3 reveal that 54.1% of the respondents indicated that they heard about soilless agriculture from friends and 36.9% through social media platform. A higher percentage of respondents

got to know about soilless agriculture through their friends and social media platform. This corroborates Geza *et al* (2021) that social media platforms like Facebook, Google, WhatsApp, friends and families form the major channel embraced by youths involved in agriculture enterprise.

**Table 3: Channels of information about soilless agriculture**

Channels	Percentage
Friends	54.1
Radio	22.1
Television	25.4
Social media platform (WhatsApp, Instagram, Facebook, LinkedIn)	36.9
Print media (Newspaper, flyers)	18.9
Farmer's association	21.3
Youth group	21.3

Source: Field survey, 2022

#### Knowledge about soilless agriculture

Table 4 shows that 62.3% knew that soilless agriculture is planting without the soil, 40.2% signified that plants are grown under controlled conditions in soilless agriculture, while 53.3% asserted that soilless agriculture needs constant supply of water and nutrients, and 49.2% identified with the

fact that soilless agriculture is capital-intensive. The findings showed that respondents are relatively knowledgeable about soilless agriculture. This study contradicts Adepoju and Olaseni (2021), who found that there exists low knowledge about aeroponics system of soilless agriculture among farmers in Nigeria.

**Table 4: Knowledge of respondents about soilless agriculture**

Variables	Correct (%)
Soilless agriculture is planting out of the soil.	62.3
Aeroponics is the most high-tech type of soilless agriculture.	29.5
Aquaponics is a combination of both hydroponics and aquaculture.	36.9
Media such as cocoa peat, percolate are used in soilless agriculture.	38.5
Plants are grown in controlled conditions in soilless agriculture.	40.2
Soilless agriculture is mostly used to grow leafy crops like vegetables, tomatoes, cucumber and herbs.	41.0
Nutrient film, grow bags, deep irrigation are systems used in hydroponics.	45.1
Soilless agriculture needs constant supply of water and nutrients.	53.3
Soilless agriculture is capital intensive.	49.2
Hydroponics, aeroponics and aquaponics are the three major types of soilless agriculture.	53.3

Source: Field survey, 2022

#### Perception of respondents about soilless agriculture

Result from Table 5 shows that respondents were in agreement that soilless agriculture will likely proffer solution to problems encountered in traditional farming ( $\bar{x}$ =4.02). Also, respondents agreed that soilless agriculture may be effective for regions having

scarcity of arable land ( $\bar{x}$ =3.94) and 69.7% agreed that soilless agriculture might help to achieve food security ( $\bar{x}$ =3.86). Further result in Table 6 shows that 55.7% of respondents had unfavourable perception about soilless agriculture. This suggests that perception of respondents about soilless agriculture is unfavourable in the study area. This is in line with the findings of Oyediran *et al* (2016) that youths were willing to

engage in agriculture with unique technology and a lot of advantages. This perception could affect

involvement in technology driven production like soilless agriculture.

**Table 5: Perception of respondents about soilless agriculture**

Perception	Mean	SD
Soilless agriculture will likely proffer solution to problems encountered in traditional farming.	4.02	0.93
Soilless agriculture may be effective for regions having scarcity of arable land.	3.94	0.98
Soilless agriculture might help to achieve food security.	3.86	1.01
Produce from soilless agriculture may seem unhealthy.	3.00	1.16
Soilless agriculture may not be sustainable.	2.84	1.16
Soilless agriculture is likely less beneficial when compared to traditional agriculture.	2.64	1.25
People may not be willing to consume produce obtained from soilless agriculture.	2.38	1.17
Soilless agriculture may be too complex to start.	2.56	1.04
Soilless agriculture may be too capital intensive than agriculture using the soil.	2.43	1.03
Soilless agriculture will likely be environmentally hazardous.	2.84	1.06
Subsidization of soilless agriculture practice might not be a motivating factor for its adoption.	2.80	1.18

Source: Field survey, 2022

**Table 6: Categorisation of respondents' perception about soilless agriculture**

Perception levels	Percentage	Min. Max.	Mean	SD
Unfavourable (19.00-33.30)	55.7	19.00 48.00	33.30	5.19
Favourable (33.31-48.00)	44.3			

