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Edited by

Professor Y. L. Fabiyi

Kuponiyi, F. A. (PhD)

Ajetomobi, J. O. (PhD)

Yekinni, O. T.

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Effects of the Federal Government Special Rice Programme on Rice Yields and Farmers' Income in Oyo State

Adeola, R. G., Adebayo, O. O. and G. O. Oyelere
Department of Agricultural Economics and Extension,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria
e-mail: adeola.rg@lautechaee-edu.com

Abstract: Rice has become a very important staple to most people in Nigeria and a large proportion of the commodity consumed in the country is imported; thus the federal government of Nigeria instituted a programme to promote the cultivation of this crop. This study sets out to assess the impact of the programme on the development of the crop and the profitability of the enterprise among the farmers. The study was carried out in Oyo State using stratified random sampling technique to select 120 respondents and structured interview schedule to collect data. The data were analysed with frequency counts, percentages and t- tests. The study reveals that rice production is dominated by males with only 5% of the respondents being females. Majority of the respondents had access to some of the inputs (rice seed, agrochemicals, sickles, fertilizers, herbicides and insecticides) distributed by the programme with the exception of milling machine, destoners and air driers the absence of which may have influence on the quality of their produce. Average yield of the farmers interviewed was 1.8 t/ha before their participation in the Special Rice programme and increased to 3.2 t/ha after the programme. The annual mean income of the respondents on rice production before participation in the programme was N35,366.67 and was increased to about N59, 875.00 per annum on rice production. Significant differences were noted in the productivity level of the rice farmers before and after the programme.

Keywords: Rice farmers, yields, federal, programme, income

INTRODUCTION

Rice has become a structural component of Nigerian diet with the share of rice in cereals consumption increasing from 15% in the 1970s to 26 % in the early 1990s (Akpokodje *et al*, 2001). It is also an important traditional basic food commodity for certain populations in sub-Saharan Africa and West Africa in particular. The FAO projects annual growth rate of rice consumption will be 4.5 % through the 2000s which will correspond to a 70 % increase in total rice consumption in West Africa by the end of the decade. Even though, total rice production has increased over the last two decades, the increases fall short of the increasing demand from the rapidly growing population. Rice has contributed a significant proportion of the food requirements for Nigerian population. The average Nigerian now consumes 24.8 kg of rice per year, representing 9% of the total caloric intake (Rice web, 2001).

Rice is cultivated in almost all the agro-ecological zones in Nigeria. Despite this, the area cultivated to rice still appears small. In 2000, out of about 25 million hectares of land cultivated to various food crops, only 6.3%was cultivated to rice. In recent years rice production had been on increase but not sufficient to meet the demand of growing population and thus the need for importation of rice to make up for the short fall. For example, the value of rice imported into Nigeria was estimated at US $300 million. Recent policies have placed emphasis on increasing local rice production in order to reverse import trends and free up limited foreign reserves for use in other sectors (WARDA, 2003).

The Special Rice Programme

The strategic position which rice has assumed among other commodities (cereals) had made the Nigerian government to intervene in the Nigerian rice economy in the last three decades. Among such interventions is the Special Rice Programme which is aimed at self-sufficiency in rice production. **A**ccording to the reports from Federal Ministry of Agriculture and Rural Development the programme is aimed at self-sufficiency in rice production and a total of 7,400 farmers nationwide participated in the programme in 1999 and year 2000, while 3,700 hectares of rice was established. A total of 203 metric tonnes of improved rice seeds were procured and distributed to the participating farmers while 20,089 litres of assorted agro-chemicals, 296 units of knapsack sprayers, 111 units of fertilizer spreader, 74 units of rice reapers 3,700 units of sickles have been distributed to rice farmers.

The Japanese Government assisted Nigeria with a supply of 43 modern rice milling machineries; 165 rice destoners, 46 forced air driers, fertilisers and other inputs to facilitate the establishment of processing mills in the geo-political zones. Production of 3,700 metric tonnes of rice is expected from the quantity of the locally produced rice as a result of the technological production packages presently introduced (FMARD, 2002).

In view of the important role rice plays in the diet of Nigerians and its persistence deficit despite the successive programmes launched by the federal government to increase its production; the assessment of the present special rice programme therefore becomes imperative to ascertain whether it has really achieved its stated objectives.

Objectives of the Study

This study sets out to determine the extent to which the programme had contributed to rice production in the study area. The study further determines the factors influencing the adoption of production packages introduced in the programme. The significant difference in the level of production obtained before and after participation in the programme was also examined.

METHODOLOGY

The study was conducted in Oyo state. The state is bounded in the north by Kwara State, in the east by Osun State, in the south by Ogun State and partly in the west by both Ogun State and Republic of Benin. The State covers an area of approximately 27,249 square kilometres and made up of 33 Local Government councils. The

climate is equatorial, notably with dry and wet seasons with relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25^0C and 35^0C almost through-out the year round (Oyo state website, 2008). The climate is conducive for the growth of a variety of food and cash crops. Among the food crops are yam, maize, cassava, millet, plantain, banana, rice and wheat; while, cash crops include cocoa, cashew and palm produce.

