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Analysis of Challenges Confronting Maize (*Zea mays*) Yield in Awka South Local Government Area, Anambra State, Nigeria

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ABSTRACT

The study is on analysis of challenges confronting maize yield in Awka South Local Government Area, Anambra State, and focused on the factors influencing the profit of maize production and the constraints faced by maize producers. The study employed various analytical techniques, including inferential statistics and a 4-Likert-type scale. The results revealed the factors affecting production as age, education, farm size, cooperative membership, and access to credit. Challenges faced by maize producers were assessed using a Likert-type scale, with a mean threshold of 2.5. The grand mean of 2.57 indicated that identified constraints were perceived as significant challenges, with a standard deviation of 0.959 signifying variability in responses. Key challenges included inadequate capital, high fertilizer costs, insufficient land space, unorganized marketing, scarcity of water, and inadequate storage facilities. Given the strong agreement on the constraint of inadequate capital (mean score of 3.03), interventions such as subsidized credit facilities, financial literacy programs, and collaborative initiatives with financial institutions could enhance the financial capacity of plantain producers, fostering sustainable and resilient plantain production systems.

Keywords: Analysis, Challenges, Confronting, Maize, Yield

INTRODUCTION

Maize thrives on a wide range of tropical and subtropical climates; it grows best in areas with temperatures ranging from 20°C to 30°C [1]. Maize can tolerate higher temperatures during the growing season, it has a mean rainfall of 600 -1200 mm per year, with a pH range of 5.5 -7.0 and a partly sandy-loam and loamy soil [2]. Maize is a cereal crop that is grown throughout the world in a range of agro-ecological environments [2]. It was introduced into Africa in the 1500s and has become one of the Africa's dominant food crops, consumed as a vegetable, although it is a grain crop [3]. Maize is one of the most important grains in Nigeria, not only on the basis of the number of farmers that engaged in its cultivation, and also useful in its economic value. Maize is a major important cereal being cultivated in the rainforest and the derived savannah zones of Nigeria [4]. Maize contains 80 percent carbohydrate, 10 percent protein, 3.5 percent fiber and 2 percent mineral with iron and Vitamin B in it [5]. Africans consume maize as a starchy base in a wide variety of porridges, pastes, grits and beer. Green maize (fresh on the cob) is eaten parched, baked, roasted or boiled and plays an important role in filling the hunger gap after the dry season [6]. Maize is used for a variety of purposes, including human consumption in the form of food products like cornmeal, corn flour, and corn syrup. It is also used as animal feed and as a raw material in various industrial processes, such as ethanol production and the manufacture of bio plastics. Maize is a crucial crop in agriculture, with significant global production and consumption [7]. Maize is a major cereal and one of the most important food crops in Nigeria and its genetic plasticity has made it the most widely cultivated crop in the country from the wet evergreen climate of the forest zone to the dry ecology of the Sudan savanna [8], [9]. It can be grown any time of the year, giving greater flexibility to fitting into different cropping patterns [10]. Few studies exit on challenges confronting maize yield in Awka South Local Government Area, Anambra State. The broad objective of this study is to analyze the

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challenges confronting maize yield in Awka South Local Government Area, Anambra State. The specific objectives were to: determine the factors affecting maize production and identify the constraints faced by maize producers in the study area.

LITERATURE REVIEW

Factors Affecting Maize Farmers

Climate Conditions

Maize farming is highly dependent on climate conditions such as temperature, rainfall patterns, and humidity. Variability in these factors can significantly impact crop growth and yields. According to [3], Climate change has led to unpredictable weather patterns, including droughts, floods, and heat waves, which pose challenges for maize farmers. Erratic rainfall patterns, in particular, can disrupt planting schedules and affect crop development.

Access to Inputs

Access to quality seeds, fertilizers, pesticides, and other agricultural inputs is vital for maize farmers to achieve optimal yields. The high cost of inputs relative to farmers' incomes often makes it difficult for them to afford essential agricultural inputs such as improved seeds, fertilizers, and pesticides. Additionally, the lack of access to credit and financing options further restricts farmers' ability to invest in inputs, hindering their productivity and competitiveness [11].

