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Resource Use Efficiency in Ginger Production in Jaba Local Government Area of Kaduna State.

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Abstract: This paper evaluated economic returns and resource use efficiency in ginger production in Jaba local government area of Kaduna state, which is the largest area of ginger production in Nigeria. The data for this study was collected form primary sources, with the aid of a well structured questionnaire using multi-stage sampling technique. Also, secondary information was used in the course of the study. Tools of analysis used for this study were descriptive statistics such as measures of central tendency (mean, frequency, distribution, and percentages), regression analyses and farm budget analysis (gross margin). Result showed that farms were on small-scale, cultivating an average of 1.8ha land. Cost and returns analysis indicated that ginger production in the study area is profitable. The study also revealed that the resources of land, labour, seed and fertilizer where underutilized while chemical was over utilized. The study recommends that for increase yield of ginger, improvement in the use of inputs like land, labour, fertilizer and seed are to be given better attention.

I. INTRODUCTION

Ginger (*Zingiber officinal*) is a monocotyledonous crop plant which belongs to the family of Zingiberaceae. It is a slender aromatic plant whose rhizome is of commercial importance for culinary use and for manufacture into a variety of products including essences, condiments, ginger oil, ginger bread, chocolate and biscuits. It is also used in some pharmaceutical industries (GRIN,2003.)

The production of ginger in Nigeria started vigorously in 1927 from an investigation carried out to find a crop that would generate internal trade for the people of Southern kaduna, the traditional home of ginger production in Nigeria, (Erinle, 1987). Since then, the knowledge of the usefulness of ginger is steadily increasing as a valuable export commodity. However, from 1967 production began to decline (Arene *et al*, 1987). According to Meadows (2008), export trade of ginger declined due to lack of attention given to the crop by the Nigeria government and due in parts to trade receipts from the oil boom and to the unattractive price paid to ginger farmers. Thus, Nigeria position in the export trade was taken by better place competitor like India.

Until 1987/88, both federal and state governments made no conscious efforts to revive ginger productions and trade. Since price plays an important role to the producers, it therefore determines to a larger extend what is produce. It may be logical to argue that in the case of ginger production, relatively low producer price, have greatly contributed to the decline farmers are likely to increase ginger production. If they receive good price.

There is considerable evidence from economic theory to back up this assertion. FAO, (2014) has hypothesized that "*certeris paribus*", the quantity of a commodity produce and offered for sale will increases as the price of the commodity rises and decreases as the price falls. The higher the price of a commodity, the greater the profit that may be earned, and thus the greater the incentive to produce the commodity and offer it for sale.

Resource use efficiency, according to Olukosi and Erhabor (1988), efficiency is generally defined as the quantity of output (y) per unit of input (x) used in the production process that is the average physical productivity (APP) symbolically, efficiency is measured as:

$APP = y/x$

Where;

APP = Average Physical product.
Y = Quantity of output
X = Input

Mijindadi (1980) defined agricultural productivity as the index of the ratio of total farm output to the

valve of the total input used in farm production. Since one of the objectives of any society is the attainment of an optimally high level of living with a given amount of effort, any increase in the productivity of resources employed in farm production amounts to progress. According to him increase in agricultural productivity will contribute to the well being of the economy as a whole. According to Olagoka (1991) aggregate measure of productivity in production economics analysis will add to the sum of our knowledge by.

i. Serving as barometer of economic progress
ii. Serving as guide to adjustment of resources
iii. Providing a frame work for formulating and evaluating policy
iv. Indicating problem areas that need further research.

The concept of efficiency is concerned with the relative performance of the processes used in transforming giving inputs into output. Economic theory distinguishes between at least two types of efficiency (Timmer, 1970; Carlson, 1972).

a. Allocative efficiency which refers to the choice of an optimum combination of inputs consistent with relative factor prices.
b. Technical efficiency which refers to the ability of firms to employ the best practice in an industry so that more than the necessary amount of a given set of inputs is used in producing the best level of output. The degree to which (a) and (b) are achieved, is commonly referred to production efficiency (French, 1977).

