



Assessment of the Profitability of Rice Production in Afikpo North L.G.A.

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Authors' contributions

This work was carried out in collaboration among all authors. Author UN designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors DJ and NUM managed the analyses of the study. Author DJ managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

This study was carried out to determine the profitability of rice production in Afikpo North L.G.A Ebonyi State of Nigeria between April and September, 2019. Seventy (70) rice farmers (35 each) randomly selected from two prominent rice producing villages (Amasiri and Akpoha) in the study area were used as sample size. Questionnaires and personal interviews respectively were the basic primary and secondary means of data collection. Descriptive statistics, Gross margin analysis and Likert Scale were used to analyze the data obtained for socio-economic, profitability and constraints to rice production in the study area respectively. Results showed that socio-economic characteristics including gender, age, farm size, household, education etc are among the factors that affect rice production in the area. The result of likert scale showed that inadequate capital, high cost of labour, inadequate farm input etc were major constraints to rice production, while cost of transportation, cost of pesticide and marketing outlet were not considered as constraints rice production in the area. The result of gross margin analysis showed that Total Revenue and Gross margin were 270,000 and 214, 0000 respectively while Net Profit was N201, 500. The cost return ratio was 3.9k. This implies that the rice farming is highly profitable since the total revenue significantly outweighed the total cost. The cost return ratio of 3.9k implies that for every one naira

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invested in rice production about 4.0k is returned as profit. The study therefore recommends that Government should formulate agricultural enhancement policies that will address the major constraints observed in this study to ensure large scale and profitable rice production in Afikpo North LGA.

Keywords: Rice; profitability; assessment; Afikpo North LGA.

1. INTRODUCTION

Agriculture contributes a lot to the economy of Nigeria. Not less than 70% of Nigerians earns their living from agriculture and it provides among others food, employment, income and foreign exchange, raw material for the manufacturing sectors. According to FAO [1], agriculture was the mainstay of Nigerian economy besides oil in terms of employment and increase food production.

Rice (*Oryza sativa*) is the major staple food for half of the human race and feeds about 60 percent of the world's population [2]. According to WARDA [3], rice has become a staple food of considerable strategic importance in many rapidly growing African cities where its consumption among urban poor households has increased substantially. In Nigeria, rice has become a major staple food in most homes today and unfortunately, domestic production of this grain has not met the demand leading to food shortages.

According to Akande, [4] the demand for rice (*Oryza sativa*) has been increasing at much faster rate in Nigeria than in other West African countries since the mid 1970s for example, Nigeria's per capital rice consumption level has grown significantly at 7.3% per annum, rising from 18 kg in the 1980s to 22 kg in 1990s.

Although rice production in Nigeria has boomed over the years, there has been a considerable lag between production and demand level with imports making up for the shortfall [4]. Factors such as lack of improved processing facilities, low rice productivity, poor harvest handling and storage, expensive and poor access to inputs (high quality seed, fertilizer and crop protection products), inadequate market information, lack of transparency among players, low capacity to meet quality standards and limited efficiency distribution networks have resulted into a declined in rice production and low income for rice farmers in Nigeria, especially in Afikpo North Ebonyi State, leading to massive loss of manpower through the abandonment of the farmers and the migration of rural youths to cities

in search of white collar jobs. Both Okoruwa and Ogundele [5] have noted that rice farmers in Afikpo North are not getting maximum returns from the resources committed into their enterprise, leading to a declined in per capital food production. This situation manifests in low output per area which no doubt leads to low productivity.

Hence, in an effort to accelerate rice production, it is essential to identify the production system and those inputs required to increase production. In light of these, this study attempted to analyses the costs and returns involved in rice production, thus determining the profitability of rice production and which will in turn promotes the capacity for expanding rice production in Afikpo North LGA.

2. METHODOLOGY

2.1 Study Area

This study was carried out in Afikpo North Local Government Area of Ebonyi State between the months of April and September, 2019. Afikpo is located at latitude 5°6^N and Longitude 7°8^E with annual rainfall of 1200 – 1600 mm, a mean temperature range of between 27°C – 33°C. Afikpo North is made up of 22 autonomous communities. It has an area of 240 km² and the population of the study is made up of all the rice farmers. Their predominant occupation is farming which include fishing, cropping and animal rearing. Besides farming, the inhabitants also engage in various other occupations such as civil service, trading and commerce. The major market is Eke market. Afikpo lies with the subequatorial belt which is characterized by two climate season, wet and dry season. The wet season last from April – September, with a peak in June and July while the dry season last from October – March with December and January as the driest months.

