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Efficiency of Melon Production in Oredo and Egor Local Government Area of Edo State, Nigeria

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***Abstract* – Melon production occupies a very important position in vegetable crop production in terms of number of farmers that engaged in its cultivation and its economic value This study examined the efficiency of melon production in Oredo and Egor Local Government Areas of Edo State, Nigeria. It sought to ascertain the socio-economic characteristic of the melon farmers, determined cost and returns and estimation of technical efficiency of melon producers. Data were collected using questionnaire and interview schedule from 120 farmers in the study areas. Data were analyzed using stochastic frontier model of regression, budgetary techniques and descriptive statistics. The results of the study showed the socio economic profile of melon producers in the study area. The cost and return analysis for melon farmers indicated that an average net return of N16, 254.98 was realized per hectare in one planting season. None of the farmers was technically efficient but the most efficient farmer had efficiency estimate of 0.9. Farmers who got efficiency estimates that were below average can increase their output up 40% by adopting the farm practice of the most efficient. Fertilizer, pesticide, labour use, weeding rate and harvesting rate had increasing effect on output while years of experience had a reducing effect on inefficiency.**

***Keywords* – Edo, Melon, Efficiency, Nigeria**

I. INTRODUCTION

Egusi *Colocynthis citrillus lanatus* generally known as honey dew, is a vegetable crop of West Africa.Egusi plays a vital role in the farming system of West African rural dwellers as cover crop, weed suppressant and soil fertilization through the formation of root nodules that improves the nitrogen status of the soil.The socio-cultural uses of egusi include; provision of cash income and a good source of quality protein. It is grown virtually everywhere; tropical, sub-tropical and temperate regions. Melon is consumed in many parts of Nigeria, but despite the nutritional and commercial value, its production remains low. Even with its good market price, melon is still produced by farmers on a small scale. Melon is a crop that is tolerant to a wide range of environmental conditions; it is planted twice in a year in the study area. Production of the crop is more popular in the Northern parts of Nigeria where there is abundance of cultivable land which has made the practice of sole or mixed cropping possible Achigan-Dako [1] Anuebunwa, [2] Debertin D.L [4] [5] and Fasola [6] .

This is unlike the south western Nigeria where the study area is part of, where scarcity of farm land has forced majority of the farmers to raise the crop under mixed cropping. Despite the socio-economic importance of melon, production output has been on the decline. The reason for this decline could be attributed to the problem of scarcity of land resulting from land fragmentation, high cost of inputs, use of traditional techniques, and inefficient allocation of resources or what the factors responsible for inefficiency among melon farmers are.

To achieve economic optimum output and thus profitability, resources have to be optimally and efficiently utilized. The broad objective of this study is to examine the efficiency of melon farmers in the study area. Specifically, to;

a) Examine the socio-economic characteristics of the farmers growing melon
b) Determine the costs and returns and profitability of melon production and
c) Estimate the technical and allocative efficiency of melon production. The following hypotheses were tested

$H_o = \alpha_{i1}\ldots\alpha_{i5} = 0: H_{o2} = b_{t1}\ldots b_{t5} = 0$

$H_{03} = P_{t1}\ldots P_{t5} = 0$; $H_{04} = R_1^2 = R_2^2 = R_3^3 = 0$: $H_{05} = Y = 0$

This project work and study is intended to explain how maximum yield in relation to cost can be attained by the melon farmers in Oredo and Egor LGA of Edo State, and also create awareness among farmers and the general public, and also serve as guide for policy formulation and implementation regarding the economic efficiency of melon production.

II. COMPOSITIONAL STUDIES OF MELON SEED

Proximate, amino acid and mineral composition of melon flour has been determined using standard analytical procedures Achigan-Dako [1] indicated that the proximate composition analysis of melon showed that the seed contained (% dry weight): moisture (4.6±0.3), ash (3.7±0.1), ether extract (45.7±0.1), crude protein (23.4±0.2), crude fibre (12.0±0.1) and total carbohydrate (10.6±0.2). Table 1 shows the result of amino acid analysis, which showed that melon seed contained good quantities (g/100g protein) of arginine (9.0), isoluecine (4.8), leucine (4.2), and phenylalanine (3.2) which are essential amino acids as well as glutamic acid (16.9) and aspartic acid (16.3).The mineral analysis (mg/100g) of the flour included: Na (13.0±0.2), K (96.1±0.4), Ca (28.2±0.2), Mg (31.4±0.2), Mn (1.7±0.1), Cu (0.4±0.1), Zn (1.2±0.1), Fe (1.3±0.2), and P (125.3±3.1). With this nutrient profile melon compares favourably with the known protein rich foods such as soybean, cowpeas, pigeon peas and pumpkin [Akintayo [3] Ezekiel and Otten [7], [8] & Oyolu [18].