The marginal valve products (MUP) is calculated from the regression coefficients using the appropriate formula depending in the functional form, while the market price of one unit of the input concerned is the unit factor cost (UFC). A ratio of 1.0 is interpreted to means resources are efficiently utilized, a ratio less than 1.0 implies the input is over utilized while a ratio greater than 1.0 means the input is underutilized.

II. PROBLEM STATEMENT

Ginger is an important spices crop which is grown primarily for sales as an economic enterprise. Despite the importance of ginger as source of revenue in the producing areas, the production is decreasing (Onwueme, 2001) High-expected price provides incentive for expanding ginger production by increasing resources allocated to its production through the adaption of improve production technology. Presently, farmers complained of low price (Manjunath, 2004). The poor output of farmers may be an indication that resources deployed into the production of the crop are not being used efficiently. The relatively small emphasis placed on the crop by farmers raise the questions of whether it is profitable to grow the crop or not. Thus, there is need to evaluate the resource use allocation in the production of ginger in the study area. However, this study is aimed at providing answers to the following research questions. Are the available resources efficiently utilized? What are the problems associated with ginger production?

The broad objective of the study is to carry out resource use analysis in ginger production in Jaba local government area of Kaduna state. The specific objectives are to:

i. determine resource use efficiency in ginger production in the study area.
ii. determine the cost and returns/profile in ginger production in the study area.
iii. identify the problems associated with ginger production in the sturdy area.

This study is essential because ginger is a major cash crop of the study area which is confronted with the problem of decrease in production. And in order to increase its production and also improve the standard of living of the farmers, it is important to carry out an economic analysis of ginger production. Anamayi *et al.* (2004) asserted that for adequate investment in any project, it requires the evaluation of its economic viability. Gittinger (1994) also opined that the economic aspect of a project preparation and analysis require a determination of the likelihood that a proposed project will contribute significantly to the development of the total economy and that its contribution will be great enough to justify using the scarce resources it will need. This study provides valuable information on the economics of growing gingers to prospective investors, to enable them consider its production as a viable option for investment. To farmers who are already producing the crop, research scientists and scholars. Above all the study has provides valuable information on resources management needed to increase the output of the crop.

III. METHODOLOGY

Study Area: The study was carried out in Jaba local government area (LGA) of Kaduna state. The LGA was created in 1991 out of the formal Jama'a local government area of Kaduna state. It is made up of thirteen districts namely, kwoi, Ankung, Daddu, Nok, Samban ,Chori, Fai, Fada, Fogyei, Sabon- gari, Sabzuro, Ngumparo and Ugwan rana. Jaba local government area is bounded in the north and west by Kachia LGA, in the west by Zongo kataf and Jama'a LGA, in the south by Karu LGA in Nasarawa state. The population of the study area is about 661,197(NPC,2006 Census). This area is located within the Southern Guinea Savannah. According to Lioeji (1972), the annual rain fall ranges from 75cm to 125cm from north to south, while the temperature ranges between 20^{o}c and 30^{o}c with a bimodal season ie.dry and rainy seasons. The soil has been described to be predominantly clay loan. The crops grown in this area include Ginger, Guinea corn, Millet, Maize, Soya Beans, Acha, Cocoyam, Cassava and Potatoes; among others. Jaba LGA serves as one of the main outlet of ginger from the southern parts of Kaduna state to other parts of the country and the outside world.

Sampling Techniques: For the purpose of this study, survey study was adopted using multi-stage sampling method. The first stage was random selection of four (4) districts out of the thirteen (13) districts of the study area. From the four districts, four farming communities was randomly selected on the second stage, while the third stage involve a random selection of twenty farmers from each of the four (4) communities to give a total sample size of eighty (80) respondents.