Sampling procedure - The study sample was selected using a three-stage stratified sampling procedure. The three levels of stratification were zone, the local government area (LGA), the village at the rice farmer level. The study sites were purposively selected to represent rice producing areas in the State. The sites were chosen along the agricultural zones of Oyo State Agricultural Development Programme (OYSADEP). Ogbomoso and Oyo zones were purposively selected for the study. Orire and Surulere LGAs were selected from Ogbomoso zone and Atiba LGA was selected from Oyo zone. The selection of the LGAs was based on the fact that they are important rice producing areas as well as selected areas for Special Rice Project. Four villages were purposively selected from each of the three LGAs and 10 rice farmers were randomly selected from each village to arrive at a total of 120 respondents.

A structured interview schedule was used to solicit information on rice production on special rice programme from the respondents. The validated and pre-tested instrument was administered to the respondents. The questions were drawn in English and translated into local language (Yoruba) during administration. Descriptive statistics such as the frequent counts and percentage were used to describe the personal characteristics of the respondents while t-test was also employed in the analysis.

RESULTS AND DISCUSSION

Personal characteristics of the respondents

Rice producing farmers in the study area are in their active years of farming with majority (80%) falling within the age range of 35-50 years and the mean age being 46 years. This implies that the respondents are still in their active years of farming and this likely to enhance productivity. Rice production in the study area is dominated by male farmers with only 5% female farmers engaged in rice production. This agrees with findings of Kebbeh *et al* (2003) that rice producing households are predominantly male-headed and women are mainly involved in seedling uprooting, transplanting and winnowing. Most of the respondents had one form of education or the other with only 28.3% having no formal education. This is likely to have positive influence on their ability to comprehend and use technical information relevant to rice production. Rice farming experience for majority (66.6%) of the respondents ranged between 5 – 10 years. This shorter experience in rice production might make them to be more responsive to new techniques of rice management probably due to their eagerness to try new things Family and hired labour are predominantly used by the rice farmers in the study area. The mean size of cultivated land for rice production is 2.1 ha with the majority (50%)

of the rice farmers cultivating between 1.5 and 2.5 ha of land in a season. This shows that the respondents are small scale farmers who undertake rainfed lowland rice production.

Table 1: Personal Characteristics of the Respondents (n=120)

Category	Frequency	Percentage
Age (years)		
35 – 45	43	35.8
45 – 50	53	44.2
55 – 60	18	15
> 60	6	5
Gender		
Male	114	95
Female	6	5
Education		
No formal education	34	28.3
Primary education	65	54.2
Secondary Education	21	17.5
Farming Experience		
< 5	32	26.7
5 -10	80	66.6
> 10	8	6.7
Farm Size (Ha)		
0 -1	39	32.5
1.5 – 2.5	60	50
3.5 – 4.5	13	10.8
> 4.5	8	6.7
Type of Labour		
Family	21	17.5
Hired	46	38.3
Family and Hired	53	44.2

Field survey, 2006

Access to project inputs

All the participating farmers claimed to have access to the following input distributed by the project. These include rice seeds (65 %), assorted agrochemicals (12.5 %), sickles (33.3 %), fertilizers (79.5 %), herbicides (43.3 %) and insecticides (37.5 %) (Table 2).. However the following items namely; milling machine, rice destoners, reapers and air driers were not distributed to the participants in the study area. The implication of this is that majority of the farmers will continue to employ the services of commercial millers before milling their produce an exercise that may not be cost effective. Absence of equipment like rice destoners and air driers may also affect the quality of the rice produced by the farmers.

Table 2. Distribution of respondents according to access to project input (n 120)

Input	*Frequency	Percentage
Rice seed	78	65
Knapsack sprayer	9	7.5
Agrochemicals	15	12.5
sickles	40	33.3
Fertilizer	95	79.2
Herbicides	52	43.3
Insecticides	45	37.5

Field survey, 2006
*Multiple Responses

Use of Recommended Packages

Manual preparation of land is very common among the participating farmers. Only 20.8% of them adopted ploughing and 10 % use harrowing in land preparation (Table 3.). This may be due to non-availability of tractors to use on their farms. Direct seeding in form of broadcasting and drilling was the main establishment technique while, 37.5% adopted transplanting technique. Majority (63.3%) of the rice farmers use pre-emergence herbicides in weed control while only 26.7% make use of post emergence herbicides. All the respondents apply chemical fertilizers to their rice plots. However, there are differences in the quantity of the fertilizer applied owing to differences in their

abilities to purchase the input. This action may greatly influence their yields.

Table 3. Distribution of respondents according to use of recommended production packages for rice

Recommendations	Frequency	Percentage
Ploughing	25	20.8
Harrowing	12	10.0
Direct seeding	90	75.0
Transplanting	45	37.5
Pre-emergence herbicide for weed control	76	63.3
Post emergence use of herbicide for weed control	32	26.7
Chemical fertilizer	120	100

Field survey, 2006

Rice yield performance before and after the programme

Farmers' yields per hectare were between 1.0 – 2.0 t/ha with a mean yield of 1.8 t/ha before participating in the project. However, the mean yield increased from 1.8 t/ha to 3.2 t/ha after participation in the project (Table 4). This yield increase accounts for an increase of 77.8% in rice production on hectare basis.

Table 4. Respondents' Yields of Rice before and After the Programme

Before t/ha	Frequency	Percentage
> 1.5	51	40.5
1.5 -2.0	69	57.5
Mean 1.8 t/ha		
After (t /ha)		
2.0 -2.5	67	55.7
3.0 -3.5	53	44.3

Field survey, 2006

Annual income on rice production before and after participating in the special rice programme

Before participating in the programme, the annual mean income of the respondents on rice production was N35,366.67 while the mean income after their participation in the programme was N59,875.00 t/ha (Table5).

