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PROFITABILITY OF 'EGUSI' MELON (*Citrullus Lanatus Thunb. Mansf*) PRODUCTION UNDER SOLE AND MIXED CROPPING SYSTEMS IN KOGI STATE, NIGERIA

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ABSTRACT

The study assessed the profitability of 'egusi' melon (Citrullus lanatus Thunb. Mansf) under sole and intercropping systems in Okehi Local Government Area (LGA) of Kogi State. Primary data were used for the investigation. The primary data were obtained through the use of questionnaire in Okehi LGA. 240 farmers were purposively sampled and 120 were randomly selected for the study. Descriptive statistics and net farm income analysis were employed in the analysis of the data. The result showed that the average net farm income per hectare for sole melon, melon in 2, 3, and 4 crops mixture were ₦1,328.69, ₦915.77, ₦887.27 and ₦414.57 respectively. The total gross return per hectare for melon (from the pooled data) averaged ₦12.638.61 while the total cost of production was ₦8, 838.74 on the average. The total net farm income per hectare for both sole and mixed (pooled data) was ₦3, 799 on the average, implying that 'egusi' melon production is profitable in the area. Based on the findings, it was recommended that farmers in the area should continue to focus more attention on sole melon production. Also the Agricultural Development Projects (ADP) in the state should intensify melon production awareness and mobilize the local industries for 'egusi' melon processing and extraction of the oil for better utilization in the area.

Keywords: melon, profitability, egusi, sole, intercrop, cropping, production, kogi.

INTRODUCTION

Sole cropping is the growing of a particular crop on a piece of land. Intercropping on the other hand is the growing of two or more crops simultaneously on the same piece of land with distinct row arrangement (Alamu, 2002). Growing crops in a mixture is a farming practice that is common among farmers of the tropics (Anonymous, 1996). In Nigerian savanna, mixed cropping is a common practice among the traditional farmers. The northern part of Nigeria is known to be characterized by mixture of cereals, leguminous grain and fibre. In the southern part of Nigeria, the cropping system is reported to consist of root crops, tree crops and occasional stands of maize and vegetables (Olukosi and Ogungbile, 1991).

Among substantial advantages attributed to mix cropping according to Remison and Onelemhemhen (1999) is that mixed cropping has been shown to lead to better utilization of land, labour and capital. It also results in less variability in annual returns compared with sole cropping. Mixed cropping system also ensure food security against total crop failure or with intent to maximize yield and profit making by the use of the same labour operations (Usman, 1997). Vegetable production in Nigeria is mainly in the form of diverse species grown as subsidiaries in mixture with staple food crops, using traditional farming methods (Denton *et al.,* 2000). The food crops are normally grown on relatively fertile lands cleared from bush fallows of varying durations which allow for soil organic matter nutrient build-up (Ayodele*, et al.,* 2007).

'Egusi' melon (Citrullus lanatus Thunb Mansf) is a native of Africa, which has probably been introduced to Asia, Iran and Ukraine (Schippers, 2000). Cultivation of 'egusi' melon is across the country but with higher

intensity in Kogi state (211, 600ha). There was large increase in land area put to melon production in 2004 and 2005 (NAERLS-PCU, 2005). A valuable vegetable oil is extracted from the seed while the ground seed is used to prepare various delicacies including cake and soup (Lagoke *et al.,* 1983). 'Egusi' melon is important for their seeds in Sudan and Ethiopia and the Extracted yellow oil in high demand (Schippers, 2000). It is usually grown in mixture with other crops such as cassava, maize and yam which may account for the increase in land area put to its production (NAERLS -PCU, 2005). Thus, this study aims at describing the socio-economic characteristics of the sampled farmers and determines profitability of egusi melon production in Okehi LGA of Kogi State.

METHODOLOGY

This study was conducted in Okehi local government area (LGA) of Kogi State, Nigeria. Okehi LGA is located between latitude 7^0 33′ and 7^0 35′ N and between Longitude 6^0 10′ E and 6^0 14′ E of the equator (Kogi ADP, 2003). It is located in Kogi Central Senatorial District, between the boundaries of Oyi, Adavi and Okene LGAs of Kogi State. Kogi State is in the southern guinea savanna of the vegetation zones and most centrally located of all Nigerian State (Fejokwu, 1992).