Methods of Data Collection: For the purpose of this study both primary and secondary data were used. Primary data was sourced from the respondents through the use of well structured questionnaire in line with the objectives of the study. Also personal interviews were adopted alongside the questionnaire as part of primary data source. Secondary data was obtained from text-books, journal, articles, conference proceedings, periodicals, internet and other printed electronic media

Analytical Frame Work: The production function analysis was used to achieve the objective of the study.

Production Function

In other to determine resource use efficiency in ginger production, the ordinary least square (OLS) multiple regression analysis was carried out on the data generated. it was hypothesized that the output from ginger production is a function of factor of production i.e. input. Multiple regression analysis were carried out in which five production functional forms were tried and the lead equation was chosen on the basis of normal economic, econometric and statistical criteria.

The implicit form of the model is given as follows;

$Y = (x_1, x_2, x_3, \ldots\ldots x_n\ \mu)$————————————————————(1)

Where;

Y = output of ginger (in kg)
x_1 =Seed(kg)
x_2 =chemical(lit)
x_3 =fertilizer(kg)
x_n =constant
μ= error term

The implicit forms of the functional as earlier specified are as follows and they were used to analyze ginger production in the study area.

Linear function: $Y = \beta_0 + \beta_1 X_{11} + \beta_2 X_{12} + \beta_3 X_{13} + \ldots\ldots + .\beta_n X_{1n} + \mu$ ....(2)

Semi- log: $\ln Y = \beta_0 + \beta_1 X_{11} + \beta_2 X_{12} + \beta_3 X_{13} + \ldots\ldots + \beta_n X_{1n} + \mu$ ....(3)

Exponential: $Y = \ln\beta_0 + \beta_1 \ln X_{11} + \beta_2 \ln X_{12} + \beta_3 \ln X_{13} + \ldots\ldots + .\beta_n X_{1n} + \mu$ ....(4)

Double log: $\ln Y = \ln\beta_0 + \beta_1 \ln X_{11} + \beta_2 \ln X_{12} + \beta_3 \ln X_{13} + \ldots\ldots + \beta_n \ln X_{1n} + \mu$ .... (5)

Quadratic; $Y = \beta_o + \beta_{11} x_{11} x_{12} + \beta_{12} x_{12} x_{13} + \beta_{13} x_{13} x_{14} + \ldots.. + \beta_n x_n x_n +$...(6)

The a prior expectation about the parameter is the parameters is that $\beta_1, \beta_2, \ldots\ldots \beta_n > 0$

This analytical tool was used to achieve objective number two (ii) ie to determine the relationship between physical production inputs and output of ginger in the study area.

Resource Use Efficiency : To determine efficiency of resource the following ratio were estimated.

$$R = \frac{MVP}{MFC} \qquad (7)$$

Where;
R= efficiency.
MVP =marginal product.
MFC = marginal factor cost.

In a production processes, it is assumed that there is a relationship between the quantity of input and the quantity of output. In other words, the quantity of output is determined by the quantity of inputs. A product function describes the technical rate at which inputs are transformed into products in any production process; there are numerous input-output relationships in agriculture because the rate at which input are transformed into output varies among soil types, animals, technologies and amount to rainfall (Olayide and Heady, 1982). In mathematical terms a production function can be implicitly be expressed as follows:

$Y = f(x_1, x_2 x_3 \text{ ---- } x_n)$

Y = Physical quantity of output

$X_1, x_2 x_3$ = physical quantity of inputs

The equation says that the quantity of output (Y is a function of the quantity of inputs $x_1, x_2, x_3, \text{ --- } x_n$. Increased agricultural productivity is one of the pre-requisite for economic development. This is particularly true for developing countries where a large proportion of the population lives in the rural areas and depends on primary production. The efficiency of resources has been an area of concern for most economists. It measures the return per unit of resource employed in production. Resource productivity can be measured in terms of the ratios of the total output to the total inputs of single resources (eg labour productivity). Indices of productivity can be constructed by multiplying the ratio by 100 (Ogunfowora *et al*, 1975).

