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Profitability Analysis of Involvement of Youth Maize Farmers in Iwo Local Government Area, Osun State, Nigeria

Oluwagbenga Titus Alao[1], Oluwatobi Esnade Olabode[1,2*]

[1]*Osun State University, Department of Agricultural Extension and Rural Development, Osogbo, Osun State, Nigeria*
[1,2*]*Federal University of Agriculture and Technology, Okeho, Department of Agricultural Extension and Rural Development, Okeho, Oyo State, Nigeria*
Corresponding Author Email: amossoutobi@gmail.com

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Abstract

The determinants, constraints, and profitability analysis of youth involvement in maize production were investigated within some selected communities in Iwo Local Government Area of Osun State, Nigeria. The study objective was to investigate the profitability of the cultivation of maize among youth farmers in the study location. The approach used deployed structured questionnaires to obtain primary data from 150 respondents selected using a two-stage sampling technique. The collected data were analysed using Statistical Package for the Social Sciences (SPSS) and interpreted using descriptive and inferential statistics. The profitability analysis showed that with a total cost of $76.64, the accrued gross margin and net farm income were found to be $ 239.55 and $239.16, respectively. The rate of return on investment (RROI) and return on investment (ROI) was estimated to be 3.12 and 4.12, respectively. Also, age (r = 0.203), years of education (r = 0.236), and farming experience (r = 0.321) revealed a positive and significant relationship, while household size (r = 0.012) and farm size (r = 0.156) revealed a positive but no significant relationship with respondents' involvement in maize production. The findings of the study revealed that inadequate capital, inadequate farmland, and poor government attention are some of the constraints to youth farmers' participation, while the profitability analysis showed that maize cultivation in the study location is a profitable agribusiness. Policies that encourage capacity-building programs aimed at increasing productivity, profitability, and sustainable rural employment among youth maize farmers in Iwo Local Government Area.

Nomenclature and units

TVC	Total Variable Cost
TR	Total Revenue
GM	Gross Margin
TC	Total Cost
TFC	Total Fixed Cost
NFI	Net Farm Income
RoI	Return on Investment
WMS	Weighted Mean Score
RRoI	Rate of Return on Investment
$	Dollar
SD	Standard Deviation

1.0 Introduction

The provision of an adequate supply of food alongside other basic needs, such as clothing and shelter, is one of the essential needs of man for a sustainable existence (Mensah, 2019). Production of food items is one of the central objectives of the practice of agriculture. Over time, most energy-giving foods are relatively inexpensive and widely grown around the globe (Alao *et al.* 2025). This category forms a larger percentage of the human diet, hence the name staple food (Erenstein *et al.* 2022; FAO, 2017). Staple foods exist in various forms, which include cereals such as rice, wheat, maize, sorghum, millet and tubers like potatoes, yams, cassava, and taro, among others.

Across the globe, maize (*Zea mays*), together with wheat and rice, is one of the leading cereal crops based on production volume, global consumption, and level of utilisation, especially in Latin America and sub-Saharan African countries (Awata *et al.* 2019). Maize is a multi-purpose crop because it is widely used as a major component in feeding livestock such as poultry, cattle, pigs, and horses. It is also a major component of ethanol produced from maize grain (Klopfensteina *et al.* 2013). In addition to these viewpoints, the use of maize also extends to the production of beer and starch. For instance, beer is one of the most widely consumed beverages across various ethnic groups in Nigeria, particularly during special occasions and social gatherings.

On the other hand, starch serves as a nutritious staple food among the Delta and Edo people in Southern Nigeria (Oke et al., 2022). Furthermore, the economic implications associated with the cultivation of maize are significant. It is globally recognised as a means to improve foreign trade exchange, create job opportunities, and develop the local market (Oke *et al.* 2022). Perhaps, these economic opportunities associated with maize may be among the driving forces encouraging its widespread cultivation across the globe (Chen *et al.* 2019). For instance, the cultivation of maize was estimated to be approximately 12 million metric tons as of 2024 in Nigeria alone (Afolabi *et al.* 2024). Thus, raising its contribution to the national gross domestic product and agricultural gross domestic product to 0.9% and 3.8%, respectively (Soneye *et al.* 2024).

Generally, maize thrives best in warm climates with adequate moisture, well-drained loamy and silt soil with a pH scale range of 7.5 to 8.5. Also, the optimum annual rainfall and temperature for the cultivation of maize are approximately 50 to 100 cm and 21 to 27 ^{0}C respectively (Chen *et al.* 2019). Fortunately, these conditions are readily available in several parts of Nigeria (Chen *et al.* 2019). The commonest types of maize using kernel shape classification include flint kernel, pop kernel, dent kernel, floury kernel, and waxy kernel (Xu *et al.* 2019). The cultivation of these varieties of maize is considered one of the most effective approaches for combating the global challenges of persistent hunger and widespread malnutrition facing many developing countries (FAO, 2017). This will not only mitigate the problem of food insecurity but also boost the local economy, thus enhancing the farmers' income (FAO, 2017).

