



## **ECONOMICS OF TRADITIONAL GROUNDNUT PRODUCTION TECHNOLOGY AMONG MICRO AGRO – ECOLOGICAL FARMERS IN EZZA NORTH LOCAL GOVERNMENT AREA, EBONYI STATE, NIGERIA AND EFFECTS ON THE ENVIRONMENT**

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### **ABSTRACT**

The study examined the economics of traditional ground nut production technology among small holder farmers in Ezza North Local Government Area, Ebonyi State, Nigeria and effects on the environment. Structured questionnaire was used to collect the required data. The sample size for the study was sixty (60) farmers who were interviewed and used for the study. Data generated were coded and analyzed using quantitative and qualitative techniques. The result showed that the farmers were relatively young with large household size. Farm enterprise variable result confirmed that the farmers were small holder farmers with wealth of experience. Gross margin analysis obtained established that fixed cost items formed the major components of the total cost of production representing 63% of the cost components. Ground nut production in the study area was established to be profitable with a positive value of ₦2,967,470.59 per annum. Return on investment was also positive with a value of 3.37. This implied that there was a return of three naira, thirty seven kobo ((₦3.37) for every one hundred naira (₦100) invested. Some of the major constraints were use of crude implements, low price, pest and disease infestation among others. It was recommended that ground nut farmers should thrive to increase their production capacity as well as form cooperative society to enjoy the benefits of economies of scale. Several effects of traditional groundnut production technology on the environment were identified. It was recommended that farmers should be enlightened on the implications and the need for environmental friendliness practices.

**Keywords:** Ground nut, Production, Small holder Farmers, Environment and Technology.

### **INTRODUCTION**

Agricultural production in Nigeria is still in the hands of small holder farmers with scattered land holdings and predominant traditional farming system. Despite that, the sector has proven to be an important segment in Nigeria economic sector. It is a source of food and food security hence this sector is considered as one of most important basic needs of man. It also provides employment, raw materials, industrial development, poverty alleviation through income generation and contribute about 22.35 percent of the total Gross Domestic Product (Ume, *et al*, 2017, Ayodele, 2019, Kaine and Ume, 20218 and Kaine *et al* 2021b). Groundnut (*Arachis hypogaea* L.) is a leguminous oil seed crop that is traditionally produced in Nigeria under the bush fallow system. The crop is regarded as one of the world's major source of oil seed. (Ezihie, 2017 and Kaine and Ume, 2021). Ezihie, 2017 and Kaine and Ume, 2021, (2018) and Florence *et al* (2021) opined that the crop is the world's major source of oil seed produced which account for the 13th best food crop and the 4th utmost significant source of edible oil. The seed contains 45% to 51% high quality edible oil, 27.7% dietary protein, 24.2% soluble



carbohydrates and minerals. This is one of the reason why it is regarded as being a very important crop.

It has been documented that plant protein requirements of the body are often derived from peas and legumes such as groundnut (Kaine, *et al.*, 2021a). The crop is not only important as a cash crop but also as a food crop. The seeds are rich in high quality digestible edible oil (50%) with 40% – 50% and 10 – 20% protein and carbohydrate respectively. Groundnut can be consumed either boiled, fried or roasted. The Kernels can also be consumed directly in any form (Shuaibu *et al.*, 2018). The haulms are used as good source of feed supplement for livestock. It also increases farm income generation when sold especially during the off season with short supply of fresh green grasses and high demand of silage (International Crop Research Institute, 2015). Groundnut oil produced from the crop is used for domestic and industrial purposes. The crop is also an important ingredient in industrial production of oil cakes and fertilizers (Nnamdi, 2010). Researches have been conducted in various aspect of groundnut production, management, processing and profitability among others. It is not however certain that there are numerous work or literature with respect to economics of traditional groundnut enterprise production technology among small holder farmers in Ezza North Local Government Area, Ebonyi State, Nigeria and the effects on the environment. It is on this premise that the study was conducted to examine the socio – economic characteristics of the farmers, identify the enterprise characteristics or variables, determine the cost and returns from groundnut production, constraints to groundnut production and ascertain the effects of traditional production technology on the environment.