Table 5. Distribution of respondents according to annual income made on rice production before and after participating in the programme (n=120)

Before (N /ha)	Frequency	Percentage
N 24,000-N 27,000	45	37.5
N 32,000- N 36,000	35	29.2
N 40,000- N 56,000	40	33.3
Mean = N59,875.00 t/ha		
After (N /ha)		
N 45,000- N 56,000	36	30
N 56,000- N 65,000	41	34.2
N 66,000- N 81,000	43	35.8
Mean = N 35,366.67 t/ha		

Field survey, 2006

Results of t-tests showed significant differences in the yields of rice and income of the rice producers before and after the programme (Table 6). This significant increase noted in the productivity level of the respondents indicated positive impact of special rice programme among them.

Table 6. Summary of the results of T-test analysis of the differences in the level of production before and after participating in the programme

Variable	Before	After	T - value	Remark
Production (ton/ha)	1.80	3.20	- 11.367	Significant
Income (Naira)	35,366.67	59,875.00	- 19.581	Significant

Level of significant=0.05

CONCLUSION AND RECOMMENDATIONS

The study concludes that rice farmers' participation in the study area had a positive influence on level of production and income. However, in view of the important roles farmers in the rural area played in food production government should intensify effort at sustaining

the gains of the programme by making the necessary inputs affordable to the farmers. Farmers should also form themselves into formidable groups and co-operatives societies to be able to purchase the necessary equipment to enhance productivity.

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Technical Efficiency of Egg Production in Osun State

Adepoju, A. A.
Department of Agricultural Economics and Extension,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria
e-mail: busola_adepoju@yahoo.com

Abstract: The major objective of this study was to examine the technical efficiency of egg production in Osun State. Specifically, the study looked at the socio-economic characteristics which influence the technical efficiency of farmers. It estimated and analysed productivity and technical efficiencies of the poultry farms. Data were collected from 86 sampled egg producers with the aid of a structured questionnaire using multistage random sampling technique. The data collected were analysed using descriptive statistics, budgetary analysis and stochastic frontier production function. The study revealed that production of egg was profitable in the study area. Result also indicated that inputs were efficiently allocated and utilized and the farmers operated in the rational zone of production function (Stage II). The inefficiency model showed that only location of the poultry egg farm positively improved TE. It is recommended that farmers should therefore be encouraged to site their poultry farms close to their source of input and environment conducive for poultry production.

Keywords: Technical efficiency, productivity, egg production

INTRODUCTION

The livestock industry is very important in the Nigerian economy because it provides a good source of animal protein such as meat, milk and egg that are rich in the essential amino acids required for body functions. Excess released from such products could as well be exported for foreign exchange. The industry, according to Okunmadewa (1999) provides raw materials such as wool, hides, and skin for the development of local industries using them to produce items such as clothing, shoes, jackets, rugs for human use. According to Akinwumi and Adeyeye (1979), poultry keeping have some advantages over other livestock because they are good converter of feed to useable protein in meat and eggs, production cost per unit is relatively low, return to investment is high if properly taken care of and 1ast1y it bas a short production cycle such that capital is not tied down over a long period.

Poultry meat and eggs offer considerable potential for meeting human needs for dietary animal supply (Folorunsho and Onibi, 2005). Poultry production in the past was not recognised as an important occupation; it has developed and occupied a place of pride among the livestock enterprises due to its rapid monetary turnover (Laseinde, 1994). This single reason, among others has made the enterprise attractive and popular among small, medium, as well as large scale poultry farmers. The poultry industry has become a diverse industry with a variety of business interests such as egg

production, broiler production, hatchery, and poultry equipment business (Amos, 2006).

The population explosion together with a poor distribution of food is among the world's greatest problem today. In Nigeria, production of food has not increased at a rate that can meet the increasing population. In developed countries, growth of population in relation to farm output is rather stable but in a developing country like Nigeria there is no compensation for population increase by the total farm output.

Therefore, the importance of livestock for sustainability of food production and fostering of widespread provision *of* food production and fostering of-widespread provision of animal- protein cannot be overemphasized. FAO (1989) recommendation for daily protein consumption is put at 60g per person out of which 35g is expected to be *of* animal source. However, it was reported that the average per capita protein intake in Nigeria was 51.7g of which' only 8.6g came from animal sources, whereas in developed countries, the average per capita protein intake was over 90g with more than 65g of animal protein (Isoun, 1980)

The level of livestock consumption in Nigeria according to FAO (1989) is ridiculously too low. A report *of* the Federal Livestock Department according to the Federal Ministry *of* Agriculture (1988) confirmed that the total meat produced in Nigeria was actually 400,000 tonnes in spite of the projected figure by F AO of 850,000 tonnes for the year 1986. All these further indicate the decline in food supply and consumption, which eventually lead to wider nutrition and malnutrition of the populace.

Within the pattern of hunger and malnutrition in Nigeria the greatest problem is that which result from inadequate protein in the diets of a large proportion of the population especially rural areas. This according to Oyenuga (1990) was due to the fact that the purchasing power of the bulk of the population is low in relation to the prevailing high cost prices of nourishing foods. There is therefore, the need for efficiency in the management of the farm at production, distribution, marketing and consumption levels, to achieve the objectives of making farming profitable and providing adequate protein supplies in the Nigeria so as to bridge the gap between food production and population in the country.