Table I: Amino acid analysis of Melon seed

Amino Acid	Concentration (g/100g Protein)
Histidine *	2.0
Alanine	5.6
Arginine *	9.0

Lysine*	0.4
Glycine	2.2
Serine	2.4
Threonine *	3.1
Methionine *	0.3
Aspartic acid	16.3
Isoleucine *	4.8
Leusine*	4.2
Glutamic acid	16.9

Source: Akintayo et al,2002

III. Technical Efficiency

Farrell [9] proposed a measure of the efficiency of a firm that consists of two components; technical efficiency which reflects the ability to a firm to obtain maximum output from a given set of inputs and allocative efficiency which reflects the capacity of a firm to use the inputs in optimal proportions given their respective prices. The two combined forms the economics efficiency of a firm. These measures can be output or input oriented approach but in most case technical efficiency will take a value ranging between zero and one. The parameters of the technical efficiency model can be estimated by Maximum Likelihood estimator or corrected Ordinary Least Square estimator.

IV. Methodology

The study covered two Local Government Areas in Edo State namely; Egor and Oredo Local Government Areas. Oredo has an area of 249km^2 and a population of 374,671 at the 2006 Census. The area is located between latitude 6.35°N and longitude 5.3°E. It is characterized by evergreen vegetation typical of a lowland rainforest belt. Due to its geographical location, Oredo LGA experiences a tropical climate with two major seasons; wet and dry. Annual rainfall ranges from 2300-2700mm, concentrated in two peaks; July and September usually separated by a dry spell in August. Average annual temperature ranges from 20-25°C with a mean monthly humidity range of 60-95%.

Egor Local Government Area has an area of 93km^2 and a population of 339,899 (The area is located within latitude 6.47 and 7.15°N of the equator and longitude 5.49 and 6.14°E. Egor and Oredo LGA are mainly inhabited by the Bini people of Nigeria with the major occupation being farming, followed by trading, arts and crafts, brewing, cottage industry, and rubber processing. The agricultural system in Oredo is predominantly small farm holdings. Farming is traditional in nature with emphasis on cultivation of crops such as sorghum, cassava, yam, maize and melon Mohammed [13]. . Melon is one of the crops majorly grown among farmers in the area.

A two stage random sampling technique was used in selecting the sample for the study. The first stage involved a random selection of twelve towns and villages (six from each Local government area of study) from the Edo State village listing as sample frame.

The second stage involved a random selection of ten farmers from the selected towns and villages. A total of one hundred and twenty farming households growing melon from the local government were used for the study. Primary and secondary data were collected for the purpose of this study. The primary data formed the basis of this study. This involved the use of an interview schedule with a structured questionnaire administered to the farmers .Although secondary data on melon production is scanty, the available ones were used in the study which was obtained from the library, internet, journals, Ministry of Agriculture and Natural Resources, and the Edo State yearly magazine of the Agricultural Development Programme (ADP). Section A, which is for socio-economic characteristics, contained information of the age, gender, marital status, house hold size, education status, years of experience etc of the farmers. Section B, contained the core area under discussion which was to gather information on the economic efficiency of melon production, also contained some open ended questions to generate information such as mode of transporting melon, constraints faced during production of melon, cost and returns of melon production etc. The validity of these instruments which indicated the extents to which the questionnaire provided an accurate presentation of what it was trying to measure was examined by a proficient authority. The dependability of the measuring instrument was given to a veteran to examine the degree to which they produce similar outcomes when repeated .This was done using the test and re-test method. Descriptive statistic and budgetary analysis was used to analyze the data collected .Descriptive statistic involved the use of frequency, ratio and percentage to analyze socio-economic characteristics of melon producers, while budgetary analysis was used to calculate and analyze the cost and returns of melon production. Efficiency function: The output of melon can be specified as a function of various input utilized in the production process. It is assumed that X is fixed in repeated samples and there is no multi-co linearity among regressions. The production efficiency model was estimated using stochastic frontier production function which makes it possible to determine whether deviation in technical efficiency estimates from frontier output is due to factors under the control of farmers or random variable.