## **MATERIALS AND METHODS**

### **The Study Area**

The study on economics of traditional groundnut enterprise production technology among small holder farmers and effects on the environment was conducted in Ezza North Local Government Area, Ebonyi State, Nigeria between October, 2021 and March, 2022. The study area has a total population of one hundred and twenty seven thousand, two hundred and twenty six (127,226) people comprising of sixty thousand, three hundred and eighty eight (60,388) male and sixty six thousand, eight hundred thirty eight (66,838) female according to National Population Commission (NPC) (2006). However, the total projected population figure using a 3.2 percent growth rate as at 2021 was two hundred and four thousand, and sixty six (204,066) people. This is made up of ninety six thousand, eight hundred and sixty (96,860) male and one hundred and seven thousand, one hundred and ninety eight (107,198) female. The total population used for the study comprised of small holder ground nut farmers in the study area.

### **Sampling Procedure and Sample Size**

Sample for the study was drawn using multi stage random sampling procedure. The sample frame consists of small holder groundnut farmers drawn from five (5) communities. First, five (5) communities were randomly selected with the assistance of the community heads, Assistant Chief Agricultural Officer (ACAO), Local Government Agricultural Officers and resident Agricultural Extension Agent. The second stage of selection involved the random selection of farmers. Twelve farmers (12) were randomly selected from each of the five (5) communities that were initially selected. A total sample size of sixty (60) farmers were surveyed and used for the study.

### **Method of Data Collection**

To achieve the objectives of the study, data was generated using primary source that involved the use of questionnaire. Well-structured questionnaire that covered the specific



objectives of the study were used to obtain the required information and administered to the sixty (60) ground nut farmers in the study area.

### **Analytical Techniques**

Information required with respect to the specific objectives were collected, coded and analyzed using both qualitative and quantitative techniques. The empirical formula for Gross Margin Analysis was specified as:

$$GM = TC - TVC$$

$$TC = TVC + TFC$$

$$NPM = GM - \text{Depreciation (Fixed Cost)}$$

Where

GM = Gross Margin

TC = Total Cost

TVC = Total Variable Cos

TFC = Total Fixed Cost

NPM = Net Profit Margin

## **RESULTS AND DISCUSSIONS**

### **Socio Economic Characteristics of Groundnut Farmers in the Study Area**

Socio economic characteristics of the farmers in the study area was presented in Table 1. The result of the age of the farmers showed that the majority thirty one (31) (52%) were within the age range 31 – 40 years of age. This indicated that the farmers were relatively young and within the economic and active age. This is in consonance with that observed by Kaine, (2015) and Alabi, (2002). However, this result negates the findings of Gbigbi, (2021) among cassava farmers in Delta State, Nigeria where majority of the farmers were reported to be old with age range of 60 – 79.

Gender analysis as presented in Table 1 indicated also that forty seven (47) (78%) of the respondents were male while thirteen (13) (22%) were female. This result implied that groundnut farming in the study area was not for men only. It also implied that women were involved in farming or agricultural production. A further analysis of the marital status indicated that fifty one (51) (85%) of the farmers were married.

The household size analysis revealed that majority, twenty nine (29) (48%) had household size range of 5 – 9. The result implied that the groundnut farmers had a large household size. Large household size is likely to have both positive and negative impact on the farmers. The educational attainment determined showed that literacy level of groundnut farmers studied was high. Forty seven (47) (78%) of the farmers had formal education while thirteen (13) (27%) only had informal education.



**Table 1:** Socio – Economic Characteristics of the Farmers  $\Sigma n = 60$

Characteristics	Frequency	Percentage
<b>Age (Categories)</b>		
20 – 30	14.00	23.00
31 – 40	31.00	52.00
41 – 50	12.00	20.00
50 and above	03.00	05.00
<b>Gender</b>		
Male	47.00	78.00
Female	13.00	22.00
<b>Marital Status</b>		
Married	51.00	85.00
Single	09.00	15.00
<b>Household Size</b>		
0 – 4	16.00	27.00
5 – 9	29.00	48.00
10 – 14	09.00	15.00
15 and above	06.00	10.00
<b>Education attainment</b>		
Informal	13.00	27.00
Formal	47.00	78.00

**Source:** Computed from field survey, 2022

### Farm Enterprise Variables of the Farmers

Farm enterprise variables (characteristics) of groundnut farmers was determined and presented in Table 2. Farm size result confirmed that the farmers were small holder farmers and majority thirty five (35) (58%) of them had farm size range of 0 – 3 hectares. Result of farming experience indicated that respondents were well experienced. It showed that thirty two (32) (53%) of the respondents had farming experience range of 11 – 15 years.