IV. RESULTS AND DISCUSSION

Multiple Regression Analysis for Ginger Production.

Table shows the result of the multiple regression analysis carried out on the data on ginger production in the study area. Based on normal economic, econometric and statistical criteria, the functional form is chosen as the lead equation. The equation is therefore expressed as follows.

Table ; Summary of multiple regression analysis result for ginger production in Jaba L.G.A

Variable	Linear	Semi-log	Double log	Exponential	Quadratic
Intercept	1010.444*	1724.590	3.121	-1924.578	2520.354
	(2.215)	(.461)	(9.363)	(-2.134)	(9.04)
β_1	.856**	.536*	.480*	.776**	.776**
	(4.700)	(3.224)	(2.703)	(4.123)	(4.925)
β_2	.152	0.79	.165	.116	.370*
	(.880)	(.519)	(1.011)	(.675)	(2.317)
β_3	.207***	-.010	-.024	.102	.323*
	(1.742)	(-.123)	(-.278)	(.935)	(3.006)
β_4	-.025	-.058	.000	-.040	.003
	(-.307)	(-.616)	(.002)	(-.424)	(.050)
β_5	-.0630**	-.354**	-.182*	-.392**	-.935**
	(-4.901)	(-4.333)	(-2.092)	(-3.306)	(-7.554)
R	.755	.728	.681	.713	.804
R^2	.571	.529	.463	.509	.646
Adjusted R^2	.541	.497	.427	.475	.621
Durbin Watson	2.10	2.06	1.69	2.18	1.83

Figures in parenthesis = t-value *- significant at 0.05% **- significant at 0.01% ***- significant at 0.1%

Source: Field survey, 2015

Table 1 shows that in the five 5 functions form tried, the estimated co-efficient of;

X_{11} (farm size) are significant at 0.01 and 0.05 per cent level respectively. This implies that X_{11} is very crucial in ginger production in the study area. This is because with insufficient land, production of ginger will be highly limited.

X_{12} (quantity of seed) is only significant at 0.05 per level in Quadratic form, this variable possesses positive co-efficient in all other four functional forms tried. This shows that the quantity of seed used as an input contribute positively to ginger production.

X_{13} (quantity of fertilizer) is significant in linear function at 0.01 and in quadratic function at 0.05 per cents, while it possesses positive co-efficient under square root function and it possesses negative co-efficient under semi-log and double log functions. Where it possesses positive co-efficient, it implies that increased use of X_{13} could lead to improvement in the output of ginger, while with negative co-efficient implies that increased use of the input will have reducing effect on ginger output. This is because of the inverse relationship between it and outputs in the functional form.
X_{14} (labour) has negative co-efficient in three of the five functions tried (Linear, Semi-log and Square root), while it possesses positive co-efficient under two of the functions i.e. Double log and Quadratic functions. It is not significant in any of the cases. Where labour possesses negative co-efficient, it implies that increased use of it will have reducing effects on ginger output. On the other hand, in the functions that X_{14} has positive co-efficient, it means adequate quantities of labour is being employed.
The intercept of square root function is negative while those of the rest four are positive. The negative intercept is contrary to the principle underlying production and production function. It implies that output of ginger becomes negative in the event that all the inputs are zero. This cannot be the case as output can both be zero or positive and not negative. This is an agreement with the submission of Henderson and Quandt (1980) that the production function is defined only for non-negative values of input and output levels. This means that the production function is assumed to be increasing starting from the origin i.e. $f_i > 0$ within its domain. This finding also is in consonance with Anamayi (2009) where he reported that negative intercepts in certain functions in cane rat production was contrary to principle underlying production and production function.
The independent variables jointly explained the total variations in ginger output by the values of the co -efficient of multiple determinations in each functional form tried. This in the table is indicated by ways of the values of adjusted R^2. The independent variables jointly explained that about 62.1; 54.1; 49.7; 47.5 and 42.7 per cent of the total variations in ginger output in quadratic, linear, semi-logarithmic, square root and double-logarithmic functions respectively. These attest to the goodness of fit of the functional forms tried. Given the values of the co-efficient of multiple determinations, A test for multicollinearity was carries out with the aid of Durbin Watson Statistic. The result (table 1) shows that there exists multicollinearity square root, linear and semi-logarithmic functional forms given the values that are greater than 2, because a value of Durbin Watson statistic up to 2 shows the existence of multicollinearity.
The value of Durbin Watson statistics in Double-logarithmic and quadratic functions are less than 2.(1.69 and 1.83 respectively). The Quadratic function was chosen as the lead equation over the double logarithmic because it possesses higher intercept value though the value of Durbin Watson statistics is higher than that of double logarithmic function, but it still falls within the acceptable region that shows that there exist to multicollinearity.