The frontier model is given as:

$$Y_i = f(X_i, \beta) \exp(V_i - U_i)$$

Where;

Y_i = Production output of ith farm in kilograms
$f(X_i, \beta)$ = A vector of inputs for the ith farm and β is the vector of unknown parameters to be estimated.
V_i = The symmetric component of the error term and
U_i = The non negative random variable which is under the control of the farmer
U_i can be specified as a function of socio-economic characteristics of the farm operator,
Therefore;

$$U_i = \alpha_0 + \alpha_1 P_1 + \alpha_2 A_2 + \alpha_3 M_3 + \alpha_4 R_4 + \ldots + \alpha_n P_n$$

Where;

α_i = parameters to be estimated
P, A, M, R are explanatory variables.
Model specification:
A cobb – Douglas stochastic frontier production function was used. The model used is presented as:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + V_i - U_i$$

Where:
i = 1, 2, 3, 4, 5
X_1 = Farm size in hectare
X_2 = Seed in kg
X_3 = Labour in man- days
X_4 = Fertilizer Application in kg
X_5 = Weeding rate in absolute figure
V_i = Farm specific technical efficiency
U_i = Random Variable

(a) Inefficiency Function

The inability of the farmer to attain the maximum output is known as inefficiency. There are factors under the control of farmers. Failure to manage resources explains the inefficiency among farmers since farmer is operating under the same technology.

The inefficiency function can expressed mathematically as:

$$V_t = P_{t1} + P_{t2}M_{t1} + P_{t3}M_{t2} + P_{t4}M_{t3} + P_{t5}M_{t4} + U_i$$

Where
V_t = inefficiency in production
P_t = Parameters to be estimated
M_t = vectors of variables that determine inefficiency
U_i = accounting for all factors outside the farmers control

HYPOTHESIS

H_o=Y = 0: No technical inefficiency among melon farmers
H_i = Y > 0: There is technical inefficiency among melon farmers
The hypothesis was tested using log likelihood ratio.
H_o = R2 = 0: Combined power of explanatory variable included in the model had zero effect on dependent variable. This was tested using the F test.

V. Results and Discussion

Age of respondents

The youngest melon farmer in the study area was twenty three years old. The oldest was seventy- six years of age with a mean of thirty eight years four months. The bulk of melon farmers fell within the age bracket of 31-50 years which accounted for 89% of the respondents (Table II). The retirement age in Nigeria is sixty-five years, but very few participants were above the age of sixty years indicating that melon production was not popular among the ex- service zone. Also the least participant was twenty three years of age indicating that the issue of child labour was not applicable in the study area.

Table II: Age of respondents

Age (years)	y	Perc.ene
<20	0.00	0.00
21 – 30	9.00	7.50
31 – 40	33.00	27.50
41 – 50	56.00	46.70
51 – 60	12.00	10.00
>60	10.00	8.30
Total	**120.00**	**100.00**
Mean	38.40	
Minimum	23.00	
Maximum	76.00	
Standard Deviation	5.39	

Source: Field Survey Data, 2012

Gender of respondents

Males and females participated in melon production in the study area. Males accounted for 94.1% of the participants, while females represented 5.9% of the total. It appears that melon production is male specific, but most studies agree that melon as a minor crop is also a preoccupation of female fold (Table III).

Table III: Gender of respondents

Sex	Frequency	Percentage
Male	113.00	94.10
Female	7.00	5.90
Total	120.00	100.00

Source: Field Survey Data, 2012

Marital Status of respondents

The finding shows that majority of the respondents (82.5%) were married while 9.2% of the participants were singles. Widows and divorcee accounted for 8.3% of the total respondents (Table IV).

Table IV: Marital Status of respondents

Marital Status	Frequency	Percentage
Married	99.00	82.50
Single	11.00	9.20
Divorcee	4.00	3.30
Widow	6.00	5.00
Total	**120.00**	**100.00**

Source: Field Survey Data, 2012

Family size of respondents

Findings show that 59.1% of the respondents in the study areas practiced polygamy, while 40.9% practiced monogamy (Table V). The respondents under the polygamous family had majority of its family size between 6 – 10 (45%). This indicates that a small family size would be insufficient for labour thus the need to use hired labour. Majority of the respondents who practiced monogamy had a family size within 1 – 5(21.70%). It can thus be deduced from the findings that the small family size possibly led to the small farm holdings of the melon farmers and as such the use of family labour.