The farming population required to sustain this rapid growth should be expanded to include able-bodied individuals, particularly the youth. These age brackets are energetic and have what it takes to adequately cope with the stresses associated with pre-planting, planting, and post-planting operation practices. Youths are the prime of any establishment; they are people within the age bracket of 18 and 35. In accordance with the report of the Nigeria National Population Commission of 2016, these groups of people constitute about half of Nigeria's population (Ogunleye, 2023). Therefore, promoting the large-scale involvement of this age group in maize production represents a significant step toward combating youth unemployment. Unemployment has been one of the perennial problems confronting many young graduates in Nigeria. It is also responsible for the large-scale movement of youths to major cities in search of greener pastures (Amare *et al.* 2021; Ng'atigwa *et al.* 2020).

1.1 Synthesis of Relevant Literature

There are several authors who have attempted to assess youth involvement in maize production; for instance, Abdulaleem *et al.* (2017) investigated the profitability analysis of the cultivation of maize using small-scale farmers as the respondents. Small-scale farmers of all ages were interviewed to collect primary data. The outcome of the study showed that maize cultivation is a profitable agribusiness, but the acquisition of land and lack of government funding remain major constraints hindering the massive cultivation of maize among the small-scale farmers.

Abdulaleem *et al.* (2019) investigated the perspective of resource use efficiency in the production of maize among the small-scale farmers using some selected locations in Southwest Nigeria. The findings of the research showed that the cultivation of maize is a highly productive agribusiness. Also, the outcome of the research outlined some critical factors affecting the technical efficiency in maize cultivation, including the size of farmland, input capital, and quantity of fertiliser, among others.

Oke *et al.* (2020) investigated economic and determining factors that support the production of maize in some selected communities in Oyo township. The outcome of their study showed that the production of maize is a profitable agribusiness that is positively influenced by farming experience, age of the farmers, and farmers' marital status. However, the major challenge is that farmers in the selected location have low access to credit facilities, thus limiting the amount of money invested in Agribusiness.

Ketema *et al.* (2021) showed that farmers who adopt improved varieties of maize tend to be food secure. Also, their work further revealed that certain factors, such as level of education, access to main road, size of farmyard plots, and age of household head, significantly impact the decision to adopt planting of improved varieties of maize.

Oni *et al*. (2022) presented maize profitability in Odeda Local Government of Ogun State, Nigeria, with emphasis on conceptual framing linked to postharvest losses, improper drying methods, and rural farmers' income as factors determining the maize profitability in Nigeria. However, the framing could be strengthened by connecting the use of the modern fabricated solar dryer to wider discussions on food security, among others.

Adelakun and Olayemi (2022) demonstrated good conceptual framing by linking climate risks, rainfall dependency, and the need for climate-smart agricultural practices among youth maize farmers with a view to boosting their profitability in maize farming. In their study, the literature synthesis is largely descriptive, with limited critical discussion of how socioeconomic constraints, labour challenges, and information access influence adoption decisions.

Adio and Olaoye, (2022) provided a moderate conceptual framing by linking maize production efficiency and profitability to food security concerns in Nigeria, particularly in Kajola Local Government Area of Oyo State. However, the review and presentation of findings are largely descriptive, with limited critical synthesis of how factors such as capital constraints, household characteristics, and access to training interact to influence technical efficiency.

Bulambu *et al*. (2023) examined the effect of the pro-sell approach to investigate the profitability of engagement in maize production in three major local governments in Taraba State, Nigeria. The findings of the study only examined the livelihood improvement through maize farming without assessing the sustainability of the profitability of maize farming.

Also, Adegbite *et al. (*2023) presented factors that enhance the profitability of the cultivation of maize among small-scale farmers in Osun State. The outcome of the study showed that factors such as age of the farmers, years spent in school, and marital status positively influence the profitability of involvement in maize production among scale farmers. However, access to government funding and land acquisition remains a major constraint to its massive cultivation.

Alabi *et al.* (2025) examine the profitability of maize farming in the northern part of Nigeria. Although the study showed that cultivating maize is profitable within the context of the type of labour deployed, farm size, seeds, agrochemicals, and fertilisers. However, the study fails to tailor maize profitability within broader agricultural development concerns such as food security, rural livelihoods, and poverty reduction, among others.

Therefore, a cursory analysis of the survey on related works regarding maize cultivation, as presented above, showed that many of the earlier works focused on information access by youth involved in maize production, effect of literacy on cultivation of maize among woman in some selected communities, resource use efficiency in the production of maize among the small-scale farmers, effect of adoption of improved varieties of maize in food security, and factors influencing the profitability of maize cultivation among women. There is a paucity of literature on profitability analysis of the involvement of youth maize farmers at the study location, despite a mammoth percentage of youths in Osun State. The initiative for carrying out this study is to tackle the problem of employment among youths and to open the eyes of young school leavers to profitable agribusiness as a coping strategy to food insecurity and gainful employment opportunities.