The major sources of protein in developing countries are beef, pork, goat meat, and mutton and poultry meat while other sources termed miscellaneous are egg and milk which have a bulk share of animal protein required by man. It is necessary to note that adequate consumption of meat is an indication of social and economic welfare. Demand for animal protein is usually higher in cities than in villages because of the difference in income, level of education and availability (Ikeme, 1990).

To bridge the protein gap in Nigeria, egg as a major poultry product has been a topic of interest for many researchers. Akinwumi and Adeyeye (1979) showed that small scale farmers tend to operate their poultry units on part time basis, most of them concentrate on egg production alone and most large scale producers locate their farms near urban areas. In their study on Economic analysis of Nigeria poultry industry, the supply and demand for egg and

poultry meat were compared and it was confirmed that most of the producers concentrate on egg production alone and neglect the broiler production creating gap between demand and supply.

Adebiyi (2000) studied on the economic analysis of egg production in Ondo State and stated that apart from the high level of protein in egg, it is more easily affordable by the common man than other sources of protein. The study compared the purchasing price of a tray of egg and a kilogramme of beef and it was concluded that from the little difference in cost price that a tray of egg which consists of thirty pieces of eggs can be enough for the better part of a month unlike a kilogramme of beef or chicken which must be consumed within a maximum of a week. Moreover, boiled eggs are now being hawked in motor parks, railway stations, market places and roadsides. This therefore, justifies that more eggs would have been consumed if the prices were right.

The production of egg has been troubled by unstable trends in the economy. The several problems plaguing the industry make it difficult for existing firms to expand while new ones are reluctant to go into the business. Such problems include - high cost of feed, other production cost, diseases and marketing problems. This situation has forced many small-scale poultry farms to close down and those still managing to survive are producing at very high cost and also contending with serious inputs limitations. The problem then is how efficient are the available resources utilized in poultry production in the light of the situation of the economy? What effect has this on farmers that are stills able to keep on with production at this high cost of inputs?

Results from this study will help to assess the impact of resources already committed to egg industry and the extent to which egg output can be increased from such existing resources. It is in view of this that the study examines the productivity and the technical efficiency of egg production in Osun State, Nigeria. Specifically, the study estimated the profitability of poultry egg production in the study area, the productivity of the factors involved in poultry egg production as well as the technical efficiency (TE) of poultry egg production in the state.

METHODOLOGY

The study was carried out in five Local Government Areas of Osun state namely, Osogbo, Ede, Ife Central, Ikirun and IIesha. Osun State has a total land area of 8802 Km^2. The people are predominantly peasant farmers cultivating mostly food crops. They also embark on livestock production such as rearing of goats, sheep, pigs, rabbits and poultry as well as marketing of their products.

Primary data were collected from poultry farmers in the study area with the use of well-structured questionnaire. The respondents were selected using multistage random sampling technique. Firstly, local government areas were chosen purposively based on the population of poultry farmers in the local government area and availability of market for the poultry products. Eighty six respondents were randomly sampled from the local government areas covered by the study. The economic variables considered for

estimating efficiency of poultry egg productions are: quantity of eggs produced (Naira), stock of birds (Number), feed intake (Kg), operating expense (Naira), other cost (Naira), experience of farmer in years, years of schooling of farmers, age of farmers and location of farm (Urban/ Rural area).

The profitability of the farm was estimated with the use of the budgetary analysis as given below

i. Gross Margin Technique

GM=TR-TVC ……. (1)

ii. Net Revenue Analysis

π = TR - TC; Where

TC = TVC + TFC and TR = PQ

Therefore, π = PQ - TVC - TFC, … (2)

Where TR is Total Revenue from sales of eggs and birds, π is Profit, P is Price of Unit egg and birds sold, Q is Quantity of eggs and birds sold and TVC is Total variable cost for birds and eggs. (This will include the cost of purchase of the birds, feeds, medication and cost of labour for feeding, watering and general management of birds). TFC is Total Fixed Cost which include cost of all fixed assets which can last for a year or more, TC is Total cost of production for eggs and birds

Econometric Method

The stochastic frontier production function analysis was used to estimate the coefficients of the parameters of the production function and also to predict the technical efficiencies of the poultry farms. The production technology of the farmer was assumed to be specified by the Cobb Douglas frontier production function which is define by

Log Y = log Po + Po log Xli + log X2i + log X3i + 10gX4 i + Vi – Ui ……. (3)

Where Y = Output of the Farmer

Xl = Stock of birds (number)

X2 = Feed Intake (kg)

X3 = Operating expenses (labour, Drugs, Transportation Cost)

X4 = Other costs (Depreciation)

Vi = Random errors which covers random effects on production outside the control of the decision unit and.

Ui = Technical inefficiency effect which are the result of behaviour factors which could be controlled by an efficient management (Xu & Jeffrey, 1998) V's are random errors which are assumed to be independent and identically distributed normal random error having zero means and unknown variance N. (U, σ_v^2)

U's are technical inefficiency effects, which are assumed to be independent of V's. Where Uj is defined by:

$$Uj = \delta_0 + \delta_1 Z_1 j + \delta_2 Z_2 j + \delta_3 Z_3 j + \delta_4 Z_4 j$$

…… (4)

Where Z_1, Z_2, Z_3, Z_4 represent years of experience (years), level of education (years), age (years) and location of farm (urban*I*rural) respectively. These are included in the model to indicate the possible influence of the farmers' socio -economic characteristics on the Technical efficiencies of the farms. 'The βs. $\delta s\, \sigma^2, \sigma^2_v, \sigma_u^2$, s, and γ are unknown scalar parameters to be estimated. The variances of the parameters systematic, V and one sided U δv^2 and δu^2re respectively and the overall model variance given as δ^2 are related thus,