2.2 Sampling Procedure

Two villages known for rice production in the study area were purposively chosen for this study. These villages are Amasiri and Akpoha.

Sample size comprised of fifty (35) respondents was randomly selected from each village, thus making a total of 70 respondents for the entire study.

2.3 Source of Data Collection

The research utilized primary and secondary data. Well structured questionnaires and personal interviews were the basic means for data collection.

The questionnaire was administered to each of the selected rice farmer while personal interviews were conducted among some workers at the National Cereal Research Institute sub-station, Ebonyi State.

2.4 Data Analysis

The data collected were analyzed using descriptive statistics, Gross margin analysis and Likert Scale. The descriptive statistics were used to describe the socio-economic characteristics of rice producing farmers in the study area.

Gross margin which is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC) was used to estimate the profitability of rice production in the area.

Likert scale was used to analyze the factors (constraints) affecting rice production in the area [6].

Gross margin is calculated thus:

$$GM/ha = TR/ha - TVC/ha$$

Where

GM = Gross margin

TR = Total Revenue/ha of land

TVC = Total variable cost/ha of land

Net return = TR – TC (TC = Total cost = Total fixed cost – Total variable cost)

Benefit cost ratio = TR/TC

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of the Rice Farmers

The socio-economic characteristics of the respondents involved in rice farming are presented in Table 1. The results showed that there were more male (65.7%) than female

(34.2%). The implication is that males who are more capable of coping with the hard work associated with rice production dominated the study area. Olukosi et al. (2000), strengthened by Pawal, [7] has also reported higher number of male than female involvement in rice production. The age of the respondents ranged from 15 to 75 years. The majority of the farmers (40.0%) fell within the age bracket of 31-45, followed by those within 46-60 (35.7%), while the least fell within 61-75 (5.7%). This indicates that young adults are more actively involved in farming activities where their productivity is at its peak and hence is of great value to rice production. Erhabor and Ahmadu [8] concurred with this finding based on his assertion that farmers who are between the ages of 30-49 years are more willing and able to take risk with the expectation of a larger profit than the older farmers.

Results showed that greater proportion (82.9%) of the respondents were married while (14.3%) were single. This implies that married people were more involved in rice production than other categories of different marital status. This could be because of married men and women have greater household responsibilities and seeks various ways to feed their families. The data obtained also showed that majority of the respondents (55.7%) were full time farmers while only few (9%) were civil servants and others engage in other kinds of occupation. The result also shows that 41.4% of the farmers had primary form of education followed by secondary education (38.6%), tertiary education (14.3%) and other forms of education (5.7%). This showed that the study area is dominated by farmers who are not well educated. Thus it is expected that the introduction of new technologies in the area will receive minimal acceptance and adaptation due to illiteracy. This confirms David, [9] report that level of education is expected to influence farmers' adoption of agricultural innovations and also improved decision making on various aspects of farming.

Results also revealed that majority of the rice farmers had farming experience between 6-10 years (40%) while (28.6%) between 11-15 years. Farmers with more farming experience are likely to be more versatile regarding the proper agronomic practices and right combination of inputs for a profitable farm venture. This finding is corroborated by Anjugam, et al. [10] that reported that farming experience is a key determinant of the ability of the farmer to make good farm management decisions effectively.

Table 1. Frequency distribution of respondents according to socio-economic characteristics

Sex	Frequency	Percentage
Male	46	65.7
Female	24	34.2
Age range		
15 – 30	13	18.8
31 – 45	28	40.0
46 – 60	25	35.7
61 – 75	4	5.7
Marital status		
Married	58	82.9
Single	10	14.3
Widow	2	2.9
Primary occupation		
Farming	39	55.7
Civil service	9	12.9
Others	22	31.4
Level of education		
Primary	29	41.4
Secondary	27	38.6
Tertiary	10	14.3
Others	4	5.7
Farming experience		
Less than 1 year	7	10.6
1-5 years	15	21.4
6-10 years	28	40.0
11-15 years	20	28.6
Household size		
0-5	20	28.6
6-10	40	57.1
11-15	10	14.3
Farm size (ha)		
0.5-1.0	24	34.3
1.5-2.0	34	48.6
2.5-3.0	8	11.4
3.5-4.0	4	5.7

Source: field survey, 2019

57.1% of the farmers had household size of between 6-10 members, 28.6% and 14.3% had 0-5 and 11-15 members respectively. This indicates that farmers had enough family labour for rice production. Household size is an important source of family labour (Narasimba, et al. 2013). However, according to Okoruwa and Ogundele [5], large family size does not necessarily translate to high usage of family labour. This is because some of the able body family members may prefer other jobs rather than farming.