The state has distinct wet and dry seasons. The raining season fall between April and October while the dry season is between November and March (Kogi ADP 2003). Majority of the people in the state are small scale farmers and the rich are diversified soil condition enable agriculture to thrive in the state (Fejokwu 1992).

Primary data were used for the study. The sample for the study was selected using structured questionnaire.

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A total of 240 farmers were purposively selected from the seven districts of the local government including Ihima, Obangede, Eika, Itakpe, Okaito, Usungwe and Uhuodo districts. Out of this number, 120 farmers were randomly selected for the study. Farmers involved in melon production (sole and mixed) were used for the study. For the melon under mixed cropping system, inputs were divided in the ratio of the number of crops in the mixture on per stand basis in order to get the cost of 'egusi' melon inputs only.

Analytical Tools

The tools of analysis used for this study were:

Descriptive statistics

These involve the use of central tendency like the mean, frequency distribution and percentages. It was used to summarize the data collected.

Net farm income analysis

This was used to determine the cost and for melon production in the area. The net farm income other wise known as profit is the difference between gross income (GI) and the total cost (TC) of production (Olukosi and Erhabor), 1988).

NFI = TVP – TC

Where
TVP = Total Value Product

TC = Total Cost of Production

NFI = Net Farm Income

The model used for estimating net farm income can be expressed by the equation:

$$NFI = \sum_{i-1}^{n} P_{yi} Y_i - \sum_{j=1}^{m} P_{xj} X_j - \sum_{k=1}^{k} F_k$$

Where NFI = Net farm income
Yi = Enterprise's Product(s) (where i = 1, 2, 3…….n products)

Pyi = Unit price of the product

Xj = Quantity of the variable inputs (where j =, 1, 2, 3……… m variable inputs)

Pxj = price per unit of variable inputs.

Fk   = Cost of fixed inputs.

Σ = Summation (addition) sign

The total variable costs (TVC) include items like total cost of labour, land, fertilizer and seed. The total fixed cost (TFC) includes the depreciation on farm tools like hoes and cutlasses and the cost of renting land.

RESULTS

Socio-economic characteristics of the farmers

The socio-economic characteristics of the farmers in Okehi LGA are presented in Table-1. The age of the farmers ranged between 21 and 60. Majority of the respondents (61.67%) were between the ages of 41 to 50. This implies that majority of the farmers were of middle age, they were still in their economic active age that can make positive contribution to agricultural production. Also, 83.33% of the respondents had one form of education or the other while 16.67% had no education. Njoku, (1991) discovered that formal education has a positive influence on adoption of innovation.

Furthermore, respondents' years of experience in melon production ranged between 1 and 25 years. 98.34% of the farmers had experience in melon production while 1.66% planted melon for the first time. This implies that more farmers are currently getting involved in melon production in the study area. As experience is gained with age, so the older the farmer, the more experienced he is in farming. The size of the household ranges between 1 to 20. 95.83% has between 1 to 15 while 4.17% has household size of between 16-20. The large household size may enable the farmers to use family labour in most of the farm operations.

Table-1. Socio-economic characteristics of the farmers.

Variables	Number of respondents	Percentage
Age (years)		
21 – 30	4	3.33
31-40	33	27.50
41-50	74	61.67
51-60	9	7.50
Total	120	100.00
Level of Education		
Primary	28	23.33
Secondary	32	26.67
Tertiary	16	13.33
Quranic	24	20.00
Non formal education	20	16.67
Total	120	100.00
Years of experience in melon farming		
1 -8	77	64.17
9 -16	35	29.17
17 -25	6	5.00
Not experienced	2	1.66
Total	120	100.00

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Household size		
1 – 5	19	15.53
6 – 10	59	49.17
11 – 15	37	30.83
16 – 20	5	4.17
Total	120	100.00

Analysis of cost and returns in 'Egusi' melon production

In order to determine the costs and returns (profitability) of this study, farm budgeting technique was employed to analyze the data collected. In this case, input quantities, factor prices, physical output and total returns were obtained. Factors of production and physical output were valued at the market price prevailing at the period of the survey. Gross returns were compared with total cost for sole melon and melon in 2, 3 and 4 crops mixture.