$\delta^2 = \delta u^2 + \delta v^2$ …… (5)

The measures of total variation of output from the frontier which can be attributed to technical efficiency are lamda (λ) arid gamma γ (Battese and Corra, 1977). These variability measures are derived as follows

$\lambda = \delta u^2 / \delta v$ ….. (6)

and

$\gamma = \delta u^2 / \delta v^2$ … (7)

Also, the farm specific technical efficiency (TE) of the farmer is estimated by using the expectation of Uj conditional on the random variable (Ei) as shown by Battese and Coelli (1988). The technical efficiency of an individual farmer is defined in terms of the ratio of the observed output to the corresponding frontier output given the available technology, that is

TE =Yi/Yi*

$$= \frac{\exp (Xi\beta + Vj - Uj)}{\exp .. (Xi\beta - Vj)} \quad \text{……. (8)}$$

$$= \exp. (- Uj)$$

So that $0 \leq TE \leq 1$.

RESULT AND DISCUSSION

The Gross margin analysis of poultry egg production in the study area is presented in Table 1 below. The major cost element in poultry egg production is the feed cost, which accounted for about 80% of the total cost of production. The gross margin per bird was N1,500.13 and the Net Return was N1,494.88. This implies that poultry egg production was profitable in the study area and thus any effort at expanding it would be a good decision.

Table 1 Budgetary Analysis (Gross Margin and Net Returns Analysis of poultry egg production)

Variables	Mean Value (Naira)
Feed cost	1,726,923.20
Operating cost	416,825.65
Total Variable Cost (TVC)	2,143,748.86
Fixed Cost (FC)	14,413.07
Total Cost (TVC + FC)	2,158,162.53
Total Revenue (TR)	62,631,105.90
Gross Margin (TR-TVC)	4,119,357.04
Net Return (TR- TC)	410,493.37
Gross Margin Per Bird	1,500.13
Net Returns per bird	1,494.88

Productivity measurement showing the estimates of the parameters of the stochastic frontier production function of poultry egg farms in the study area is also presented in Table 2. The coefficient of the number of birds raised to produce the eggs was 0.52 and highly significant at 5% level of significance. The coefficient is positive and less than unity implying that increasing the number of birds for egg production by one would increase the revenue accruable by 52 kobo. In other words, the allocation and utilisation of this factor is in stage II of the production surface and thus it is efficiently allocated and utilised.

Table 2 Estimates of the parameters of production function of Poultry egg farms

Variables	**Parameters**	**Coefficients**	**T-ratio**
General Model			
Constant	β0	3.81	8.77
Stock of birds	β1	0.52	3.18
Feed	β2	-0.09	-0.56
Operating expenses	β3	0.24	1.51
Other cost	β4	0.10	1.16

Inefficiency Model			
Constant	$\delta 0$	-3.68	-0.26
Experience	$\delta 1$	0.02	0.22
Educational level	$\delta 2$	0.31	0.40
Age of farmers	$\delta 3$	0.01	0.10
Location of farm	$\delta 4$	-0.34	-0.44
Variance Parameters			
Signa squared	δ^2	0.87	0.55
Gamma	γ	0.83	2.79
Loglikelihood		-56.82	
Mean T.E		0.76	

The coefficient of operating expenses and other costs are positive and also less than unity but are not significant at 5% level of significance. This implies that the variables are efficiently allocated and utilized. The coefficient of feed is negative implying that total revenue from egg production decreases with increase in feed cost. This factor allocation is already is stage III of the production surface and to come back to the stage of efficiency the allocation has to be reduced. The Returns to Scale (RTS) (summation of the elasticity of production of the variables involved in the production process) of the poultry egg production is as presented in Table 3. The RTS is O. 77. It is positive and less than unity indicating that eggs production is in stage II (Rational Zone) of the production function and that inputs allocation and utilization are efficient.

Table 3 Elasticity of Production and Returns to scale (RTS)

Variables	Elasticity Production (EP)
Stock of birds	0.52
Feed	-0.09
Operating expenses	0.24
Other Cost	0.10
RTS	0.77

There is presence of technical inefficiency effects in the poultry egg production in the study area. This is confirmed by the large and significant value of the gamma coefficient (y). The gamma value of 0.83 indicates that about 83% variation in the output of the poultry egg production would be attributable to technical inefficiency effects alone while only 17% would be due to random effects. The predicted Technical Efficiencies of the poultry egg farm range, between 0.24 and O. 93 with a mean Technical Efficiency of 0.76. Table 4 presents the decile range of the Frequency distribution of the T E of the poultry egg farms. The frequency distribution of the TE shows that about 79% of the poultry egg farms have TE exceeding 70 percent.

The signs and significance of the Inefficiency model of the stochastic frontier, production function has important implications on the technical efficiency of the poultry farms. The coefficients of experience, educational level, and age of poultry egg farmers are positive but less than unity. This indicates that these factors lead to decrease in Technical Efficiency. The coefficient of location is negative and implies that the location of the poultry farm leads to increase in TE. The nearer the farm to the urban centre the higher the TE.

