

## Profit Analysis of Rain Fed Cucumber Production in Anambra State

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### Abstract

*The study examined profit analysis of rain fed cucumber production in Anambra State, Nigeria. Specifically, it described socioeconomic characteristics, cost and returns and constraints to rain fed cucumber production in the study area. Multistage sampling and random techniques were used to select two agricultural zones, 4 LGAs, 8 communities and 160 respondents (farmers) for the study. Data were collected by means of structured questionnaire and analyzed using descriptive statistics such as means, frequency distribution, percentages and mean ranking. Findings from socioeconomic characteristics showed that much number of young and strong male folks dominated the production because of its duration for maturity and monetary value. The result of costs and returns showed that the net return on investment figure implied that for every 1 Naira invested in the production of rain fed cucumber, farmers return N2.29 kobo. The overall profitability proves that rain fed cucumber production is a profitable venture. Result showed that pests and disease, inadequate storage facilities, variation in weather conditions, inadequacy of capital and lack of required skills were perceived as the major constraints. Government should address the participation of extension officers in training intending rain fed cucumber farmers and soft loan should be made available for young people who intends venturing into the enterprise were recommended.*

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### Introduction

Nigeria is one of the sub-Saharan African Countries of which agriculture was the back bone of her economy before the oil boom of 1970s and still remain her major source of food and accounts for about 35% of merchandised export, 75% of employment (Gbughemobi, Meludu and Nkamigbo, 2021 and Uchelue, Isibor, Nkamigbo and Okonkwo-Emegha, 2023). Isibor and Nkamigbo (2023) reported that Nigeria agriculture is the major source of food and accounts for 35% of the Gross Domestic Product (GDP), 75% of the rural household income and still remain the mainstay of our economy by providing food for the teeming population. Cucumber (*Cucumis Sativus L.*) is a monoecious annual horticultural crop that belongs to the Cucurbitaceae family (Rolnik and Olas, 2020). It is believed to have been cultivated by man for over 3,000 years (Adinde, Uche, Anieke, Odom, Igwe and Akor, 2021). Katarzyna, David, Malgorzata and Gajc-Wolska (2020) noted that cucumber is a subtropical crop that is an economically important vegetable grown in over 80 countries worldwide, and its annual production in 2020 was estimated to be 91.258 million tons on 2,261,318 hectares, achieving an average yield per square meter of 4.04 kilos (FAOSTAT (2018). Samba,

Nunomura, Nakano and Tsakagoshi (2023) noted that cucumber productivity difference among countries is remarkable. Cucumber production has the potential to improve agricultural productivity, promote economic empowerment, and enhance food security (Okafor and Yaduma, 2021). Cucumbers are commonly consumed fresh, served as a dessert after meals, or used in combination with other food items to make juice. Cucumbers are long, cylindrical green fruits that contain about 95% water and are for this reason often recommended as natural diuretics and helpful for body building. They are classified as accessory fruits but are however perceived, prepared and eaten as vegetable Elum, Etowa and Ogonda (2016). Cucumber is grown for its tender fruits which are consumed either raw as salad, cooked as vegetable or as pickling in its immature stage the fresh are good source of vitamin C, vitamin K, vitamin A, vitamin B6 and thiamin. It helps in healing diseases of urinary bladder and kidney, digestive problems like heart burn, acidity, gastritis and ulcer (Adinde, Anieke, Uche, Aniako, Isani and Nwagboso, 2016; and Adinde, Uche, Anieke, Odom, Igwe and Akor, 2021).

Although most cucumber production in Nigeria is intended for local consumption, there are instances where Nigerian cucumbers are exported to neighboring countries in West Africa, such as Chad, Cameroon, Niger, and Benin Republics, as reported by Okafor and Yaduma (2021).