RESOURSE USE EFFICIENCY

In determining the resource use efficiency of ginger farmers in Jaba L.G.A of Kaduna states the marginal value product (MVP) of each resource was compared to the marginal factor cost (MFC). The estimates of the analysis were used in the computation of MVPs of the various resources and the results are presented in table 2.

~~Table 3: Measures of resource use efficiency of ginger farmers' efficiency index.~~

Variable Resource	MVP(~~₦~~)	MFC(~~₦~~)	MVP/MFC	~~DECISION~~
Farm size X_{11}	11,452731	7,000	1,636.104	under utilized
Quantity of seed X_{12}	389,559.6	50,000	7.791191	under utilized
Quantity of fertilizer X_{13}	546,459.1	3,500	156.1312	under utilized
Labour X_{14}	1,435.759	350	4.102169	under utilized
Chemical X_{15}	-1,424343	800	-1780.43	over utilized

Source: Field survey, 2015

The value of MFC for all the variables was less than the MVP values except for X_{15} where the MFC

was greater than the MVP value. The efficiency index of all the variables was greater than one except for X_{15} which was less than one. Therefore going by decision rule for determination of resource use efficiency as stated in chapter 3; X_{11} ;X_{12} ;X_{13} and $X_{14}$are underutilized in the production of ginger in the study area, while X_{15} was over utilized.

PROBLEMS OF GINGER PRODUCTION

The problems identified as the major limited ginger production in the study area during the period of survey. These problems are presented in the table below.

Table 4: * Problems of ginger farming

PROBLEMS	NO OF RESPONDENTS	PERCENTAGE	RANK
Poor price	77	96.25	1
Input	74	92.50	2
Labour shortage	52	65.00	3
Storage	50	62.50	4
Transportation	44	55.00	5
Lack of credit	35	43.75	6
Disease	31	38.75	7
Processing problem	22	27.50	8
Theft	7	8.75	9
Marketing	4	5.00	10

Source: Field survey, 2015
***Multiple responses**

INPUTS (fertilizer and chemicals)

Farmers also reported that unavailability of inputs such as fertilizer and agro-chemicals at the onset of farming activities was ranked second by 92.50% of the farmers. According to the farmers, fertilizer and agro-chemicals are made available when farmers are far into the production period, some time at the middle of the raining season and when the inputs are available, it becomes very expensive for small peasant farmers to purchase. This is ranked as the second among the problems.

SHORTAGE OF LABOUR

Shortage of labour was ranked third with 65% of the farmers attesting to this as a constraint. Family labour was predominant in the study area and that is why there was acute shortage of labour in the labour market. According to the farmers; during the active period of production every household would have been engaged in his family farm work. The demand for labour is normally very high and expensive during the peak period of land clearing, ridging, harvesting and processing. This was ranked as the third major problem.