This current study, therefore, leverages the increasing rise of unemployment among youths in the Iwo Local Government due to the absence of industries that can absorb these youths after graduation from high school to propose maize cultivation as a viable agribusiness among youths. Furthermore, this study also investigates determinants, cost, and return analysis in maize production using Iwo local government area, Osun state, Nigeria, as a case study. The uniqueness of this current study relative to other studies is that it is location-specific research, which provides context-based evidence, identifying local challenges and opportunities, and revealing regional variations in determinants of profitability of maize farming among youth maize farmers.

2. Materials and Methods

2.1 Description of study area

This study was carried out in the Iwo Local Government Area of Osun State, Nigeria. Iwo is a rich agricultural area, located about 45 kilometres from Ibadan and Osogbo. It has an area of 245 km^2 and a population of 191,348, making it the most populous LG in the State of Osun according to the 2006 Nigerian census figures. The people in the LGA are predominantly Yoruba by tribe and mostly peasant farmers. The area enjoys a tropical climate with prominent wet and dry seasons. The rainy season generally occurs between April and October, while the dry season occurs between November and March. Most of the people in the area engage in farming activities, especially animal rearing and crop production on a small and medium scale. Also, one of the most cultivated cereal crops in that study area is maize.

2.2 Target population

The target population comprised youth maize farmers in Iwo LGA. The youths were defined as farmers within the age range of 18-35 years who are actively involved in maize production during the 2024 farming season.

2.3 Sampling framework

A two-stage sampling procedure was used to select the respondents between the ages of 18-35 years. In the first stage, ten (10) villages were randomly selected based on high levels of maize production characteristics, youth demographics, socio-economic characteristics, agricultural support, and market linkages. In the second stage, a total of 150 respondents were selected for the study and for equal representation, fifteen (15) youth maize farmers aged 18–35 years were compiled for each selected village using records from extension agents, farmer associations, and village heads. The selection of respondents was done using simple random sampling, which was used to select 15 youths' maize farmers from the compiled list of eligible farmers so as to ensure that each farmer had an equal chance of being selected.

1.2 Questionnaire Validation

The questionnaire was subjected to face and content validation by three experts in Agricultural Economics and Extension from the Department of Agricultural Extension and Rural Development, Osun State University, Ejigbo Campus. The experts assessed the relevance, clarity, and adequacy of each item in measuring the study variables, particularly youth maize farm profitability indicators, using a structured evaluation checklist. Their comments and suggestions were used to revise and improve the instrument.

A pilot test was conducted among 20 youth maize farmers outside the selected study villages to assess the clarity and reliability of the instrument. Necessary modifications were made based on feedback from the pilot study. Reliability analysis using Cronbach's alpha produced a coefficient of 0.78, indicating acceptable internal consistency of the measurement scale. These procedures provided evidence supporting the validity and reliability of the questionnaire for the study.

2.4 Ethical Approval

Ethical clearance was first obtained from the College Ethics Committee, and approval was later endorsed by the University Research Ethics Committee of Osun State University, Osogbo, Nigeria.

2.5 Data collection procedure

Trained enumerators were engaged to administer the validated structured questionnaire by experts, which was approved by both the College and Central University Ethics Committees. The trained enumerators collected the primary data by distributing the validated structured questionnaire to the respondents. The data collected were analysed using descriptive statistical tools, which comprise frequency, ranking, table, and percentages.

The test of the hypothesis was done using a Pearson product-moment correlation coefficient due to its suitability for quantitative and continuous variables, such as the cost of input, revenue from maize production, profit level, and farm size, among others. Pearson product-moment correlation coefficient was also adopted for consistency with similar empirical studies, which were used to corroborate the findings of this study. The costs and returns analysis on the amount invested in maize production and cultivation was done using profitability indexes such as total cost, total revenue, rate of investment, and benefit-cost ratio.

2.6 Mathematical modelling of cost and return analysis in maize production

Cost and return analysis seeks to establish the level of profit that can be accrued to a farm for investing a certain amount in maize production. The profitability index evaluated in this study includes gross margin (GM), Net farm income (NFI), rate of return on investment (RROI), and return on investment (ROI). The major distinction between the RROI and ROI is that RROI measures how fast the investment grows per time period, while ROI is a measure of total profit made from an investment. If TVC represents the Total Variable Cost ($), TFC denotes Total Fixed Cost ($), and TR connotes the Total Revenue ($), then these indices are expressed mathematically thus;

The Total Cost (TC)$= TVC + TFC$ (1)

Gross Margin (GM) $= TR - TVC$ (2)

Net Farm Income (NFI) $= GM - TFC$ (3)

Rate of Return on Investment (RRoI) = $$\frac{Net\ Farm\ Income}{Total\ Cost}$$ (4)

Return on Investment (RoI) = $$\frac{Total\ Revenue}{Total\ Cost}$$ (5)

Also, weighted mean score (WMS) and ranking techniques were used to arrange in descending order the distribution of youth maize farmers according to the activities they are involved in maize production. The WMS was computed using Eqn (8) thus;

$$WMS = \frac{\Sigma(f_i \times w_i)}{N} \quad (6)$$

Where; f_i= frequency of responses for each category; w_i =weight assigned to each response category; N = total number of respondents.