Rainfed cucumber (*Cucumis sativus* L.) production is an important agricultural activity in Southeastern Nigeria, particularly in Anambra State. The crop provides farmers with an important source of income and food (Nnodim and Somoni, 2019), while also contributing to the nutrition of the local population. On its health importance, Onyeozu, Adekola and Deekor (2020) stated that cucumber is good for diabetic patients as it contains low sugar and speeds up digestion. Rainfed cucumber production requires relatively simple techniques, making it a practical and sustainable form of agriculture for many farmers. Rain-fed cucumber farming is often done on small plots of land, typically within the semi-arid and sub-humid regions of the south. In order to successfully grow cucumbers, farmers must ensure that their fields are prepared in the most efficient and effective manner (Elum et al, 2019). Some of these practices include applying organic matter, such as compost, to raise the fertility of the soil, as well as ensuring that their fields have proper drainage. Cucumber plants can require a lot of water and nutrients, so farmers must plan carefully before and during planting. To ensure the most successful growth, farmers should use seeds that are adapted to the environment and of high quality (Kong, Llewellyn and Zheng, 2018). Rain fed cucumber production is a viable agricultural practice in the southern region of Nigeria and one that can help to improve the dietary and economic needs of farming communities. With proper resource management and an efficient marketing strategy, cucumber farmers can benefit from better crop yields and increased income. To achieve increased yield and maximize profit from cucumber production, proper management techniques must be implemented. This includes practices such as crop rotation, soil fertility management, pest and disease control, and weed control (Abdulkadir, Mahmoud and Kashere, 2020). Owwoeye and Adeleke (2022) submitted a temperature range of 15°C to 30°C as appropriate for cucumber production. The availability and quality of soil are essential for successful cucumber production.

### **Materials and methods**

The research was carried out in Anambra State. The State is bounded by Delta State to the West, Imo State to the South, Enugu State to the East and Kogi State to the North. It has an estimated population of 6,358,311 million people (Wikipedia.org/wiki Anambra State Population, 2022) which stretches over about 60 kilometers between surrounding communities. Anambra State lies on the longitude 6220°N and 7021°E and latitude of 5038°N and 6930°E (Wikipedia.org/wiki Anambra State, 2022). Anambra State population is estimated to be growing at an average of 2.84% annually. The population density of Anambra State currently is rated at 992.1p/Km (Wikipedia.org/wiki Anambra State, 2022). Anambra State comprised of 21 Local Government Area, and four (4) Agricultural zones (AZs) – Aguata, Anambra, Awka and Onitsha. The State is embedded by five (5) major rivers and their tributaries. These are River Niger, Anambra River, Ezu River, Idemmili River and Ulasi River. However, there are smaller streams like Oyi, Nkisi and Obizi. The State experiences dry season from late October to early May and has at least 6 dry months in the year and rainy season occurs from April to November. The annual rainfall ranges from 1400 mm in the Northern part to 2500 mm in the Southern part of the State with temperature of 25°C - 35°C. Anambra State is occupied by the Igbo ethnic group who by nature are farmers, fishermen, craftsmen and traders and also it is known for production and marketing of several raw materials and agro-products in different parts of the State. Some of the crops produced and marketed in the State include rice, yam, oil palm, cassava, cocoyam, maize, cucumber, mango, vegetables and different varieties of fruit trees, among others and livestock such as fish, goat, sheep, poultry and cattle. Anambra State has several daily markets both in rural and urban areas where agricultural products are sold.

#### **Population and Sampling Technique of the Study**

The population of the study consisted of 30,056 (Twenty thousand and fifty-six) registered cucumber farmers in Anambra State (Agricultural Development Programme (ADP) 2022) which is the sample frame. Anambra State comprises of four zones: Awka, Anambra, Aguata and Onitsha zones. A Multi-stage and random sampling procedure were used to select respondents for the study.

**Stage I:** Two agricultural zones were purposively selected from the four agricultural zones of the State. This is as a result of their intense participation and popularity in rain fed cucumber production among others in the State, namely Aguata and Anambra zones.

**Stage II:** Two Local government were randomly selected from each of the selected two agricultural zones making it a total of four LGAs. Aguata zone (Orumba North and Orumba South) and Anambra zone (Ayamelum and Anambra East LGAs).

**Stage III:** Two communities were purposively selected from each of the four LGAs (based on their popularity in rain fed cucumber production) making it a total of eight communities for the study.

These communities include Omogho and Ajali in Orumba North LGA, Ezira and Ogboji in Orumba South LGA, Omor and Omasi in Ayamelum LGA and Aguleri Otu and Nando in Anambra East LGA totaling eight (4) LGAs and 8 communities.

**Stage IV:** Thirty (20) rain fed cucumber farmers (respondents) were randomly selected each from the already selected LGAs making a total of one hundred sixty (160) respondents for the study which is the sample size.