Table V: Family size of respondents

	Family size	Frequency	Percentage
Polygamy			
	1 – 5	9.00	7.50
	6 – 10	54.00	45.00
	11 – 15	7.00	5.80
	16 – 20	1.00	0.80
	>20	0.00	0.00

Monogamy			
	1 – 5	26.00	21.70
	6 – 10	23.00	19.20
	11 – 15	0.00	0.00
	16 – 20	0.00	0.00
	>20	0.00	0.00
Total		**120.00**	**100.00**

Source: Field Survey Data, 2012

Level of Education of respondents

The finding shows that the bulk of melon farmers (75.8%) had formal education. About 59% had secondary education but about 50% of this proportion had no formal education but could communicate in pigin English. All respondents could communicate in pigin English which eliminated the issue of communication barrier normally encountered among illiterate farmers.

Table VI: Educational status of respondents

Educational status	Frequency	Percentage
None	29.00	24.20
Primary	37.00	30.80
Secondary	22.00	18.40
Tertiary	32.00	26.60
Total	120.00	100.00

Source: Field Survey Data, 2012

Occupation of respondents

Table VII below revealed that majority of the respondents (55%) are full-time farmers, while others engaged in other occupations apart from farming ranging from civil servant, schooling and artisan such as (mechanics, welder, tailors, bricklayers e.tc). About 15% of the respondents were civil servants, while 25.8% were self – employed in divers businesses. The implication of this is that, instead of the farmers to use back the money or income realized from farming into investment in agriculture, they invest the extra income from farming in other business because they believe that farming is not an occupation that gives quick returns. On the other hand, they consider that the time lag between the planting and the harvesting period can be used to run other types of business, which will serve as sources of income to sustain them during this period. That is, to cater for security and diversification of production resources so as to guide against the risk and uncertainties of agriculture.

Table VII: Occupation of respondents

Occupation	Frequency	Percentage
Farming	66.00	55.00
Civil Servant	18.00	15.00
Schooling	3.00	2.50
Self Employed	31.00	25.80
Applicant	2.00	1.70
Total	120.00	100.00

Source: Field Survey Data, 2012

Experience of respondents

Finding shows that majority of the farmer had between 1 and 10 years production experience with a mean of 7.50years. The most experienced farmer was a 76years old man, who had been in the production of melon for 45years. His total farm size was 5hectares and total yield per planting season was 6,000kg. The 3 least experienced farmers had an average age of 35years and 2years of experience. It is believed that majority of the farmers are experienced melon producers since 61% of the respondents had between 6 – 15years of experience. The findings also showed that only few respondents had above 16 years of experience, accounting for 6.6% of the respondents. Also, since experience is gained with age and farming being the major occupation of most of the respondents, therefore, the number of the year of experience in farming can be linked with the age of the farmer. The older the farmer, the more experienced he is and the better his understanding of farming.

Table VIII: Experience of respondents

Experience	Frequency	Percentage
1 - 5	38.00	31.70
6 - 10	49.00	40.90
11 - 15	25.00	20.80
16 - 20	4.00	3.30
>20	4.00	3.30
Total	120.00	100.00
Mean	7.49	
Standard Deviation	1.29	
Minimum	2.00	
Maximum	45.00	

Source: Field Survey Data, 2012

PROFITABILITY OF 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.

A total of 120 farmers harvested a total of 34,723.3kg from a total farm size of 260.49ha. An average gross return of ₦26, 660.00 per hectare was obtained. Table 12 shows that the total cost of labour was ₦5, 193.52 per hectare while the total cost of seed, fertilizer and pesticide were ₦600.50, ₦3, 414.40 and ₦119.19 per hectare respectively. The total variable cost incurred was ₦9, 327.11, while the total fixed cost was ₦477.91 per hectare. The total cost of production was found to be ₦9, 805.02 while the net farm income for melon production was ₦16, 254.98 per hectare. The average wage rate of N63.94 per man-hour was used to calculate the total labour cost. Seeds used were mainly obtained from the market. An average market price of N200 per kg of melon need was used in estimating the total cost of seeds.

The difference between the gross return and the total cost of production gave the gross margin which was calculated to be ₦16, 854.98 per ha. This implies that

melon production is profitable in the study area (Table IX & X)

The profit made per hectare was relatively high for sole 'egusi' melon (₦16, 254.98) 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, 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.