Pests and Diseases

Maize crops are exposed to a wide range of pests and diseases, including stem borers, armyworms, maize weevils, and fungal pathogens. These pests and diseases can cause significant yield losses if not properly managed. According [12], ineffective pest control measures, such as reliance on synthetic pesticides and poor crop rotation practices, contribute to pest resistance and resurgence. Moreover, climate change may alter pest distribution patterns, leading to new pest outbreaks and challenges for farmers. Integrated pest management (IPM) strategies, including biological control, cultural practices, and resistant crop varieties, are essential for sustainable pest and disease management in maize farming [2].

Soil Quality

Soil degradation, erosion, and nutrient depletion are common challenges faced by maize farmers, soil fertility, structure, and healthy soil play crucial roles in maize production. However, [13] noted that Continuous cultivation without adequate soil conservation measures can lead to soil erosion and nutrient loss, reducing crop productivity over time. Moreover, the use of chemical fertilizers without proper soil testing and nutrient management practices may exacerbate soil acidity and nutrient imbalances [5].

Labour

Maize smallholder farmers rely on manual labor for planting, harvesting, and other farm operations due to limited access to affordable machinery and equipment. This manual labor can be physically demanding, time-consuming, and less efficient, which may affect productivity and profitability. Labour is very important in the production process, where labour is limited, it is expected that production will be low and hence the profitability [14].

Postharvest Handling

Many maize farmers engage in manual harvesting methods, which can lead to losses due to improper handling and damage to the maize cobs. Additionally, harvesting at the wrong maturity stage or under unfavorable weather conditions can affect maize quality and storability [15].

Storage

Inadequate storage facilities expose maize to pests, rodents, and moisture, leading to spoilage and deterioration in quality. Many smallholder farmers rely on traditional storage structures, such as mud silos or woven bags, which offer limited protection against pests and environmental factors [16].

Technology and Farming Practices

Many maize farmers face constraints in accessing and adopting appropriate technologies due to factors such as high costs, limited technical know-how, and cultural barriers. Mechanization, precision agriculture, and digital tools offer opportunities to increase efficiency, reduce labor requirements, and improve crop management [5]. Addressing these challenges requires coordinated efforts from multiple stakeholders, including governments, research institutions, extension services, private sector actors, and farmer organizations, to promote sustainable maize production and improve farmers' livelihoods [9].

METHODOLOGY

Research Design

This study employed Survey Research Design. This research design is the most suitable for this study since it seeks to obtain the opinion of the respondents on the subject matter [17].

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Area of the Study

Awka South Local Government Area is predominantly agrarian, with agriculture serving as the primary source of livelihood for a significant portion of the population. Subsistence farming is widespread, with crops such as yam, cassava, maize, vegetables, and palm produce cultivated for local consumption and commercial purposes. Thus, trade, small-scale businesses, and services contribute to the local economy, particularly in urban centers like Awka. The communities in this LGA are is made up of nine towns, namely, Amawbia, Awka, Ezinato, Isiagu, Mbaukwu, Nibo, Nise, Okpuno and Umuawulu. Agricultural practices in Awka South LGA vary depending on factors such as land availability, soil fertility, and climatic conditions. Traditional farming methods are prevalent among smallholder farmers, although there is an increasing adoption of modern agricultural techniques and improved crop varieties. Challenges such as land degradation, pest and disease outbreaks, and limited access to agricultural inputs and markets impact agricultural productivity in the area.

Population of the study

The study was comprised of all registered maize (1,230) farmers in the study area.

Sampling Technique and Sample Size

Multistage sampling procedure was used in selecting respondent for study.

In the first stage, Awka south local government area was purposively selected because of the dominance of maize producers. In the second stage, 5 (five) communities (Ezinato, Isiagu, Mbaukwu, Okpuno and Umuawulu) was randomly selected from the local government area. In the third stage, from each of the selected 5 (five) communities, 20 maize farmers was randomly selected. This gave a total of 100 plantain farmers that was selected for the study.