**Table 1 Sample of the Zones, LGA, Communities, Coordinates and Respondents.**

Agricultural Zones	LGAs	Communities	GPS Coordinates	Respondents
Aguata	Orumba North	Omogho	6 <sup>0</sup> 23N , 7.144E	20 farmers
		Ajali	6.2971 <sup>0</sup> N, 7.1339 <sup>0</sup> E	20 farmers
	Orumba South	Ezira	5.9965 <sup>0</sup> N, 7.2194 <sup>0</sup> E	20 farmers
		Ogboji	6 <sup>0</sup> 01 <sup>1</sup> 02N, 7 <sup>0</sup> 15 <sup>1</sup> 107E	20 farmers
Anambra	Ayamelum	Omor	6.5056 <sup>0</sup> N, 6.9753 <sup>0</sup> E	20 farmers
		Omasi	6.6354 <sup>0</sup> N, 7.0283 <sup>0</sup> E	20 farmers
	Anambra East	Aguleri Otu	6.3333N, 6.8833E	20 farmers
		Nando	6.3114 <sup>0</sup> N, 6.9075 <sup>0</sup> E	20 farmers
<b>Total = 2</b>	<b>4</b>	<b>8</b>		<b>160</b>

Source: Field Survey, 2023.

### Method of Data Analysis

The objectives of the study were achieved by means of the following statistical tools. Descriptive statistics such as tables, mean, frequency distribution, and mean ranking.

### Socioeconomic characteristics

X<sub>1</sub> = age in years.

X<sub>2</sub> = gender (GEN) (male =0, female =1)

X<sub>3</sub> = marital status (MRS) (single = 0, married=1 and widow/divorce)

X<sub>4</sub> = educational status

X<sub>5</sub> = source of finance (SOF)

X<sub>6</sub> = household size (HHS)

X<sub>7</sub> = farm size (FS)

X<sub>8</sub> = monthly income

X<sub>9</sub> = other business activities (OBT)

### Socioeconomic characteristics of rain-fed cucumber production

Socioeconomic characteristics of rain fed cucumber farmers is presented in Table 2. From the results, it was discovered that a trend of younger generation who are between the age of 30-39 (37.30%) who drive joy in testing new things for a living are into cucumber production.. This a generation that are vibrant and energetic to tackle the stress and hustle of adapting to agronomical practices for optimum and optimal production. This agrees with Nkamigbo, Ugwumba and Okeke (2019) who noted that young, energetic are in watermelon marketing in the study area. This agrees with Nmada and Marcus (2020) who reported mean age of ginger farmers in their study area. The result analysis shows that rain fed production in the study area is gender base in that much number of young and strong male folks (85.62%) are into the production because of its duration for maturity and monetary value. This is a prove that young

ones especially male folks are interested in agriculture if properly positioned. This is in tandem with the report of Adeoye and Balogun (2016) and Ekpunobi, Nwigwe & Nkamigbo (2020) who stated that male dominated cucumber production and yellow cassava production in their study areas. This is contrary with the report of Wilcox (2015) and Elum et al. (2016) who stated that cucumber production is dominated by female in their study area.

The enterprise recorded much number of single (61.25%) than married and widowed. The educational status revealed that it is an enterprise for enlightened crop of farmers in that it encompasses younger generation who have gotten one form of education or the other with high percentage of young graduate who are finding it difficult to secure white collar job and also those that have flair for the crop and its financial pay. This is in agreement with Elum et al. (2016) who reported that education is a vital as it could enable quick capacity building in cucumber production that farmers' education can enhance their farming activities, level of awareness and level of receptivity of improved technologies.

Household analysis showed that 1-4 people living and eating from the same pot is 75.62%. This is in agreement with Mukaila, Obeta and Ogbu (2022) who reported that a large household size increases the probability of getting physical assistance from family members which enhances the proliferation of the venture. The result of source of finance for the enterprise proved that friends and relative and isusu is the main source of finance for take-off of the enterprise. The result shows that average farm size greater than I hectare recorded 66.87%. The implication is that cucumber production is gradually gaining ground in the study with much farmers venturing into it. The result of monthly income shows that young farmers are gradually tilting in agricultural production. The result of other business activity shows that rain fed cucumber farmers do have other business activity they belong I order to maximize profit.