Table 4 Frequency Distribution of Decile Range of Technical Efficiency

Decile Range of T.E	Frequency	Percentage %
0.30 – 0.39	1	1.1
0.40 - 0.49	-	-
0.50 – 0.59	2	2.2
0.60 - 0.69	6	7.0
0.70 – 0.79	9	10.5
0.90 – 0.89	28	32.6
0.90 - 0.99	36	41.9
1.00	4	4.7

CONCLUSION AND RECOMMENDATION

The study examined the Technical Efficiency (TE) of poultry egg production in five Local Government Areas of Osun State, Nigeria. Primary data were collected from 86 poultry egg farms from the selected Local Government Areas. Findings from the study showed poultry egg production was profitable in the study area as depicted by the large gross margin per bird of Nl,500.13 and Net Returns per bird of Nl,493.88. The study also confirmed that feed cost accounted for about 80% of production cost. The productivity analysis showed that apart from feed cost all the other factors showed positive decreasing returns to the factor. The Returns to scale was 0.77 which indicates stage II of the productivity surface showing an efficient allocation and utilization of resources. The Technical Efficiency measurement showed that there were technical inefficiency effects in poultry egg production. The predicated T. E. ranged between 0.24 and 0.93 with a mean of 0.76 and about 79% of farms having TE of over 0.70. This variation can be attributed to the presence of technical inefficiency effects in poultry egg production in the study area.

The inefficiency model showed that only location of the poultry egg farm positively improved TE while other socio-economic variables such as education, poultry keeping experience and age of the poultry farmers in the model are negative and insignificantly influence the TE. The varying level of technical efficiencies of poultry egg farms in the study area is ample opportunity to improve on the current level of efficiency. Farmers should therefore be encouraged to site their poultry farms close to their source of input and to environment conducive for poultry production. Also, *to* stimulate egg consumption in the rural areas, adequate enlightenment on the benefit of egg consumption should be introduced.

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Economic Analysis of Plantain Marketing in Akinyele Local Government Area in Oyo State, Nigeria

Adetunji, M. O. and I. O. Adesiyan
Department of Agricultural Economics and Extension,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria
e-mail: moreniketunji@yahoo.com

Abstract: The study was carried out to evaluate the costs and returns to plantain marketing and to examine the structure of the market in Akinyele Local Government Area of Oyo State Nigeria. Eighty plantain marketers were selected through random sampling of the population and structural questionnaires were used to collect the data. The data were analysed using descriptive statistics, budgetary, marketing margin analysis, regression analysis and Herfindahl index. The findings revealed that most of the marketers were female and were at their active age. About 20% of them have no formal education, 60% completed their secondary school education. The gross margin gained on the sale of a bunch of plantain is N 105.06k, while N 1,275.75k is gained on a daily sale, when an average of fifteen bunches of plantain is being sold. The Herfindahl index is 0.123, this identified plantain market as a perfect competitive market. Analysis of regression result implied that there was significant relationship between some marketing activities (transportation and labour costs) and gross margin. It was therefore, recommended that plantain marketing should be ventured into because it is a profitable enterprise.

Keywords: Plantain marketing, profitability, Herfindahl index

INTRODUCTION

Plantain and modern banana originated from South East Asia and Western pacific region (John and Marchal, 1995). It belongs to the family of "*Musaceae*" and of two types "*Musa acuminata*" (genome AA) and "*Musa balbisiana*" (genome BB). Also both plantain and banana are staple food crops for many people in developing countries. In terms of gross value of production, plantain and banana are one of the most important fruits in the developing world (Akalumbe, 1994).

In terms of distribution, four main types of plantain are available in Nigeria, which are strictly based on their bunch characteristics. These are horn type, French type, false type and french-horn type. In Nigeria, the false horn type is the most widely distributed because of its ability to tolerate poor soil condition than others (John and Marchal, 1995).

Plantain marketing involves the role of middlemen in passing plantain from the farms to the markets. Therefore, the roles of markets cannot be over emphasized because production centers are fragmented and mostly in small scale. It is faced by a lot of marketing problems and these problems determine whether production can be expanded. Production problems can be

overcomed through introducing new production technology and efficient marketing system and this can only be realistic by understanding marketing system. As a seasonal crop with relatively short shelf life, plantain is available for a limited time and post harvest losses are high. The perishable nature of plantain makes processing a vital link in the marketing process. Some important plantain products include local beer (Sekete), plantain flour, plantain chips, roasted plantain (Boli) as well as processed form known as "Dodo Ikire".

Plantain is important in diet of many Nigeria families. In the urban areas, it is normally eaten in convenient forms like "Dodo (fried ripe pulp), chip (fried unripe pulp) and as plantain flour (Akinwumi, 1999). This plantain flour has an advantage over other starchy foods because it contains protein, mineral and vitamins. Medicinally plantain can be used to cure some ailments; like sore throats, tonsillitis, diarrhoea and vomiting. Due to its high nutrients, plantain is used in the production of Soymusa, which can be used in the treatment of kwashiorkor (Idachaba, 1995).

Relative attention given to plantain is focused on its production technology while little is done on its marketing. It is however obvious that increased production without corresponding increase in marketing may amount to wastage of resources. However, the issues of neglecting marketing system was first observed by Mellor (1992) who postulated that marketing system has been totally neglected in the literature on economic development. Also, Njoku and Nweke (1996) later agreed that the marketing condition changed because the sector was ignored. All these researcher and many authors have shown serious concerns for roles marketing can play in economic development. Researchers held that underplaying marketing in economic development left people on the platform of malnutrition as a result of over ripening of the produce (plantain) which led to loss or waste.