Table IX: Percentage and frequency distribution According to source of various inputs

Input		Frequency	%
Source of Labour	Family	34	28.3
	Hired	29	24.2
	Both	57	47.5
	Total	120	100
Source of land	Inherited	84	70.0
	Leased	32	26.7
	Purchased	4	3.3
	Total	120	100
Fertilizer	Organic	40	78.4
	Inorganic	11	21.6
	Total	**51**	**100**

Source: Field Survey, 2012

Table X: Profitability of Melon Production

Items of value	Quantity	Value (₦)
Output		
Melon yield/Ha	133.3kg	**26,660**
Unit of sales	0.20kg	40
Price/ kg	1kg	200
Inputs costs (₦);		
Variable cost		
Seed	3kg	600.00
Total labour		5,193.52
Fertilizer	42.68kg	3,414.4
Pesticide	0.13L	119.19
Total variable Cost		**9,327.11**
Cost of renting land		725.33
Depreciation of farm tool		352.58
Total fixed Cost		**477.91**
Total Cost of Production		**10,405.02**
Gross Margin		**16,254.98**

Source: Field Survey Data, 2012

FUNCTIONAL ANALYSIS OF MELON PRODUCTION

Ordinary Least square estimate of coefficient of multiple determinations (R^2) indicates that variables included in the model explained about 94% variations in the dependent variable. All the explanatory variables had increasing effect on melon output, but only two where found significantly different from zero. Elasticity of production varied from 0.010 to 1.196 with an increasing return to scale of 7.67 indicating that farmers were operating at stage one of classical production function. Also showing that farmers were producing less than what is possible under the present production environment.

Table XI: Functional analysis of melon production

Variables	Coefficient	Standard-Error	t-ratio
Constant	5.659	0.331	17.078
Fertilizer Application rate	0.072*	0.018	4.008
Pesticide Application rate	0.043	0.055	0.775
Farm size (ha)	1.196*	0.349	3.428
Seed (kg)	0.349	0.266	1.308
Weeding rate	0.010	0.086	0.117
Labour mandays	0.024	0.087	0.274
Harvesting	0.317*	0.104	3.035
R	0.954		
R^2	0.909		
F Cal	160.769		

Source: Result from Data Analysis, 2012

TECHNICAL EFFICIENCY OF MELO N PRODUCTION

Table Table XII shows the estimate of the production parameters of stochastic production function. All the independent variables had the expected sign. The explanatory variables had increasing effect on yield of melon. Three variables had coefficients that were significantly different from zero. Technical efficiency varied among the farm operators. The technical leader had efficiency estimate of 0.970 while the least performer had technical efficiency estimate of 0.428 with an average of 0.699 estimates (Table XIII). The technical leader was a man of 43years, having a farm size of 3hectare with 8years of experience. He applied fertilizer and used pesticide to control the infestation of pest, with a total man-day of 96hours.

INEFFICIENCY FUNCTION

The analysis showed that age has a positive relationship with technical efficiency. This implies that the older the farmer is, the more likely efficient he would be. The analysis showed that experience had a negative relationship with technical efficiency. The positive sign implies that increase in farm size or increases in age could lead to higher increase in output. This implied that the more experienced the farmer was, the less likely inefficient he would be. The possible cause of this is that the experienced farmers really so much on the old existing way of doing things rather than following a new trend or adopting a new innovation.

The inefficiency model shows that experience had a negative and significant influence on the technical inefficiency of the respondents. The negative result for experience implies that the less experienced respondents were, the more technically inefficient compared to experience. This means that the experienced producers were more technically efficient.

The likelihood ratio test ($X^2 = 22.91$) is significant at the 5% level of ($X^2 = 11.07$). This implies that there was technical inefficiency among the respondents. The gamma (Y=0.994) implies that 99.4% of the variation in

respondents output was due to technical inefficiency. The sigma squared (1.990) is significant at the 5% level since the calculated (1.969) is greater than the critical (t = 1.96). This means that Maximum Least Estimation is better at explaining the data than the Ordinary Least Square model.