**Table 2: Socioeconomic characteristics of rain fed cucumber farmers.**

<b>VARIABLES</b>	<b>FREQUENCY</b>	<b>PERCENTAGES</b>
<b>Age</b>		
20-29	35	21.87
30-39	60	37.50
40-49	33	20.62
50-59	17	10.63
60 and above,	15	9.37
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Gender</b>		
Female	23	14.37
Male	137	85.62
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Marital Status</b>		
Single	98	61.25
Married	46	28.75
Widow/Divorced	16	10
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Educational Status</b>		
0-6	11	6.87
7-12	50	31.25

13-18	99	61.87
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Source of Finance</b>		
Personal savings	33	20.61
Friends and relatives	70	43.62
Cooperatives/Isusu/banks	57	35.62
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Household Size</b>		
1-4	121	75.62
5-8	32	20.0
9 and above	7	4.37
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Farm size</b>		
≤1 ha	53	33.12
≥ 1 ha	107	66.87
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Monthly income</b>		
50,000-100,000	71	44.37
Above 100,000	89	55.62
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Other biz Activities</b>		
Yes	121	75.62
No	39	24.37
<b>Total</b>	<b>160</b>	<b>100</b>
<b>Farming Experience</b>		
<b>1-5 years</b>	<b>77</b>	<b>48.12</b>
<b>6-10 years</b>	<b>50</b>	<b>31.25</b>
<b>11 years and above</b>	<b>33</b>	<b>20.62</b>
<b>Total</b>	<b>160</b>	<b>100</b>

Source, field survey, 2023.

### Profitability of rain fed cucumber production

The cost and return was used to estimate the monthly profitability of rain fed cucumber production as shown in Table 3. Result of the analysis indicating total revenue (TR), total variable cost (TVC), total fixed cost (TFC), gross margin (GM) net farm income (NFI) and net return on investment (NROI) is presented in Table 3. The shows that on average, rain fed cucumber farmers got a revenue of ₦4, 400,000.00 and incurred a total variable cost of ₦1, 085, 375.00. It could be seen also from the table that out of total cost of ₦1, 334, 375.00 spent in the production of rain fed cucumber, purchase of seed constituted 46.80% followed by cost of labour 25.80%. From the result, cost of purchase of planting seed is the most important cost in the production of rain fed cucumber in the study area while transportation is the least cost. The average quantity of cucumber sold per production season was 550 at an average price of ₦8,000.000 per bag. This is in agreement with Nkamigbo and Isibor (2019) who reported that cost of purchase of watermelon seed constituted 89.67% and 89.61% for wholesalers and retailers. This is contrary to Nkamigbo, Nwoye, Makwudo and Gbughemobi (2018) who reported 6.25% for the cost of purchase of maize seed in their study area. And cost of labour

as the most important cost in maize production. The cost of transportation of cucumber is the least cost in rain fed cucumber production. This is as a result of high cost of fuel and transportation and producers resort to waybill of the seed (cucumber) than bodily presence. The production generated a gross margin of ₦3, 317, 625.00, net farm income of ₦3, 065,625.00 and net return on investment 2.29. The implication of net return on investment figure shows that for every 1 Naira invested in the production of rain fed cucumber, farmers return ₦2.29 kobo. This agrees with Isibor and Nkamigbo (2023) who reported ₦1.61 net return on turmeric marketing in their study area. The overall profitability proves that showed that rain fed cucumber production is profitable venture.

Also applying the benefit cost ratio to analyze the profitability of rain fed cucumber production by dividing the total revenue with the total variable cost. The result shows BCR of 3.29, thus when BCR is greater than 1, it implies a profitable situation. The implication of this is that the enterprise is a profitable venture in the study area.