Likewise, Holton (1995) identified the effects of ineffective marketing channels and stressed that "they should be less tortuous and costly to navigate in order to facilitate flow of goods from producers to consumers". Mellor (1992) also observed that inefficiencies in the marketing functions could cause actual loss of product, while Frison and Sharoock, (1998) stressed the importance of integrating the expression of marketing function with the expression of production. Akalumbe (1994) observed the marketing and post harvest handling systems of plantain in Southern Nigeria and agreed with Njoku and Nweke (1995) that good infrastructures and facilities for storage as well as processing coupled with means of transport are important for an improvement in the plantain marketing system.

In view of the above facts it could be inferred that if marketing system of plantain is well understood, production could be expanded to ease food situation in Nigeria.

The objectives are to;

i. determine socio-economic characteristics of the plantain marketers.
ii. find-out marketing activities of plantain marketers
iii. evaluate gross margin and marketing margin earned by the plantain marketers

iv. examine the structure of the plantain market.

Hypothesis of the study is written in null form

$H_0$1: There is no significant relationship between the marketing activities of plantain marketers and their gross margin.

METHODOLOGY

The study area of this research work is Akinyele Local Government Area of Oyo State. It shares boundary with Ibadan North Local Government in the South, Afijio Local Government in the North, Lagelu Local Government in the East. The average annual rainfall is about 1200mm and ecological zone type is forest savanna type. The major occupations of the people residing in the area are farming, carpentry, trading, marketing, food processing as well as carving work. The crops types grown in the area include maize, cassava, banana, plantain, cocoyam etc.

Random sampling technique was used in selecting the respondents. In all, eighty respondents were selected from the following areas; Onidudu, Moniya, Ijaye and Oojo (i.e. twenty respondents from each area). Data were collected through a well-structured interview schedule. This was analyzed by the use of descriptive statistics and also by budgetary analysis to evaluate costs and returns of plantain marketing. Gross margin analysis was employed to determine profitability of the business. Regression analysis was used to test the hypothesis.

Mathematically:

Gross margin (GM) = Total Revenue – Total variable cost = TR -TVC

Marketing margin (Mm) = Consumer price (Cp) – Producer price (Pp)

Herfindahl index (HI)

This is used to measure concentration of the market which is one of the variables of market structure.

The market share of a marketer is denoted by $Si = qi/q$

$$HI = S_1^2 + S_2^2 + \text{--------} + S_n^2$$

$$\sum Si^2 = \frac{1}{q_n} \sum q_i^2$$

Where; q_i = output of the plantain marketer i

q_n = output of all the plantain marketers

$S_i = \frac{\text{Output of plantain marketer i}}{\text{Number of marketers}}$

$S_n^2 = \frac{\text{Output of 'n' plantain marketer}}{\text{'n' number of marketers}}$

The Regression Model

Regression Analysis was used to test for the level of relationship or significance between the gross margin (dependent variables) and marketing activities (independent variables).

Here

Y = gross margin (dependent variables)

$X_1 - X_4$ = Marketing activities (independent variables)

$Y = F(X_1, X_2, X_3, X_4, e)$

Y = Gross margin (N)

X_1 = Transportation Cost (N)

X_2 = Labour Cost (N)

X_3 = Storage Cost (N)

X_4 = Trading Material Cost (N)

e = Error term

General forms of the two functional forms used are:

(1) Linear Function

$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$

(2) Log Function

$\text{Log } Y = b_0 + b_1\log x_1 + b_2\log x_2 + b_3\log x_3 + b_4\log x_4 + e$

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The finding revealed that 43% of the respondents were within the age range of 31-40 years and 60% completed their secondary school education, this indicated that most of the plantain marketers were in their active age but were not well educated. Larger percentage of the plantain marketers were female (88%) and married (64%), it was also discovered that about 45% of the marketers had an average of four people in their household.

Table 1. Socio -economic Characteristics of Respondents

Age (yrs)	**Frequency**	**Percentages**
< 20	2	3
21-30	18	23
31-40	35	43
41-50	15	18
51 and above	10	13
Level of Education		
0	16	20
1- 3	08	10
4- 6	48	60
7- 9	08	10
Gender		
Male	10	12
Female	70	88
Marital status		
Single	20	25
Separated	0	0
Divorced	0	0
Widowed	9	11
Married	51	64
Household size		
≤ 2	12	15
3 –5	36	45
6 – 8	28	35
> 8	04	05
Total	**80**	**100**

Source; Field Survey 2004

Marketing Activities of Plantain Marketers

Table 2 showed the initial capital used to start plantain marketing, it was revealed that larger percentage of the marketers (48%) used about N2,500 - N5,000 to start the business while 22.5% of the marketers used an average of N1,500. It was therefore discovered that plantain marketing was easy and cheap business to start. Losses of plantain were minimized by processing the over ripe plantain to indigenous snack food called "Dodo Ikire". About 80% of the marketers confirmed this information.

The findings in Table 3 revealed marketing activities that the marketers engaged in order to make the produce (plantain) available in the markets on daily basis; this is associated with transportation cost, labour cost and trading material cost.