LACK OF STORAGE

About 62% of the farmers complained of lack of storage facilities, which forces them to sell their produce at the farm gate. Also, high cost of labour for processing also prevents the farmers from storing their produce to sell at the later date to get more money. This was ranked as the fourth major problem.

TRANSPORTATION PROBLEM

About 55% of the farmers agreed that lack of good road and high transportation cost prevent them from carrying their produce (Ginger) from the farm to their houses and market at the right time. Farmers had to face the uneatable task of renting a vehicle at the very exorbitant price to take their produce home and market because of the condition of the road. This is ranked as the fifth among the problems.

DISEASES

About 38.75% of the farmers complained disease that attack their crops both in the field and while in

the storage resulting in varying degrees of crop damage and reduction in yield. Other specific problems faced were lack of credit 43.75%, processing problems 27.50%, theft 8.75%, and marketing problem 5.00%.

V. CONCLUSION AND RECOMMENDATION

This study was conducted to analyze the economics of ginger production in Jaba local government area of Kaduna state. The specific objectives are to describe the socio economic characteristics of the farmers, determine the input and output relationship, determine the cost and return associated with production among sampled farmers, determine the resource use efficiency in ginger production, determine the relationship between socio economic characteristic and output and lastly to identify the problems associated with ginger production. The data for this study was collected form primary sources, with the aid of a well structured questionnaire using multistage sampling technique.

The tools of analysis used for this sturdy were descriptive statistics such as measures of central tendency (mean, frequency, distribution, percentages). Farm budget analysis (gross margin) , regression analysis and correlation analysis.

The major finding of the socio economic characteristic of these farmers was that they were small-scale, cultivating an average of 1.8ha of land the study also reveals that the age group of between 50-59years was more actively involved in the production of ginger and about 19% of them had little or non-formal education. About 56% of the ginger farmers have household size of between 6 -10 members, while 31% has between 21 years and above of farming experience.

From the multiple regression analysis of ginger production the result from the five function tried shows that the estimated coefficient of farm size (X_{11}) is significant at 0.01 and 0.5 percent level which implies that farm size (X_{11}) is very crucial in ginger production, while seed (X_{12}) is only significant at 0.05 percent level in quadratic form, it possesses positive coefficient in all other four functional forms tried. This implies that X_{12} as an input contributes positively to ginger production, fertilizer (X_{13}) when positive implies that increase use of X_{13} could lean to improvement in the output of ginger while when negatively coefficient it implies that increase use of the input will have reducing effect on ginger output. Like wish for labour and chemical X_{14} and X_{15} respectively. Chemical has negative value in all the five functions tried which Implies that X_{15} has no significant effect on ginger output rather if more of it is been used could result to increase in cost incurred .in production.

The findings of this study reveals that the resources of land, labour, seed and fertilizer where underutilized while chemical was over utilized. Also the cost and returns analysis shows that significant profit could be realized in ginger production. Therefore ginger production is economical. The regression result shows that R^2 value, which represents the percentage variation of the dependent variable, explained by the explanatory variables was 86.7% that is to say other factors, which could not be explained by the independent variables, accounted for the remaining 13.3%.

Consequently, it could be concluded that if yield of ginger is to be increase, the use of important inputs like land, labour, fertilizer and seed are to be efficiently utilized by applying sufficient quantities of these inputs

Base on the findings of the study the following recommendation are hear by made;

1. Ginger farmers should be encourage to form cooperative which will be responsible for the collection of ginger from the farmers and subsequently aware of the disposal of the produce to different consumers, this will enable the farmers to earn profit from benefit of collective action cooperative formation always enables farmers to benefit from marketing an input purchase.
2. Shortage of labour can be over come through the use of chemical for weed control (herbicide), government through its specialize agency should make tractors hiring service available at affordable prices to farmers; this will also reduce shortage of labour for operation such as ploughing and harrowing.
3. Establishment of storage facilities by the local government will also reduce storage losses
4. Transportation problem can be solve through improving infrastructure such as road, this will facilitate the marketing of the produce.
5. Government should provide financial support through small credit scheme. This will enable the farmers to effectively used the necessary input required for ginger production.
6. Research result on the control of ginger disease should be made available to farmers on time. Forth night training should be organize by extension agent on the control measures for ginger

disease during the farming season. Emphasis should be place on the preventive measure and the symptoms of the various Ginger Disease.