Majority (48.6%) had small farm size that ranged between 1.5 - 2.0 hectares in scattered plots. This small size of the cultivated land areas could

be limiting output level in the study area. Okunlola and Adekunle, [11] previously reported that the majority of the Nigerian farmers operate at small scale level.

3.2 Rice Variety and Cultivation System

Results showed that majority of the respondents (38.6%) plant Akujie variety while only 8.6% of the farmers plant Dave Umahi variety (Table 2). Choice of rice variety for cultivation in the study area followed the decreasing order of Akujie> Mars> Kpurukpuru> Dave Umahi. In the light of the above, it can be deduced that Akujie and Mars are the most common varieties of rice cultivated in the study area. Ezech, [12] has also

reported that Akujie is the most common rice variety cultivated in southeastern Nigeria.

The table also showed that all the respondents grow rice under swamp condition. This could be attributed to the fact that majority of arable lands in the study area are swampy. Also, David, [9], reported higher yield and less labour requirement for weeding in swampy area or lowland rice production. According to Kumar et al. [13], swamp rice with water control and fertilization will yield up to 4450 kg to 5,750 kg/ha. Average swamp rice without fertilizer will yield between 1,150 to 2,300 kg/ha.

24.3% of the farmers' yield fall between 300 – 700 kg/ha, 40% had yield of between 800 – 1200 kg/ha while 35.7% had yield of between 1300 – 1500 kg/ha. According to the rating by FAOSTAT, (2012), the present yield range falls within the low category. The low yield could be as a result of pest infestation, variety, soil and some socio-economic factors in the area.

The Table 2 also revealed that 80% of the farmers in the study area finance their production, which implies that they have never applied for loan for or obtain loan or grants to finance their production. The technical bureaucracy, coupled with the high and unstable interest rate of commercial Banks might be responsible for this. However, only a minimal fraction of the farmers fund their rice production through cooperative (11.4%) and local money lenders (8.9%). Adequate and timely access to funds is crucial to commercial rice farming. Okoruwa and Ogundele, [5] have however

identified lack of credit facilities as a major constraint to rice production in Nigeria.

3.3 Constraints to Rice Production in Afikpo North LGA

Analysis of constraints affecting rice production in the area using likert scale is presented in Table 3. Some of the constraints limiting rice production in the study area were identified.

Results showed that the studied variables including inadequate capital, high cost of labour, inadequate farm input, poor marketing outlet, high cost of pesticide, land tenure system, high cost of fertilizer, high cost of transportation, and problem of pest and diseases, were identified as the major constraints to rice production in the study area. Those that are highly limiting production include: pest and diseases, inadequate farm input, inadequate capital, high cost of fertilizer and labour.

The problem of pests and diseases was identified as the most limiting factor (Mean =3.5) to rice production, while poor marketing outlets was the least militating factor (Mean =2.4). Generally, lack of finance and other farm input constituted constraints to rice production in the study area. This result is in line with the position of Imolehin and Warda [2], who reported similar constraint to rice cultivation in a field experiment, the above result therefore suggest the need for more government attention to rice production through the provision of most of these identified constraints.

Table 2. Rice variety and cultivation system

Rice variety	Frequency	Percentage
Mars	25	35.7
Akujie	27	38.6
Kpurukpuru	12	17.1
Dava Umahi	6	8.6
Cultivation system		
Swamp (Lowland)	70	100
Upland (Dryland)	-	-
Both	-	-
Output of rice (100 kg/hectare)		
300-700	17	24.3
800-1200	28	40.0
1300-1500	25	35.7
Source of finance for rice production in the area		
Farmer	56	80
Cooperative	8	11.4
Local money Lenders	6	8.9

Source: Field survey, 2019

Table 3. Analysis of constraints affecting rice production in the area using Likert scale