Table XII: Maximum Likelihood Estimates of parameters

	coefficient	Standard -error	t-ratio
Constant	5.712	0.238	24.008
Fertilizer Application rate	0.012*	0.006	2.137
Pesticide Application rate	0.031	0.043	0.716
Farm size (ha)	1.183*	0.555	2.130
Seed (kg)	0.202	0.199	1.015
Weeding rate	0.226*	0.063	3.577
Labour man-days	0.062	0.063	0.993
Harvesting	0.003	0.078	0.032
Inefficiency model			
Constant	7.490	14.210	0.527
Age	0.059	0.106	0.556
Sex	1.356	2.783	0.487
Experience (Years)	-0.211*	0.043	-4.884
sigma-squared	1.990	1.011	1.969
Gamma	0.994	0.411	2.417

**Significant at 5% (critical t = 1.96)*
Source: Result from Data Analysis, 2012

Table XIII: Technical efficiency distribution of respondents Max:0.97 min:0.428 mean:0.837 sd:0.4015

ESTIMATE	Frequency	Percen
0.100 & below	0.00	0.00
0.101 -0.200	0.00	0.00
0.210 -0.400	0.00	0.00
0.401-0.500	4.00	3.30
0.501-0.600	3.00	2.50
0.601-0.700	13.00	10.80
0.701-0.800	10.00	8.30
0.801-0.900	44.00	36.70
0.900 less than 1	46.00	38.40
Total	120.0	100.00

Source: Result from Data Analysis, 2012

Labour Use analysis

The amount of labour used by the most technical leader was 13. Findings show that he had a total land size of 3hectares, and weeded 4times during the planting season and had a total man-day of 96hours.The least performer had a total labour force of 14, with a total man-day of 66hours. He had a total farm size of 2hectares and weeded 4times during the planting season. The total man-day of all the respondents were 9, 747hours, with an average of 81hours.

Fertilizer application of melon production

Findings show that a total of 41farmers used organic fertilizer ranging from animal droppings to compost manure, while 11 farmers used inorganic fertilizer. The inorganic fertilizers used were NPK and Calcium Ammonium Nitrate. They average application rate of the NPK fertilizer used by the farmers was 185kg/ha instead of 250kg/ha, while the average application rate of Calcium Ammonium Nitrate used by the farmers was 130kg/ha instead of 150kg/ha.This indicates that, for efficiency and maximum yield to be attained by the melon producers, the right application rate of fertilizer must be used.

Problems Associated with Melon Production

All the farmers sampled had the primary objective of profit maximization. This is as a result of the fact that melon is mainly not consumed but serves also as soil protector. Table XIV explains the limiting factors of melon production in the area. The processing of melon after harvesting starts with breaking of fruits after they have been gathered together during harvesting. After breaking the fruits, they are left for a period of one to two weeks depending on the weather condition and severity of the breakage for the fruits to soften for easy scooping. High temperature favor early softens. Scooping of melon from the fruits is labour intensive and very heavy to carry from one place to another. It is difficult to transport the melon to source of water particularly when large quantities are involved. This problem of scooping scares and discourages prospective melon growers. Water is required for washing melon seed after harvesting and is highly labour intensive. According to some of the respondents, if one is not very close to a source of water, it will be very difficult for one to wash it because it will require transporting it to where water is available this has been one of the problems affecting melon production. Other problems found to be confronting farmers include labour. Family labours are mostly used. But when hired labours are used, the amount charged per man-day is too high. This is because labour demand coincides with limited labour supply during melon production season. Poor yield is another problem military against melon production. Problem of poor yield may be as a result of inadequate fertilizer, none use of hybrid seed, late planting period and poor agronomic practices. The result shows that credit is one of the constraints to melon production. Since the respondents are small-scale farmers, they have low capital base and therefore cannot afford the high cost of inputs. According to the respondents, formal institution do not normally give credit to melon farmers may be because melon is considered not to be popularly grown and given adequate recognition. The problem of inaccessibility of the farmers to the modern inputs such as fertilizer, improved seeds and machineries, hence they made use of the traditional tools which limit their output and farm size.

Table XIV: Problems of melon production

Factors	**Frequency**	**Percentage**
Scooping	40.00	25.98
Water	16.00	10.38
Labour	27.00	17.53
Yield	21.00	13.63
Credit	23.00	14.93
Farm inputs	13.00	8.44
Pest and diseases	14.00	9.09
Total	**154.00***	**100.00**

Source: Field Survey Data, 2012.*Multiple responses

VI. Conclusion

The study established that melon production in the study area is profitable. However non of the farmers was technically efficient under the present production environnent.Farmers who got efficiency estimates that were below average can increase their output up 40% by adopting the farm practice of the most efficient. Fertilizer, pesticide, labour use, weeding rate and harvesting rate had increasing effect on output while years of experience had a reducing effect on inefficiency.

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