Also, as of the time of conducting this research, $1 was equivalent to ₦1,350.00. The choice of presenting the outcome of this research in dollars is for the global audience to be able to appreciate the profitability associated with maize farming among youth farmers in the study location.

2.7 Hypothesis testing

Ho: There is no significant relationship between the selected socio-economic characteristics of the youth maize farmers and their involvement in maize production.

3. Results and Discussion

The socioeconomic characteristics of the youth maize farmers are presented in Table 1. Based on age distribution, approximately (40.8%) were between the ages of 26 and 30 years. Also, some (33.4%) of them were between the ages of 31 and 35 years. Similarly, a few (13.9%) of them were less than 25 years of age, while very few (6.3%) and (5.4%) of them were between the ages of 41 and 45 years, ages of 36 and 40, respectively. The average age of the respondents was found to be 30 years. This implies that farmers are within the active age groups and, by inference, they can withstand stress, coupled with the fact that they can put more time into various farming operations.

Furthermore, the dominance of youth in the population of the study location corroborates the findings of Odesola and Bolarinwa (2019) and Alabi & Abdulazeez (2018) that the youth maize farmers in their study area's mean age was 28 and 27 years, respectively. This indicates that youth are very much involved in maize production; this may be due to the short planting season (3 months) and probably reduced risk.

Also, the majority (73.3%) of the respondents were males, while a few (26.7%) of them were females. The outcome of this study is consistent with the findings of Oke *et al.*, (2022) and Odesola and Bolarinwa (2019) that more males were involved in maize production than their female counterparts. The observed gender disparity in the study location showed that males dominated this agricultural venture because of the need to be food secured, as a larger percentage of the respondents are married with an average family size of 4 children. Also, the male dominance could be attributed to ownership of farm land, possibly through inheritance and easy access to production input. This outcome aligned with the findings of Ogunleye *et al.* (2014), that male tends to inherit more of the farmland from their parents compared to females due to marriage.

Furthermore, approximately 65.4% of the respondents were found to be married, while 34.6% indicated their marital status as single. This is in line with the findings of Alabi and Abdulazeez (2018), Yunusa and Giroh (2017) that the majority of farmers between the ages of 18 and 35 years are married. The indication of this is that the mass participation of married youth in maize production can be attributed to the need to meet concerns for their household food security status.

The higher percentage recorded for the married youth maize farmer respondents can be attributed to a low level of education, with most of them being secondary school holders. This low level of education among the respondents could have encouraged early marriage, which is concomitant with the findings of Owolabi *et al.* (2023), who reported that a low level of education among youths motivates them to engage more in agribusiness as a coping strategy to meet family feedings and financial obligations. Furthermore, Owolabi *et al.* (2023), Agboola *et al.* (2015), and Odesola and Bolarinwa (2019) showed that a low level of education encourages early marriage and a large population size, leading to the need to be involved in agribusiness, which aligned with the finding of this study that a low level of education contributes significantly to early marriage.

On the basis of household size, approximately 67.3% of the youth maize farmers had a household size of 2 persons, about 0.7% of them had a household size of 3 or 4 persons, very few (6.7%) of them had a household size greater than 4 persons. The result is in tandem with Odesola and Bolarinwa (2019), who reported a mean household size of 6 persons among respondents in their study area. Furthermore, more than half (54.0%) of the respondents had secondary education, a few (26.7%) and (12.0%) of them had tertiary education and primary education, respectively, while very few (7.3%) of them had no formal education. This finding corroborates the report of Odesola and Bolarinwa (2019) that the majority of youth maize farmers in their study area had secondary education. By inference, the youth maize farmers in the study location have one level of formal education, making them literate; consequently, it could bring about more informed decisions that could lead to possibly increasing output level, as opined by Oke *et al.* (2022) and Adenuga *et al*. (2013).

Also, the majority (58.0%) of the youth farmers practised the Islamic religion, some (41.3%) of them practised Christianity, while very few (0.7%) of them were atheists. This implies that Islam is the major religion among young maize farmers in the study area. The primary occupation distribution of the respondents showed that (38.7%) were freelancers, 30% were engaged in arable crop farming (maize production inclusive), (24.0%) had other forms of primary occupation like schooling, students, 12 % of them were civil servants, very few (4.6%) and (0.7%) of them were artisans and traders, respectively. This indicates that most of the young maize farmers in the study area were freelancers, which is expected as they are all youths.

This finding was supported by the research report of Ogunniyi *et al.* (2012), which showed that the majority of youths participating in maize production are freelancers in southwestern Nigeria. While Oke *et al*. (2022) reported a contrasting finding that the majority of the youths involved in maize farming took it as their main occupation due to the profitability of maize farming in the short run. The average farm size of the respondents is 1.63 hectares. The majority (76.0%) of respondents had between 1 and 3 hectares, very few (5.4%) and (0.7%) of them had less than 1 hectare, and greater than 6 hectares, respectively. A few (10.0%) of them had between 4 and 6 hectares of farmland.