REFERENCE

[1]. Arene,O.B; Orkwor, G.C and Okwuowulu, P.A (1987): Ginger research in Nigeria in : Terry, E.R: Akorodu, M.O.and Arene, O.B(Ed). Tropical Root Crops: Root Crops and the African Food crisis IDRC, Ottawa.

[2]. Anamayi,S.E.(2009): "Economic evaluation of cane rat (*Thryonomy swinderianus*) production in south-west Nigeria; unpublished Ph.D Dissertation, Ahmadu Bello University, Zaria, Nigeria.

[3]. Anamayi, S. E, E.N.Okeke, and JM Usman (2004)"profitability analysis of semi-intensive method of pig productions. A case study of Kaduna North and Kaduna south Local Government Area of Applied Research, Animal Science Association of Nigeria 7(2);75-79.

[4]. Erinle, I.O. (1987): Problem of production and marketing of ginger , paper presented at the Ginger trade conference, Kaduna, Nigeria.

[5]. French, B.C.(1977) :The analysis of production efficiency in agricultural marketing models, Methods and progress in a survey of agricultural economics literature,Vol 1. Traditional fields of Lee R. Martin editor university of minnesola press.

[6]. FAO, (2014): Final 2012 Production Quantity for Ginger in Metric Tons, World List Nested by Country" Food And Agricultural Organization of the United Nations: Economic And Social Department: The Statistical Division. 4 August 2014. Retrieved 11 November 2014.

[7]. Gittriger, J,P. (1994): Economic Analysis of Agricultural projects 2nd Edition. The John Hopkins University press,Baltomore Mary land, USA. Pp12-21;279-361.

[8]. GRIN (2003): Ginger Research Institute of Nigeria Annual Report, 2003.

[9]. Lioeji, N.P (1972): Geography of west Africa Macmillan publisher, Lagos Nigeria.

[10]. Meadows, A.B.(2008): Ginger processing for food and for industry paper presented at first National ginger workshop organized by national root crops research institute, Umudike Nigeria pp 17-21 oct.2008.

[11]. Manjunath, K.(2004): http//www.toenre.ae,in/seminar/semi-manjull, htm.

[12]. Mijindadi, N.B.(1980): Production efficiency of farms in northern Nigeria, unpublished Ph.D Dissertation. Cornel university. Itaca. U.S.A pp 19-22.

[13]. Onwueme, I.C.(2001): Towards increasing production and export of ginger in Nigeria. Proceeding of the first national ginger workshop, October 17-21, Umudike, Nigeria.

[14]. Ogunfowora, O. Essang, S.M. Olayide, S.O (1975): Rresource productivity in traditional agriculture. A case study of Nigeria. Nigeria rural development study. Rural development paper,34 (4):269.273.

[15]. Olukosi, J.O. and Erhabor, P.O. (1988) Introduction to farm management economics Principles and application .AGITAB publishers Zaria, Nigeria .

[16]. Olukosi, J.O. and Ogungbile, A.O (1989) Introduction to agricultural production economics, Principles and application ,AGITAB publishers, Zaria ,Nigeria.

[17]. Olayide, S.O and Heady, E.O. (1982). Introduction to agricultural production economics, University press, University of Ibadan.

[18]. Olagoke, M.A. (1991). Efficiency of resources use in Rice production system in Anambra State, Nigeria. Issues of Africa rural development,winrocck international edition. Arlington ,U.S.A pp 319.342

[19]. Timmer, C.P. (1970). No measure technical efficiency, food research institute studies in Agricultural economics