Sources of finance was considered as an important variable. The result was determined and it indicated that thirty nine (39) (69%) and nineteen (19) (32%) financed their groundnut farm enterprise through personal savings and cooperative respectively (Table 2). Sources of labour was determined and presented in Table 2 also revealed that thirty six (36) (60%) used combined source (family and hired) labour while eighteen (18) (30%) and (06) (10%) used family labour and hired labour respectively.



**Table 2:** Farm Enterprise Variables of the Farmers Σn = 60

Variables	Frequency	Percentage
<b>Farm Size</b>		
0 – 3	35.00	58.00
4 – 6	22.00	37.00
7 – 9	02.00	03.00
10 and above	01.00	02.00
<b>Farming Experience</b>		
5 – 10	05.00	08.00
11 – 15	32.00	53.00
16 – 20	15.00	25.00
20 and above	08.00	13.00
<b>Membership of association</b>		
Yes	53.00	88.00
No	07.00	12.00
<b>Sources of Finance</b>		
Personal Savings	39.00	69.00
Bank Loan	02.00	03.00
Cooperative	19.00	32.00
<b>Sources of Labour</b>		
Family Labour	18.00	30.00
Hired Labour	06.00	10.00
Family and Hired Labour	36.00	60.00

**Source:** Computed from field survey, 2022

### Profitability of Groundnut Production

Profitability of traditional groundnut enterprise production technology was determined using an average output of 100kg and result was presented in Table 3. The result indicated that total cost of production was ₦1,805,728.70. The total variable cost was established to be ₦673,784.17 and the total fixed cost was 1,131,944.57 representing 37% and 63% of total variable cost and the total fixed respectively of the total cost items. This implied that the fixed cost items formed the major components of the total cost of production. The result of this study negates the findings of Ubokudom *et al* (2021) that opined that variable cost items formed the major cost components in a study of profitability of Biofortified yellow cassava farming in Nigeria: evidence from Akwa Ibon State, Nigeria and that of Kaine (2019) in a study on profitability and marketing efficiency of traditional palm oil production technology in Ovia North East Local Government Area, Edo State, Nigeria. It also refuted the result of Kaine (2021) that ascertained that variable cost item was the major cost component in a study to determine technical efficiency of backyard goat farmers in Igabi Local Government Area, Kaduna State, Nigeria. Enimu *et al* (2016) in a study on profitability analysis of cassava production in Cross River State, Nigeria observed that variable cost item constituted the main components of the total cost of production. Ibekwe (2008) obtained similar result in a study of the role of women in oil palm fruit processing and marketing in Imo State, Nigeria. These however refuted the result of this study.

The result of profit margin determined, showed a positive value of ₦2,967,470.59 per annum with a return on investment of 3.37. The profit margin positive value of ₦2,967,470.59 obtained in this study revealed that groundnut production in the study area was profitable. The



result is in consonance with that observed by Abubakari *et al* (2019) among groundnut farmers in Tolon District, Ghana. The return on investment of 3.37 also ascertained that groundnut production was profitable in the study area. Lawal and Muhammad (2018) however obtained a return on investment of 1.3 in a study on economics of groundnut production among smallholder farmers in Michika Local Government Area of Adamawa State, Nigeria. This result contradicted that obtained in this study. Girei *et al* (2013) on the other hand obtained a return on investment of 0.47 among groundnut farmers in Hong Local Government Area, Adamawa State, Nigeria.

Return on investment of 3.37 obtained, implied that for every one hundred naira (₦100) invested in groundnut production, there was a return of three naira, thirty seven kobo (₦3.37). The result therefore established that groundnut production in the study area was profitable.