This indicates that the youth maize farmers have considerable access to land for agricultural purposes, which implies most of them obtained the land through inheritance or probably purchase, as submitted by Adamu (2014). Similarly, the classification of farmers given by Alabi and Abdulazeez (2018) as follows: 0.1-5.0 hectares (small-scale); 5.1 to 10 hectares (medium-scale); 10 hectares and above (large-scale) corroborated the finding of this research, and by inference, youth maize farmers in the study location are predominantly small-scale farmers based on their average farm size.

Table 1: Distribution of the youth maize farmers according to their socio-economic characteristics (n=150)

Characteristics	**Percentage**	**Mean ± SD**
Age		30.40 ± 4.95
< 25	13.9	
26-30	40.8	
31-35	33.4	
36-40	5.6	
41-45	6.3	
Sex		
Male	73.3	
Female	26.7	
Marital status		
Single	34.6	
Married	65.4	
Household size (persons)		1.0 ±1.03
1-2	93.3	
3-4	5.9	
>4	0.8	
Educational qualification		
No formal	7.3	
Primary	12.0	
Secondary	54.0	
Tertiary	26.7	
Religion		
Christianity	41.3	
Islam	58.0	
Atheist	0.7	
Primary occupation		
Arable crop farming (incl. maize production)	30.0	
Artisan	4.6	
Civil service	12.0	
Trading	0.7	
Freelancer	38.7	
Others (schooling)	14.0	
Farm size (hectares)		1.65 ± 1.09
<1	18.0	
1-3	76.0	
4-6	5.4	
>6	0.6	

Presented in Table 2 is the distribution of respondents based on their farming experience, knowledge acquisition, enterprise objective, monthly income, access to bank loans, monthly income from maize production, and other sources. Based on farming experience, respondents' average farming experience is approximately 5 years. This finding agreed with the findings of Oke *et al.* (2022), who reported an average farming experience of over 5 years among maize farmers in their study area.

This showed that most youth maize farmers in the study location have moved beyond the learning or trial stage and have acquired practical knowledge of farm operations, input use, and basic farm management. This level of experience is capable of enhancing decision-making efficiency, which can positively influence productivity and profitability. Furthermore, a detailed examination of the youth maize farmer's year of experience in farming revealed that respondents with less than 3 years of farming experience approximately (24.7%), about 43.2% had experienced between 6 and 8 years, (26%) had experienced between 3 and 5 years while a minute of (6%) had between 8 and 11 years of experience in maize farming.

Regarding the knowledge acquisition distribution of the respondents, about 31.3% of the youth maize farmers acquired farming knowledge from school and self-taught, a few (24.7%)

got the knowledge from parents, while 12.7% of them acquired knowledge from family and friends. The fact that the largest proportion of respondents (31.3%) acquired farming knowledge from school and self-learning suggests a transition from purely traditional knowledge systems to formal and cognitive-based agricultural learning. This is significant because farmers with formal or self-acquired knowledge are more likely to adopt improved technologies and better farm management practices, which can enhance productivity and profitability. Similarly, this distribution showed that these youth maize farmers may be better at cost control, record keeping, and input optimisation, leading to higher gross margins compared to those relying mainly on inherited or informal knowledge. This finding aligned with the submission of Haruna *et al.* (2023).

From the perspective of respondents' enterprise, a total of 50% got themselves involved in maize production purposefully for consumption and commercial purposes, while 50% of the respondents revealed that their involvement in maize production is for both consumption and commercial purposes. The distribution by monthly income showed that the respondents' average monthly income from maize production is $100.39, which is fairly similar to the findings of Yunusa and Giroh, (2017), who reported an average income of $130.82 for youth farmers in their study area.

Further detailed distribution showed that (26.0%) of the youth maize farmers earned between $52.78 and $70.37 monthly in maize production, (19.3%) of them earned above $140.73 monthly, while 21.3% earned between $35.18 and $52.78 monthly. Also, respondents' monthly income from other occupations showed that (11.4%) of them either earned between $87.96 and $105.55, or $123.14 and $140.73 monthly, also about (5.3%) earned between $70.37 and $ 87.96, while only (2.7%) earned between $105.55 and $123.14 monthly.

However, the average monthly income of the youth maize farmers from other occupations was estimated to be $39.26. This finding showed that respondents in the study location bank on other sources of income to support their earnings from maize production. In the aspect of farmers' access to loans, approximately (95.3%) of the respondents had no access to bank loans while very few (4.7%) of them had access to the bank loan and this finding agreed with the research report of Yunusa and Giroh, (2017) who reported that a larger percentage of their own respondents do not have access to a bank loan in form of credit facilities.