Source: Field survey, 2022

#### Constraints to respondents' involvement in soilless agriculture

Table 7 shows that insufficient information ( $1.11 \pm 0.90$ ), lack of interest ( $0.91 \pm 0.87$ ) and inadequate finance ( $0.75 \pm 0.79$ ) as major constraints to respondents' involvement in soilless agriculture. The

result is in tandem with Egboduku *et al* (2021) that several factors limit youth participation in agricultural activities, ranging from financial challenges, lack of awareness, lack of interest, lack of access to basic information among others. The implication of this is that youth involvement in soilless agriculture could be low as a result of these constraints.

**Table 7: Constraints to respondents' involvement in soilless agriculture**

Constraints	Mean	SD	Rank
Lack of interest	0.91	0.87	2 <sup>nd</sup>
Inadequate finance	0.75	0.79	3 <sup>rd</sup>
Insufficient information	1.11	0.90	1 <sup>st</sup>
Personal preference for soil-based agriculture	0.48	0.68	6 <sup>th</sup>
Cultural beliefs and tradition	0.52	0.69	5 <sup>th</sup>
Peer influence	0.52	0.74	4 <sup>th</sup>

Source: Field survey, 2022

#### Involvement in soilless agriculture by respondents

Information in Table 8 shows that most of the respondents were not involved in hydroponics (81.1%), aeroponics (85.2%) and aquaponics (87.7%). This obviously shows that respondents were not engaged in soilless agriculture practices. Also, Table 9

reveals that there was low involvement in soilless agriculture among majority (76.2%) of respondents. This corroborates the findings of Gumisiriza *et al* (2022) that involvement in hydroponics was low among youths in a similar study. This low involvement could be as a result of inadequate finance and lack of interest by respondents.

**Table 8: Involvement in soilless agriculture**

	Not Involved %	Partially involved %	Fully involved %
Hydroponics	81.1(99)	12.3 (15)	6.6 (8)
Aeroponics	85.2 (104)	10.7 (13)	4.1 (5)
Aquaponics	87.7 (107)	6.6 (8)	5.7 (7)

Source: Field survey, 2022

**Table 9: Categorisation of involvement in soilless agriculture**

Involvement	Frequency (%)	Mean	SD
Low (0.00-0.61)	93.0 (76.2)	0.62	0.79
High (0.62-6.00)	29.0 (23.8)		

Source: Field survey, 2022

### Relationship between socioeconomic characteristics and Involvement in soilless agriculture

Table 10 reveals that there was a significant relationship between respondents' level of education ( $\chi^2=8.826$ ,  $p=0.032$ ) and involvement in soilless agriculture, whereas, source of income ( $\chi^2=1.137$ ,  $p=0.768$ ) and primary occupation ( $\chi^2=7.725$ ,  $p=2.59$ ) were not significantly related to involvement in

soilless agriculture. This implies that involvement in soilless agriculture is influenced by level of education, thus, youth who are more educated are able to venture into soilless agriculture because they will be more exposed to information through the internet and other collaborations that will help them to be well informed. The findings corroborate Trevor and Musole (2018), that level of education affects youth involvement in agricultural technologies.

**Table 10: Chi-square result between selected socio-economic characteristics of respondents and involvement in soilless agriculture**

Variables	$\chi^2$	df	p-value	Decision
Level of education	8.826	3	0.032	Significant
Source of income	1.137	3	0.768	Not significant
Primary occupation	7.725	6	2.590	Not significant

Source: Field survey, 2022

### CONCLUSION AND RECOMMENDATIONS

Respondents were aware of and knowledgeable about soilless agriculture but had unfavourable perception about soilless agriculture. Also, involvement in soilless agriculture is low and which is attributed to inadequate finance and lack of interest. Furthermore, involvement in soilless agriculture is influenced by level of education as this will boost the rate at which youths will be informed which will increase their chances of involvement in soilless agriculture. Campaign programmes and trainings about soilless agriculture should be organised by research institutes and extension agents across all governmental agencies and provision of financial assistance and inputs is necessary for youths so that they can be more interested in agriculture as a business.

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