**Table 3:** Profitability Analysis of Groundnut Production in Study Area

Variables	Value (₦)
<b>Average quantity of groundnut produced (100kg)</b>	
<b>A. Variable Cost</b>	
Cost of planting materials (seeds)	56,000.00
Cost of fertilizer	272,000.00
Cost of herbicides	96,000.00
Labour cost	218,386.63
Transport cost	31,397.54
<b>Total Variable Cost (TVC)</b>	<b>673,784.17</b>
<b>B. Fixed Cost (FC)</b>	
Rent on land	248,466.10
Interest on Loan	56,677.80
Depreciation	826,800.67
<b>Total Fixed Cost (TFC)</b>	<b>1,131,944.57</b>
<b>C. Total Cost (TC) (TVC + TFC)</b>	<b>1,805,728.74</b>
<b>D. Total Output (Kg) 100Kg</b>	
Sales: 100Kg x 56,000.00 (Output x price)	5,600,000.00
<b>E. Profit</b>	
<b>Sales – TC</b>	<b>3,7942,71.26</b>
<b>F. Profit Margin</b>	
Gross Margin (GM) – Depreciation (3794271.26 – 826800.67)	2,967,470.59
<b>Return on Investment</b>	<b>3.37</b>

Source: Computed from field survey, 2022

### Constraints to Groundnut Production

Constraints to groundnut production in the study area was identified and presented in Table 4. Result showed that use of traditional tools as was indicated by sixty eight (68.00) of the respondents which accounted for forty one percent (41.00%) was considered as a major constraints to groundnut production in the area. Low price (53.00) (31.80%), pest and disease infestation (50.00) (30.00%), price fluctuation (48.00) (28.00%) and high cost of inputs (40.00) (24.00%) were also considered as major challenges to groundnut production in the study area. Other constraints as indicated by the farmers were: lack of improved varieties (37.00) (22.20%), market uncertainty (37.00) (22.20%), lack of storage facilities (30.00) (18.00%), high cost of labour supply (30.00) (18.00%) and inadequate credit facilities (27.00) (16.20%).

**Table 4:** Constraints to Groundnut Production in the Study Area

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
Use of traditional tools	68.00	40.80
Low price	53.00	31.80
Pest and disease infestation	50.00	30.00
Price fluctuation	48.00	28.00
High cost of inputs	40.00	24.00
Lack of improved varieties	37.00	22.20
Market uncertainty	37.00	22.20
Lack of storage facilities	30.00	18.00
High cost of labour supply	30.00	18.00
Inadequate credit facilities	27.00	16.20
	* *	**

**Source:** Computed from field survey, 2022 \*\* Multiple responses

### **Effects of Traditional Production Technology on the Environment**

Effects of traditional groundnut production technology on the environment was identified, determined with farming system approach and was presented in Table 5. Groundnut farming systems were considered as: pre – planting, planting and post planting operations. Pre – planting operations were categorized into: clearing, burning and tillage. The analysis of clearing, a pre – planting activity as presented in Table 5, showed that majority, seventy eight (78.00) (46.80%) ranked deforestation first as traditional groundnut production technology that is hazardous to the environment. Destruction of shrubs and grasses, seventy two (72.00) (43.20%) was ranked second as production activity that can lead to land degradation. Erosion, sixty four (64.00) (38.40%), was ranked third as pre – planting operation carried out that can cause depletion of the soil. A further analysis of effect of clearing showed that it could lead to soil erosion (64.00) (38.40%), loss of water shades (38.00) (22.80%) and may alter oxygen – carbon (iv) balance as was ranked third, fourth and fifth respectively by the respondents. Only twenty four (24.00) (14.40%) indicated that clearing causes soil evapo – transpiration and was ranked sixth.

The effect of burning as a traditional production technology on the environment was also determined and presented in Table 5. The major effects of burning on the environment as presented in Table 5 revealed that it leads to destruction of ecosystem (72.00) (43.00%), causes wind erosion (70.00) (42.00%) and destruction of micro and macro organisms (56.00) (33.60%) as identified by groundnut farmers and ranked first, second and third respectively. The effect of traditional tillage operation on the environment was determined. The result revealed that majority (53.00) (31.80%) indicated that it could lead to soil and land depletion as well as cause soil compactment (32.00) (19.20%). The result of the planting operations carried out in the study area indicated that majority (80.00) (48.00%) of ground nut farmers over cropped the arable land. The impact of this on the environment is reduction in soil nutrient and soil moisture with a multiplier effect(s) on the environment.