**Table 3: Cost and returns of rain fed cucumber production in Anambra State**

Variables	Amount (₦)	Percentage (%)
<b>Total revenue</b>	<b>4,400,000.00</b>	
Cost of planting material (Hybrid seed)	508,000.00	46.80
Cost of labour	280,105.00	25.80
Cost of fertilizer	98,000.00	9.03
Agro chemicals	50,880.00	4.68
Twine	31,000.00	2.85
Sacks (Bags)	20,200.00	1.86
Transportation	18,650	1.71
Stake	42,000	3.86
Recharge card	36,540	3.36
<b>Total Variable cost (TVC)</b>	<b>1,085,375.00</b>	<b>100</b>
<b>FIXED COST (FC)</b>		
Cost of land renting/leasing	181,500.00	72.89
Depreciation on equipment (wheel barrow, machetes, hoe Knapsack)	67,500.00	27.10
<b>TOTAL FIXED COST (TFC)</b>	<b>249,000.00</b>	<b>100</b>
<b>TOTAL COST TC (TVC+TFC)</b>	<b>1,334,375</b>	
Gross Margin (TR-TVC)	3,317,625.00	
<b>NFI (TR-TC)</b>	<b>3,065,625.00</b>	
<b>NROI (NFI/TC)</b>	<b>2.29</b>	

Source: Field survey, 2023.

Also, applying the Benefit Cost Ratio to calculate the profitability of rain fed cucumber production is shown below:

BCR = Total Revenue/ Total Market Cost = ~~N~~4,400,000.00/1, 334, 375 = 3.29

If BCR greater than 1 = Profitable

### Constraints to rain fed cucumber production

The constraints associated with rain fed cucumber production in the study area were shown in Table 4. The findings showed that pests and diseases infestation (M= 3.40) was perceived as the most serious constrained to rain fed cucumber production. The infestation reduces the value which equally reduces the market price of the produce thereby affecting the net returns of the farmer. Another constraints of importance is inadequate storage facilities (M=3.35) in the study area. The absence of modern storage facilities is becoming a menace among producers in agricultural circle as most product are either sold below the expected price or wasted when it stays beyond the period of its freshness. Rain fed cucumber production depends solely on availability of natural rain for its production but due to variation in climate sometimes rain may not come at the time expected or may be irregular at the time of production thereby hindering growth and equally production thus variability in weather condition (M= 3.20) is among the serious constraints. Inadequacy of capital (M= 3.09) is another constraints of much magnitude to the producers as most farmers lack resource either to buy enough improved seeds or other essential materials for production or may buy a little which is not enough to boast the yield and revenue. Lack of required skill (M= 2.50) from the analysis is perceived as another constraints to rain fed production in the study area. Most people due clarion call to agriculture dabble into cucumber production knowing little or nothing about production may hit the rock which will affect its yield and revenue. Inadequacy of land (M=2.45), Poor skill in management (M=2.35), Urban migration (M=2.30), Poor extension services (M= 2.25) and low returns from production (M= 2.22) are constraints of less importance to rain fed production in the study area.

**Table 4: Constraints to rain fed cucumber production**

Sn.	Constraints	Mean score	Rank
1	Pests and diseases infestation	3.40	1 <sup>st</sup>
2	Inadequate storage facilities	3.35	2 <sup>nd</sup>
3	Poor extension services.	2.25	9 <sup>th</sup>
4	Poor skill in management	2.35	7 <sup>th</sup>
5	Urban migration	2.30	8 <sup>th</sup>
6	Lack of required skills.	2.50	5 <sup>th</sup>
7	Variability in weather condition	3.20	3 <sup>rd</sup>
8	Inadequacy of land.	2.45	6 <sup>th</sup>
9	Inadequacy of capital	3.09	4 <sup>th</sup>
10	Low returns from production.	2.22	10 <sup>th</sup>

Key Note: mean cut off mark = 2.5. Field, survey (2023), multiple responses



## Summary and Conclusion

The result analysis shows that rain fed production in the study area is gender base in that much number of young and strong male folks (85.62%) are into the production because of its duration for maturity and monetary value. The result of cost and returns shows that on average, rain fed cucumber farmers got a revenue of ₦4, 400,000.00 and incurred a total variable cost of ₦1, 085, 375.00, out of total cost of ₦1, 334, 375.00 spent in the production of rain fed cucumber, purchase of seed constituted 46.80% followed by cost of labour 25.80%. Findings on the constraints militating against rain fed cucumber production showed that pests and disease, inadequate storage facilities, variation in weather conditions, inadequacy of capital and lack of required skills were perceived as the major constraints while inadequacy of land poor skill in management, urban migration, poor extension services and low returns from production were constraints of less importance to rain fed production in the study area.

## Recommendation

Based on the findings of this study the following recommendations were made:

- i. Government should address the participation of extension officers in training intending rain fed cucumber farmers.
- ii. Soft loan should be made available for young people who intends venturing in the enterprise.

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