Average costs and returns for sole 'Egusi' melon per hectare

An average gross return of ₦5, 262.72 per hectare was obtained for sole melon Table-2 shows that the total cost of labour was ₦3, 138.66 per hectare while the total cost of seed and fertilizer were ₦158.21 and ₦91.67 per hectare respectively. The total variable cost incurred was ₦3, 388.54 while the total fixed cost was ₦291.91 per hectare. The total cost of production was found to be ₦3, 934.03 while the net farm income for sole melon production was ₦1, 328.69 per hectare. This is higher than the net farm income for melon in 2 crops mixture.

Average costs and returns for 'Egusi' melon in 2 crops mixture per hectare

An average gross return of ₦3, 045.91 per hectare was obtained for melon in two crops mixture in the LGA. For the input costs, the total cost of labour employed per hectare was ₦1, 816.56. The total costs of seed and fertilizer were ₦91.57 and ₦53.06 per hectare respectively. The total variable cost was ₦1, 961.19 per hectare while the total fixed cost per hectare was ₦168.95. The total cost of production per hectare averaged ₦2, 130.14 while the net farm income was ₦915.77 per hectare as shown in Table-3.

Average costs and returns for 'Egusi' melon in 3 crops mixture per hectare

Table-4 shows that the average gross return for melon in 3 crops mixture was ₦2, 951.12 per hectare. The total cost of labour used was ₦1, 760.03 per hectare. The total cost of seed and fertilizer per hectare were ₦88.72 and ₦51.40 respectively. The total variable cost was ₦1, 900.15 per hectare while the total fixed cost was ₦163.69 per hectare. The total cost of production and the net farm income per hectare were ₦2, 063.84 and ₦887.27

respectively. The net farm income in 2 crops mixture was higher than that of 3 crops mixture.

Average costs and returns for 'Egusi' melon in 4 crops mixture per hectares

The gross return per hectare for melon in 4 crops mixture was ₦1, 378.87 as shown in Table-5. The total labour cost was ₦822.35 while the seed and fertilizer costs were ₦41.45 and ₦24.02 respectively. The total variable cost was ₦887.82 while the total fixed cost was ₦76.48. The total cost of production was ₦964.30 while the net farm income was ₦414.57 for melon in 4 crops mixture. The net farm income in 3 crops mixture was higher than that of 4 crops mixture.

Table-2. Average costs and returns per hectare for sole 'egusi' melon in Okehi LGA.

Items of costs and returns (₦)	Total
Melon yield (kg)	74.99
Gross return	5262.72
Inputs costs (₦);	
Family labour only	1,789.04
Hired labour only	609.21
Both family and hired labour	740.41
Total labour	3138.66
Seed	158.21
Fertilizer	98.67
Total variable cost	3388.54
Cost of renting land	38.33
Depreciation on farm tools	253.58
Total fixed cost	291.91
Total cost of production	3,934.04
Net Farm Income	**1,328.69**

Table-3. Average costs and returns for 'egusi' melon in 2 crops mixture per hectare.

Items of costs and returns (₦)	Total
Melon yield (kg)	43.40
Gross return	3045.91
Inputs costs (₦);	
Family labour	1,035.44
Hired labour	352.59
Both family and hired labour	428.53
Total labour	1,816.56
Seed	91.57
Fertilizer	53.06

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Total variable cost	1,961.19
Cost of renting land	22.18
Depreciation on farm tools	146.77
Total fixed cost	168.95
Total cost of production	2,130.14
Net Farm Income	**915.77**

Table-4. Average costs and returns for 'egusi' melon in 3 crops mixture per hectare.