Variables	4 SA	3 A	2 D	1 SD	Total score	Mean
Inadequate capital	40(4) = 160	20(3) = 60	7(2) = 14	3(1) = 3	237÷70	3.4
High cost of labour	30(4) = 120	25(3) = 75	10(2) = 20	5(1) = 5	220÷70	3.1
Inadequate farm input	35(4) = 140	30(3) = 90	4(2) = 8	1(1) = 1	239÷70	3.41
Poor marketing outlet	18(4) = 72	10(3) = 30	25 (2) = 50	17(1) = 17	169÷70	2.4
High cost of pesticide	19(4) = 76	10(3) = 30	23 (2) = 46	18(1) = 18	170÷70	2.4
Land tenure system	25(4) = 100	23(3) = 69	10(2) = 20	12(1) = 12	201÷70	2.9
High cost of fertilizer	30(4) = 120	29(3) = 87	6(2) = 12	5(1) = 5	224÷70	3.2
High cost of transport	15(4) = 60	13(3) = 39	26(2) = 52	16(1) = 16	167÷70	2.38
Problem of pest and disease	45(4) = 180	20(3) = 60	3(2) = 6	2(1) = 2	248÷70	3.5

Mean > 2.5 = Accepted, Mean < 2.5 = Rejected

3.4 Cost and Returns in Rice Production

The result of the profitability analysis of rice production in the study area is shown in Table 4. Results showed that the Total Variable Cost (TVC) was N56000 while Total Fixed Cost (TFC) was 12500. Total Revenue (TR) and Gross Margin (GM) were N270, 000 and 214,000 respectively. The Net return was N201, 500.00 and cost return ratio is 3.9k. The cost return ratio of 3.94 implies that for every one naira invested

in rice production about ₦4.0k is returned as profit. Therefore the profitability of rice enterprise and farmers income is expected to increase significantly if more land is put under production. Ekpe and Alimba (2013) have also reported similar value in a field study. This implies that the rice farming is highly profitable since the total revenue has significantly outweighed the total cost. Therefore, this is a sure sign that the rice enterprise is profitable enough to keep the rice farmer in further production. The high profitability

Table 4. Cost and returns in rice production

Materials used	Qty (kg)	Qty	Cost/unit	Total value
Revenue	1500kg		₦180/kg	₦270,000
Variable cost				
Rice seed	25 kg	2	2000	4000
Fertilizer	50 kg	4	5000	20000
Herbicides	1 liter	2	1200	2400
Planting	Man-days	4	1125	4500
Land clearing	Man-days	6	1250	7500
Ploughing	Man-days	3	1167	3500
Fertilizer/herbicide application	Man-days	2	750	1500
Weeding	Man-days	4	1200	4800
Harvest cost	Man-days	5	960	4800
Transportation cost	(N)	15	200	3000
Total variable cost				N56000
Fixed cost at depreciated values				
Cost of land	Hectares	1.5	2500	2500
Hoe		2	1500	3000
Cutlass		1	1800	1800
Knife		2	400	800
Sickle		1	1000	1000
Bags		20	150	3000
Basket		2	200	400
Total fixed cost				12500
Gross margin				214,000
Net profit				201,500
Cost return ratio				3.9k

Source: Field survey, 2019

of rice business in the study area can contribute significantly to the income of the farmer as well as the Gross Domestic Product of the country, thereby promoting the economy and general standard of living of the citizens.

4. CONCLUSION

Rice which has always been the mainstay of Nigerian economy has a rich history and the contributions of rice to National economic developments are vast. The studied identified some socio-economic characteristics of rice farmers that have bearings to their productive capabilities. Pests and diseases, finance and general inadequate farm inputs were identified as major constraints to rice production in the study area. Marketing outlets and high cost of pesticides were however not considered as major limitations to rice production.

The result of gross margin analysis showed that Total Revenue and Gross margin were 270,000 and 214, 0000 respectively while Net Profit was N201, 500. The cost return ratio was 3.9k. This implies that the rice farming is highly profitable since the total revenue significantly outweighed the total cost. The cost return ratio of 3.9k implies that for every one naira invested in rice production about 4.0k is returned as profit.

Therefore the profitability of rice enterprise and farmers income is expected to increase significantly if more land is put under production. Thus the promotion of rice production among farmers will increase availability and affordability of the grain, enhance income generation of farmers and improve food security at the household and national level.

Given the ecological features including climatic and soil conditions, Afikpo North LGA, as the potential of producing rice that could feed the whole nation especially when adequate attention in terms of necessary inputs are provided by the government. This study therefore recommends appropriate, timely and sustained policies that will address the problems of rice production to ensure sustained and large scale rice production in the study area.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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