Specification of Model

The multiple regression model was used to analyze the factors influencing maize production. Age shown as (AGE), sex (SE), marital status (MAS), household size (HOS), farming experience (FE), education (EDU) and labour cost (LAC). Y= f (AGE, SE, MAS, HOS, FE, EDU, LAC + e)

Where:

AGE = maize farmers age in years
SE = maize farmers sex
MAS = maize farmers marital status
HOS =household size (number of persons in the household)
FE =farming experience
EDU =farmers education (years of schooling obtained)
LAC =labor cost
e = stochastic error term

Factors influencing maize Production

The multiple regression model were implicitly specified as:

$Y = (x_1, X_2$……...xn e)

The model were explicitly specified as linear, semi-log, exponential and double-log.

Linear: $Y= b_0+b_1x_1+ b_2x_{2+} b_3x_{3+} b_4x_{4+} b_5x_{5+} b_6x_{6+} b_7x_7+e$…… (II)

Semi-log: $Y=b_0+b_1\log x_1+b_2\log x_2+ b_3\log x_3+ b_4\log x_4+ b_5\log x_5+b_6\log x_6+ b_7\log x_7+\log$……..(III)

Exponential: $\log Y=Y=b_0=b_1x_1+b_2x_2+b_3x_3 +b_4x_4 +b_5x_5 +b_6x_6 + b_7x_7+e$ …….. (IV)

Double log: $\log Y=b_0+b_1\log x_1+b_2\log x_2+ b_3\log x_3+ b_4\log x_4+ b_5\log x_5+b_6\log x_6+ b_7\log x_7+\log e$….(iv)

Likert scale rating technique

A likert scale is a psychometric scale in survey research when responding to a likert questionnaire item, respondents specify their levels of agreement or disagreement on a symmetric agree-disagree scale for a series of item statement. The scale captures intensity of their feelings. A 4-poiint rating scale was employed in this study. This was regarded as strongly agree (SA), agree (A), disagree (DA) and strongly disagree (SD) with corresponding values of 4, 3, 2 and 1 respectively. The mean score (MS) of the respondents based on the 4-point rating scale was computed as = 2.50 cut off point. Based on this, any score below 2.50 (MS<2.50) was taken as weak factor and may not be considered while those with mean score of above 2.50 (MS>2.50) were taken as strong factors and thus be considered.

RESULTS AND DISCUSSIONS

The Factors Affecting Maize Production

The factors affecting maize production in the area are presented in Table 1

The F-statistics is 9.482(***), indicating that the overall model is statistically significant at a 1% level of probability. This means that at least, one of the independent variables is affecting the dependent variable. The R-square value is 0.516, suggesting that the model explains 51.6% of the variance in maize production. **The coefficient of Age** is 2.988 with a t-value of 3.03***, suggesting that age has a statistically significant positive effect on maize production

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at a 1% level of probability. As age increases, maize production tends to increase by 2.988 units. **The coefficient of Education** is 3.468 with a t-value of 1.77*, implying that education has a statistically significant positive effect on maize production at a 10% level of probability. Higher Levels of education are associated with higher levels of maize production by 3.468 units. Older and more educated maize producers tend to have higher levels of production. **The coefficient of Farm Size** is 18.071 with a t-value of 6.00***, indicating a statistically significant positive relationship between farm size and maize production at a 1% level of probability. Larger farm sizes are associated with higher levels of maize production by 18.071 units. **The coefficient of Cooperative Membership** is 91.804 with a t-value of 3.21***, indicating a statistically significant positive effect. Cooperative membership is associated with higher maize production levels in this analysis by 91.804 units. Contrary to expectations, being a member of a cooperative and having access to credit are associated with higher maize production.

The coefficient of Access to Credit is 156.716 with a t-value of 5.50***, suggesting a statistically significant positive effect. Limited access to credit is associated with higher maize production levels by 156.716 units. **The coefficient of the cost of labour** is -0.010 with a t-value of -1.64*, suggesting a statistically significant negative effect. A unit increase in the cost of labour will reduce the output of maize by 0.010 units. **The coefficient of the cost of Maize cob** is -0.09 with a t-value of -1.79*, suggesting a statistically significant negative effect. A unit increase in the cost of cob is associated with a decrease in maize output. [18], in their work reported coefficient of cost of labour, farm size, and cost of planting material were negatively significant at 1% probability level to yield.