A further analysis of planting operations on the environment showed that it leads to land and soil degradation as indicated by sixty four (64.00) and (38.40%) of the farmers studied. Post planting operations considered in this study were classified as weeding (manual and use of herbicides), fertilizer (organic and inorganic) and pesticides application as well as harvesting. The analysis revealed that weeding as a post planting operation leads to loss of soil nutrient (61.00) (36.60%), erosion (59.00) (35.40%) and destruction of habitat (43.00) (45.80%) as was indicated by the farmers.



Fertilizer and pesticide applications were considered in this study as a post planting operations. The result showed that the major effects of this traditional farming operation on the environment were pollution (77.00) (46.20%) and land degradation (61.00) (36.60%). The result also revealed that sixty (60.00) (36.00%) indicated that fertilizer and pesticide application affects human health. Harvesting as a post planting operation was studied, determined and the result presented in Table 5. The result showed the effects of harvesting on the environment to include: loss of soil nutrients (71.00) (42.60%), destruction habitats and ecosystem (66.00) (39.60%) and loss of species (53) (31.80%).

**Table 5:** Effects of Traditional Production Technology on the Environment

Activities	Frequency	Percentage	Rank
<b>Pre – planting operations</b>			
<b>Clearing</b>			
Deforestation	78.00	46.80	1st
Destruction of shrubs and grasses	72.00	43.20	2nd
Erosion	64.00	38.40	3rd
Water shades	38.00	22.80	4th
Oxygen – Carbon (iv) oxide balance	32.00	19.20	5th
Evapo - transpiration	24.00	14.40	6th
<b>Burning</b>			
Destruction of ecosystem	72.00	43.00	1st
Wind erosion	70.00	42.00	2nd
Destruction of micro and macro organisms	56.00	33.60	3rd
Atmosphere turbidity	28.00	16.80	4th
<b>Tillage</b>			
Soil and land depletion	53.00	31.80	1st
Soil compactment	32.00	19.20	2nd
Soil ecosystem quality	28.00	16.80	3rd
Oxygen – Carbon (iv) oxide balance	19.00	11.40	4th
<b>Planting operations</b>			
<b>Planting</b>			
Over cropping of arable land	80.00	48.00	1 <sup>st</sup>
Land and soil degradation	64.00	38.40	2nd
<b>Post planting operations</b>			
<b>Weeding (manual and chemical application)</b>			
Loss of soil nutrients	61.00	36.60	1st
Erosion	59.00	35.40	2nd
Destruction of habitat	43.00	25.80	3rd
<b>Fertilizer (organic and inorganic) and pesticides</b>			
Pollution	77.00	46.20	3rd
Land degradation	61.00	36.60	4th
Affect human health	60.00	36.00	5 <sup>th</sup>
Destruction of micro of microorganisms	53.00	31.80	6th
Increase soil acidity	32.00	19.20	7th
<b>Harvesting</b>			
Loss of soil nutrients	71.00	42.60	1st
Destruction habitats and ecosystem	66.00	39.60	2nd
Species loss	53.00	31.80	3rd

**Source:** Computed from field survey, 2022 \*\* Multiple responses





## CONCLUSION AND RECOMMENDATIONS

Fixed cost items were established to form the major components of the total cost of production representing 63% of the cost components. Ground nut production in the study area was profitable as it showed a positive value of ₦2,967,470.59 per annum with a return on investment of 3.37 indicating that there was a return of three naira, thirty seven kobo (₦3.37) for every one hundred naira (₦100) invested in groundnut production. The major constraints to ground nut production in the study were use of crude implements, low price, pest and disease infestation, price fluctuation, high cost of inputs and lack of improved varieties. It is recommended that:

1. Since ground nut production is profitable in the study area, it was recommended that farmers should thrive to increase their production capacity.
2. It was also recommended that ground nut farmers in the study area should form and/or join cooperative society to enable them enjoy the benefits of economies of scale, facilitate access to credit from financial institutions and acquire inputs at low and subsidized rate.
3. The Ebonyi State and Federal Government in conjunction with the private sector should establish central storage facilities.
4. Farmers should be enlightened on the implications and the need for environmental friendliness practices.

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