Items of costs and returns (₦)	Total
Melon yield (kg)	42.06
Gross return	1.951.12
Inputs costs (₦);	
Family labour	1,003.22
Hired labour	341.62
Both family and hired labour	415.19
Total labour	1,760.03
Seed	88.72
Fertilizer	51.40
Total variable cost	1,900.15
Cost of renting land	21.15
Depreciation on farm tools	142.20
Total fixed cost	163.69
Total cost of production	2,063.84
Net Farm Income	**887.28**

Table-5. Average costs and returns for 'egusi' melon in 4 crops mixture per hectare.

Items of costs and returns (₦)	Total
Melon yield (kg)	19.65
Gross return	1.378.87
Inputs costs (₦);	
Family labour	468.74
Hired labour	159.62
Both family and hired labour	193.99
Total labour	822.35
Seed	41.45
Fertilizer	24.02
Total variable cost	887.82
Cost of renting land	10.04
Depreciation on farm tools	66.44
Total fixed cost	76.48
Total cost of production	964.30
Net Farm Income	**414.57**

Total costs and returns per hectare for 'Egusi' Melon (Both Sole and Mixed) Production in Okehi LGA.

Table-6 shows the summary of the total costs and returns from the pooled data obtained for both sole melon and melon in 2, 3 and 4 crops mixture per hectare in the study area. The gross return per hectare was ₦12, 638.61. Total cost of labour was ₦7, 537.60 while the total cost of seed and fertilizer were ₦379.95 and ₦220.15, respectively. The total variable cost was ₦8,137.70 while the total fixed cost ₦701.04. The total net farm income for egusi melon production in Okehi LGA was ₦ 3,799.87 on the average.

Table-6. Total cost and returns for 'egusi' melon (both sole and mixed) production in Okehi L.G.A per hectare.

Items of costs and returns (₦)	Total
Melon yield (kg)	175.35
Gross return	12,638.61
Inputs costs (₦);	
Family labour	3,203.48
Hired labour	2,449.72
Both family and hired labour	1,884.40
Total labour	7,537.60
Seed	379.95
Fertilizer	220.15
Total variable cost	8,137.70
Cost of renting land	92.04
Depreciation on farm tools	609.00
Total fixed cost	701.04
Total cost of production	8,838.74
Net Farm Income	3,799.87

From Table-6, the gross return per hectare was ₦12, 638.61 while the total cost was ₦ 8,838.74 on the average. The average net farm income per hectare was ₦3, 799.87. The gross return per naira invested was ₦1.43 per hectare. This implies that for every naira invested in 'egusi' melon production, a gain of forty three kobo was made.

DISCUSSIONS

The study revealed that the higher the number of crops in the mixture the less the profitability. This is in line with the findings of Yusuf (2005), where he discovered in his research on 'egusi' melon that the more the number of crops in the mixture the less the yield and the less the profitability, which he attributed to the competitive effects of the various crops in the mixture. The profit made per hectare was relatively small for sole 'egusi' melon (₦1, 328.69) when compared with other findings. Ayodele, *et al.,* (2007), in his research on 'egusi' melon in Ibadan, made a profit of ₦3, 619.01 and ₦ 5,

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674.81 with only 25 kg and 50 kg of nitrogen fertilizer applied respectively per hectare. The variation in the profitability may be attributed to the differences in the nutrient composition of the soil and management.

CONCLUSIONS AND RECOMMENDATIONS

The study has shown that egusi melon production is profitable in the study area. It was revealed that sole melon production has higher net farm income than melon in the crops mixture. Melon in 2 crops mixture has higher net farm income than melon in 3 crops mixture and so on. Based on these findings, the following recommendations are made:

Farmers in the area should continue to focus more attention on sole melon production, if they should go on mixed cropping for other advantages associated with it, they should focus attention on 2 crops mixture rather than many crops in the mixture. Also, the Agricultural Development Projects (ADP) in the state should intensify 'egusi' melon production awareness and mobilize the local industries for 'egusi' melon processing and extraction of oil for better utilization in the area.

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