Table 2: Distribution of assessments of respondents' involvement in maize production

Variables	Percentage	Mean ± SD
Maize farming experience (years)		5.32±2.22
<3	24.7	
3-5	26	
6-8	43.3	
8-11	6	
Knowledge acquisition		
School	31.3	
Parent	24.7	
Family and friends	12.7	
Self-taught	31.3	
Enterprise objectives		
Consumption	33.3	
Commercial	33.3	
Both	33.4	
Primary consumers		
Consumer	100.0	
Monthly income (Maize production)		142666.7± 89350.13
<$35.18	2.7	
$35.18 - 52.78	21.3	
$52.78 - 70.37	26.0	
$70.37- 87.96	18.6	
$87.96 -105.55	11.3	
$105.55-123.14	2.7	
$123.14 -140.73	11.4	
>$140.73	6.0	
Monthly income (Other occupation)		55793.33± 16467.70
<$7.04	0.6	
$21.11-24.63	2.7	
$28.15-35.18	51.4	
$42.22-56.29	42	
$70.37-84.44	3.3	
Bank loan		
Yes	4.7	
No	95.3	

Table 3 presents the respondents' assessments based on access to extension services, access to improved varieties of seed, means of land ownership, source of maize seed, and sources of farmland. Evaluation of respondents' access to extension services showed that the majority (61.3%) of the youth maize farmers had no access to extension services, while some (38.7%) of them had access to extension services. This implies that the farmers may not have access to innovations and or improved technologies that could help them improve their income and productivity. This finding reflects that the activities of extension agents are critically low, as the majority of the youth maize farmers had limited access or no contact with extension agents, which agrees with the submission of Bolarin *et al.* (2022) and Adebayo *et al.* (2018)

In addition, respondents' assessments regarding access to improved varieties of maize seed showed that about 88.0% of the maize youth farmers had access to improved varieties of maize seed, while a few (12.0%) of them had no access to improved varieties of maize seed for planting. This implies that the local market is flooded with varieties of improved maize seed for purchase, hence the respondents can easily access varieties of improved maize seed at the local market. Also, the literacy level of the youth maize farmers in the study location equally assisted them in shifting to planting of improved varieties rather than religiously sticking to the traditional varieties they were trained with, and this finding corroborates the submission of Wasiu and Adebayo (2015) and Okonji and Awolu (2022).

This inference agreed with the results of assessments obtained from the source of maize seed in this study. With respect to the maize seed source, a majority (88.7%) of the youth maize farmers purchased their maize seed, while just 11.3% of them used maize seed from their previous harvest. This indicates that the respondents sell off their produce after harvest and rely on purchasing new seeds for the new planting season. This agrees with the submission of Olasoji and Egbetokun (2017), who opined

that maize seed saving is limited, especially when most production is sold.

Further analysis showed that approximately 80.7% of the youth maize farmers do not own farmland, while only 19.3% of respondents indicated that they own their farmland. This finding disagreed with the research report of Odesola and Bolarinwa (2019) that the majority of youth maize farmers in their own study area owned their farmland. Also, assessments of respondents based on the source of farmland revealed that (80.7%) of the maize youth farmers leased their farmland, a few (13.3%) of them inherited their farmland, and very few (6.0%) of them purchased their farmland. This agreed with what was reported by Odesola and Bolarinwa (2019) that most of the youth maize farmers in their own study area leased their farmland. The significant implication of this finding is that youth maize farmers may not fully commit themselves to productivity-enhancing practices such as long-term soil improvement and irrigation projects because leased land often comes with short-term agreements, which have the propensity to limit agricultural transformation efforts in the study location.

Table 3: Distribution of respondents' access to maize production supporting factors

Assessment factor	Percentage
Access to extension services	
Yes	38.7
No	61.3
Access to an improved variety of maize seed	
Yes	88.0
No	12.0
Land ownership	
Yes	19.3
No	80.7
Source of maize seed	
Purchased	88.7
Previous harvest	11.3
Source of land	
Purchased	6.0
Leased	80.7
Inheritance	13.3

Table 4 shows the distribution of the respondents based on the activities involved in maize production, with the results of analysis arranged in descending order and corresponding to their weighted mean score (WMS), showing that land clearing, packing/burning of debris, and planting had a WMS of 2.0, respectively. This implies that maize youth farmers are primarily involved in the initial and critical stages of maize production, which is consistent with their energy levels and limited access to mechanised services. Also, the supply of seeds and harvesting had an MWS of 1.9, respectively. This finding suggests the moderate participation of maize youth farmers and that they sometimes shared these activities with hired labour, and family members. Similarly, fertiliser application had a WMS of 1.8, storage, ploughing/heaping also had a WMS of 1.7, weeding WMS is 1.6, drying, processing, and shelling had a WMS of 1.3. This finding showed reduced involvement of youth maize farmers in post-harvest activities. This reduced involvement has the propensity to trigger post-harvest losses, which can lead to lower grain quality and reduced market value. Consequently, low profitability in these ventures seems inevitable while irrigation WMS is 0.0. This showed that none of the youth maize farmers in the study location practised irrigation, and this suggests that maize cultivation in the area is wholly rain-fed, making it highly vulnerable to climate variability, irregular rainfall, and seasonal production cycles. The trends of results obtained for these preplanting, planting and post-planting activities agreed with the findings of Odesola and Bolarinwa (2019), Alabi and Abdulazeez (2018), and Yunusa and Giroh (2017)