Table 1: The Factors Affecting Maize Production

Independent variables	Coefficient	Std. Error	t-value
Intercept	1757.345	228.238	7.70
Age	2.988	0.986	3.03***
Farming Experience	1.951	2.291	0.85
Education	3.468	1.964	1.77*
Farm Size	18.071	3.012	6.00***
Cooperative membership	91.804	28.605	3.21***
Access to credit	156.716	28.500	5.50***
Extension contact	1.353	4.668	0.29
Cost of Labour	-0.010	0.006	-1.64*
Cost of Maize Cob	-0.009	0.005	-1.79*
Cost of Transportation	-0.001	0.000	-1.38
F-statistics	9.482		
R-square	0.516		
Adjusted R-square	0.461		
Obs.	100		

Source: Field Survey, 2025. Significant @ 10 %(*), 5 %(**), and 1 %(***).

Constraints Faced by Maize Producers

The table 2 presents an assessment of the constraints faced by maize producers based on a Likert-type scale, with a decision threshold set at a mean score of 2.5. The grand mean of 2.67 indicates that, on average, the identified constraints are perceived as challenges to maize production. The mean is slightly above the decision threshold of 2.5, suggesting that the majority of challenges are considered significant by the respondents. The standard deviation value of 0.959 indicates variability in the farmers' responses, implying that there is a range of opinions among respondents regarding the severity of constraints.

For the individual challenges and mean scores

Inadequate Capital (Mean: 3.00 - Agree): This challenge has a mean score of 3.03, indicating strong agreement among respondents that inadequate capital is a major constraint to maize production., **High and Poor Cost of Fertilizers (Mean: 3.01 - Agree):** The high mean score suggests strong agreement that the cost of fertilizers is a major challenge to maize production.

Lack of Land Space (Mean: 3.0 - Agree): Respondents strongly agree that the lack of land space is a significant constraint to maize production. **Unorganized Marketing (Mean: 2.51 - Agree):** This challenge is perceived as significant, with respondents agreeing that unorganized marketing is a constraint to maize production. **Scarcity of Water (Mean: 1.45 - Agree**): Respondents disagree that the scarcity of water is a notable constraint to maize

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production. **Inadequate Storage Facilities (Mean: 3.02 - Agree**): Respondents strongly agree that inadequate storage facilities are a significant constraint to maize production. This finding is in line with the report of [19], [20], [21], who stated that the major decline in food security is as a result poor governance and factor such as lack of capital, unorganized market, lack of formal education and civil unrest.

Table 2:Constraints faced by maize producers

Sn.	Challenges	Mean	Std. Dev.	Decisions
1	Inadequate capital	3.00	0.790	Agree
2	Pest and disease problem	1.99	0.722	Disagree
3	High and poor cost of fertilizers	3.01	0.714	Agree
4	Poor quality cobs	2.43	1.122	Disagree
5	Lack of land space	3.05	0.712	Agree
6	Inadequate extension services	2.44	1.104	Disagree
7	Unorganized market	2.51	1.111	Agree
8	Scarcity of water	1.45	1.057	Disagree
9	Lack of improved varieties	2.23	1.032	Disagree
10	Post-harvest losses	2.4	1.130	Disagree
11	Lack of formal education	1.91	0.823	Disagree
12	Inadequate storage facilities	3.02	0.820	Agree
	Grand mean	**2.67**	**0.909**	**Agree**

Source: Field Survey, 2025.

CONCLUSION

The study examined the analysis of challenges confronting maize yield in Awka south LGA of Anambra state. The major constraints faced by maize farmers are inadequate capital, high fertilizer costs, insufficient land space, unorganized marketing, scarcity of water, and inadequate storage facilities. The study also revealed that very little extension contacts have been organized in this area and most of the farm size were below 2 hectares.

RECOMMENDATIONS

From the findings of this study, these recommendations were made:

1. The cooperative societies should encourage maize farmers through providing a soft credit for expansion production and efficiency.
2. There is need to strengthen the farmers through capacity-building programs through the extension officers.

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