Table 4: Distribution of the respondents relative to the farming activities involved in maize production in the study location

Items	Very much involved	Partially involved	Not involved	WMS	Rank
Land clearing	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Packing/Burning of debris	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Planting	149(99.3)	01(0.7)	0(0.0)	2.0	1st
Supplying of seeds	135(90.0)	15(10.0)	0(0.0)	1.9	2nd
Harvesting	141(94.0)	09(6.0)	0(0.0)	1.9	2nd
Fertilizer application	115(76.7)	35(23.3)	0(0.0)	1.8	3rd
Storage	111(74.0)	39(26.0)	0(0.0)	1.7	4th
Ploughing/Heaping	101(67.4)	49(32.6)	0(0.0)	1.7	4th
Weeding	92(61.3)	58(38.7)	0(0.0)	1.6	5th
Drying	51(34.0)	99(66.0)	0(0.0)	1.3	6th
Processing	49(32.7)	101(67.3)	0(0.0)	1.3	6th
Shelling	51(34.0)	99(66.0)	0(0.0)	1.3	6th
Irrigation	0(0.0)	02(1.3)	148(98.6)	0.0	7th

Table 5 presents constraints to respondents' involvement in maize production in the study area. The examined includes inadequate capital, inadequate farmland, poor government attention, high cost of production, and poor infrastructure, which had WMS of 2.0 respectively and were ranked to be the highest. This implies that these challenges are widely experienced and strongly perceived by the respondents. Similarly, energy-sapping had a WMS of 1.9, and inadequate storage facilities had a WMS of 1.9. These findings showed that cultivation of maize is physically demanding and that post-harvest management remains weak in the study location.

Also, price fluctuation had a WMS of 1.8, and inadequate labour had a WMS of 1.7. This finding is an indication of market instability and labour shortages or high labour costs, which have the propensity of reducing the youth farmers' ability to Table 5 presents constraints to respondents' involvement in maize production in the study area. The examined includes inadequate capital, inadequate farmland, poor government attention, high cost of production, and poor infrastructure, which had WMS of 2.0 respectively and were ranked to be the highest. This implies

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Also, price fluctuation had a WMS of 1.8, and inadequate labour had a WMS of 1.7. This finding is an indication of market instability and labour shortages or high labour costs, which have the propensity of reducing the youth farmers' ability to forecast income. Furthermore, the poor yield had a WMS of 1.6, and the poor market condition had a WMS of 1.5. This finding showcased that the youth maize farmers achieved reasonable yields; however, the profitability margin from this agricbusiness may be undermined by economic challenges rather than by agronomic performance alone.

In addition, scarcity of good seed had a WMS of 0.8, while pest and disease infestation had a WMS of 0.3 and took the lowest weighted mean score. The outcome of this study showcases the maize youth farmers in Iwo LGA as having adequate access to planting materials, alongside being able to manage pest and disease pressures with the aid of agrochemical use, which is the common practice in the study location. Furthermore, the trends of results obtained agree with the findings of Odesola and Bolarinwa (2019), Alabi and Abdulazeez (2018) and Yunusa and Giroh (2017) that inadequate capital and land problems are major factors militating against youth involvement in maize production in their study location.

Challenges	Severe	Less severe	Not severe	WMS	Rank
Inadequate capital	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Inadequate farmland	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Poor government attention	150(100.0)	0(0.0)	0(0.0)	2.0	1st
High cost of production	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Poor infrastructure	150(100.0)	0(0.0)	0(0.0)	2.0	1st
Inadequate storage facilities	114(76.0)	10(6.7)	0(0.0)	1.9	2nd
Energy-sapping	143(95.3)	6(17.3)	1(0.7)	1.9	2nd
Price fluctuation	132(93.3)	17(11.3)	1(0.7)	1.8	3rd
Poor yield	123(82.0)	26(17.3)	1(0.7)	1.6	4th
Poor market condition	114(76.0)	36(24.0)	0(0.0)	1.8	5th
Scarcity of good seed	61(40.7)	89(59.3)	0(0.0)	0.8	6th

Table 6 presents the profitability analysis of involvement in maize production in the study area. With the average quantity (tonnes) value of 2.19 and average cost/tonnes with a mean value of $144.58 tonnes produced a total revenue of $316.63 per hectare. The total variable costs consist of fertilizer (23.53%) being the highest percentage of the total variable costs, while labour cost accounts for 23.05%, cost of chemical accounts for 21.02%, maize seed planting cost accounts for 17.21%, cost of harvesting accounts for 9.87% and cost of transportation accounts to 4.80%.

The total variable costs account for 99.48% of the total cost with a mean value of $76.75. The total fixed cost (0.50%), with a mean value of $0.39, consists of the fixed costs after depreciation, which are cutlass (3.08) and hoe (2.0%). The gross margin was computed to be $239.88, while the net farm income was found to be $239.49. Also, the rate of return on investment was obtained to be 3.12, while the return on investment was 4.12. This agrees with the findings of Oke *et al.* (2022) that an agricultural venture is profitable if the ROI is greater than 1

Table 6: Costs and return analysis of maize production/hectare

Item	Mean (₦)	%TC
Revenue		
Average quantity (tonnes)	0.0015	
Average income/tonnes	144.58	
Total revenue (TR)	316.63	
Variable items		
Labour cost	17.70	23.05
Chemical cost	16.14	21.02
Fertilizer cost	18.06	23.53
Transportation n cost	3.67	4.80
Cost of seed	13.22	17.21
Harvesting cost	7.58	9.81
Total variable cost (TVC)	76.36	99.48
Fixed cost after depreciation		
Cutlass	0.25	0.33
Hoe	0.14	0.17
Total fixed cost (TFC)	0.39	0.50
Total cost (TC) = (TVC+TFC)	76.75	99.98
Gross margin (GM) = TR-TVC	239.88	
Net farm income (NFI) = GM-TFC	239.49	
Rate of return on investment (RORI) = NFI/TC	0.0022	
Return on investment (ROI) = TR/TC	0.0029	

Table 7 presents the result of the hypothesis proposed for this study, the youth maize farmers selected socio-economic characteristics, and their involvement in maize production showed that the age (r = 0.203), years of education (r = 0.236). and farming experience (r = 0.321) revealed a positive and significant relationship, while household size (r = 0.012) and farm size (r = 0.156) revealed a positive but no significant relationship with their involvement in maize production.

The positive correlation with age suggests that as youth farmers grow older, they tend to be more actively involved in maize production because of the need to adequately cope with their increased responsibilities. Similarly, a positive and significant relationship with years of education indicates that

better-educated maize youth farmers tend to demonstrate enhanced decision-making ability, open to information access, alongside improved farming practices, while the strongest relationship obtained for farming year implies that accumulated practical knowledge increases confidence and efficiency, thereby encouraging deeper involvement in maize production activities.

Furthermore, as the youth farmers increase in age, years of education, and farming experience, their involvement in maize production increases, and this may be due to the need to meet their basic needs of food, clothing, and shelter.

Table 7: Test of hypothesis and results of correlation coefficient

Variable	Coefficient	P-value	Decision
Age	0.203	0.013*	Significant
Household size	0.012	0.884	Not significant
Years of education	0.236	0.004*	Significant
Farm size	0.156	0.057	Not significant
Farming experience	0.321	0.000**	Significant

4.0 Conclusion

The respondents in this current study were mainly youth whose mean age is more than thirty years. It was observed that married males are the major producers of maize in the study location, and most of these males are in their active years, possibly because of the need to make their household food secure. Also, commercialisation and consumption are the major motivating factors encouraging the massive participation of these respondents. This implies that youth maize farmers' involvement is directly linked to the need to be food secured, alongside being a sustainable source of income. Consequently, policies that support the revitalisation of the market board should be re-enacted. This will ensure fair price regulation, quality control, export coordination, and protection of youth maize farmers.

The farmland used for the cultivation of maize is acquired through a lease system, which implies that many of them do not own their farmland, and their average farming experience spans five years. These findings showed that policies that support land acquisition for youths should be encouraged to combat problems encountered in getting land leased for maize cultivation. Similarly, village chiefs should ensure that abandoned farmland is made readily available to youth maize farmers at relatively no cost. This will help in reducing the challenges posed by the land lease system, which many of the youth maize farmers relied on in the study location.

Also, the study discovered that respondents engage in other side hustles to supplement their monthly earnings due to some constraints limiting their involvement in maize production, and a few of such constraints include inadequate capital, acquisition of farmland, lack of access to improved extension services, and price fluctuation, among others. This finding showed that there is a need for policies that support easy access to credit facilities from agricultural financial institutions at cheaper rates to youth maize farmers, since this agribusiness is a profitable venture.

Furthermore, the results of the analysis showed that age, years of education, and farming experience reflect a positive correlation coefficient, which is also significant, while household size and farm size exhibited a positive but non-significant relationship with the respondents' involvement in maize production. This implies that educated but unemployed graduates could seek employment in maize farming as an alternative to waiting endlessly for white-collar jobs, which many will never get.

Also, a considerable number of youths were observed to be involved in maize cultivation in this study location and by implication, the profitability analysis showed that **y**oung people are more likely to view agriculture as a viable agribusiness, thereby creating diverse employment opportunities in the agricultural value chain.

Conclusively, based on the findings of the study, the policy direction should be to encourage the Youth Maize Enterprise Support and Input Accessibility Policy. This will help in enhancing youth involvement in profitable maize production through accessible credit schemes, subsidised agricultural inputs, mechanisation support, and extension training services. Also, effort should be made in promoting the establishment of youth cooperative societies which will foster improved access to finance, modern technologies, market opportunities, and capacity-building programs aimed at increasing productivity, profitability, and sustainable rural employment among youth maize farmers in Iwo Local Government Area.

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