Table 2: Initial capital used to start plantain marketing

Initial Capital (N)	**Frequency**	**Percent**
< 500	4	5
500 – 2,500	18	22.5
2,501 – 5,000	38	47.5
5,001 – 7,500	10	12.5
7,501 – 10,000	8	10
>10,000	2	2.5
Total	80	100.0
Method of Minimizing Losses		
Processing	64	80
Sell at cheaper price	12	15
Storing	4	5
Total	80	100.0

Source; Field Survey, 2004

Table 3: Variable costs spent on marketing activities on plantain per day

Marketing activities	Amount spent per day (N)
Transportation	750.5
Labour	100.0
Trading material	55.5
Total	906.0

Source; Field Survey 2004

Analysis of Costs and Returns

Gross Margin (GM) Analysis/ Bunch

Total Cost (TC) = Total Fixed Cost + Total Variable Cost =T FC + TVC

Total Revenue (TR) =Selling price per bunch = N295.80 per bunch

Total Variable cost (TVC) = Cost of plantain (bunch) + Marketing activities cost (per bunch)

TVC = N 150.35 + N 39.85 = N 190.20 per bunch

GM = Total Revenue – Variable Cost

= N295.80 - N 190.20

= **N 105.6 per bunch**

Gross Margin (GM) Analysis/ Day

Total Revenue = N 4,437 per day (average of 15 bunches of plantain)

Total Variable cost = Cost of plantain (bunch) + Marketing activities cost (per day)

= N2,255.25 + N 906.0 = N 3,161.25

GM = Total Revenue – Variable Cost

= N4,437.00 - N 3,161.25

= **N1,275.75 per day**

Therefore the gross margin gained on the sale of a bunch of plantain is N 105.6, while

N 1,275.75 is gained on a daily sale.

Marketing margin

Marketing Margin (Mm) = Cp - Pp

Cp = Consumer price = selling price

Pp = Producer price = cost of plantain from the farm

Mm = N295.80- N 150.35

= N 145.45 per bunch

The marketing margin is N 145.45 per bunch

Structure of Plantain market

The Herfindahl index is 0.123 (i.e. 12.3%). The low index number signified low concentration of market shares and that there was a situation of structurally perfect competition.

Regression Analysis

In order to test whether the marketing costs of plantain were significantly related to gross margin, some measured variables were subjected to regression analysis. Both linear and log functions were used. The linear function gave the best fit of the two tested function based on the co-efficient and the magnitude of R^2.

The functional equation of the linear function is given as

(3) Linear Function

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e_i$

$Y = 980.78 + 1.491X_1** + 3.046X_2* + 0.864X_3 + 0.0045X_4$

(2.241) (3.669) (0.632) (1.015)

The co-efficient of multiple determinations (R^2) is 64.4%, which indicates that 64.4% variation in gross margin is caused by the independent variables while the remaining 35.6% is due to error term. The value of F-Test (3.32) obtained shows that overall equation is statistically significant at 5% probability level. With this result the null hypothesis (H_o) is rejected.

The result of regression analysis thus showed that the explanatory variables, X_1 and X_2 are positively significant at 5% and 1% respectively, while X_3 and X_4 are not significant at all. This means that when the transportation cost (X_1) increases, gross margin will also increases because marketers will always increase their selling price in order to cover the costs. It also implies that marketers who spent more on transportation went to remote areas where they obtained cheaper plantains. The co-efficient of labour cost (X_2) is positive and statistically significant, which means that as the labour cost increases, gross margin also increases due to the increase in the selling price, which was as a result of high labour cost. However, the co-efficient of storage cost (X_3) and trading material cost (X_4) are not significant. Implying that storage costs and trading materials have insignificant influence on gross margin.

CONCLUSION

Plantain market is a perfect competitive market and the business is easy to start with moderate initial capital. Plantain marketing is quite profitable with high gross margin and marketing margin which are subject to increase as marketers source produce from remote communities. The over-ripe plantain can easily be processed into indigenous delicacies. The study also revealed that transportation and labour cost were the major factors affecting returns on plantain.

RECOMMENDATION

Based on the research findings the following are recommended. There is need for provision of basic marketing facilities such as infrastructural facilities, credit facilities which will eventually enhance marketing efficiency positively. Development/adoption of better techniques that will simplify processing is needful. Policies aimed at increasing total production through genetic improvement should be made.

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Farmers' Perception of the Agricultural Information Resource Centre at Ago-Are, Oyo State, Nigeria

Banmeke, T. O. A. and M. T. Ajayi
Department of Agricultural Economics and Extension Services,
University of Benin, Benin City, Nigeria.
e-mail address: tajudeenbanms@yahoo.com, akinwumi5253@yahoo.com

Abstract: This study assessed farmers' perception of the agricultural information resource centre at Ago Are, Oyo State, Nigeria as a source of information for improving agricultural productivity. A structured questionnaire was used to elicit responses from 60 farmers who were randomly selected. The findings show that majority of the respondents (75%) are males and about fifty six percent of them were between the ages of 25 to 50 years. Majority of the respondents (68.3%) had no formal education while 51.2% had more than 25 years farming experience. Respondents mostly used information board, video presentation and the radio programme at the centre. The most frequently sought information is on fertilizer application, harvesting methods and market information. Internet usage by the farmers was found to be low due to the frequent break down of the computers in the centre. Most of the respondents perceive the centre as an important means of getting information needed to boost their agricultural production. There was a significant relationship between the type of information sought and respondents' perception of the resource centre ($r = 0.28$; $P>0.05$). A need to organize frequent training for farmers and adequate maintenance of resource centre's facilities to avoid constant breakdown were recommended.

Keywords: Information, perception, resource centre.

INTRODUCTION

Information has been identified as an important and crucial variable in the development process. This makes it imperative to provide adequate, relevant and up-to-date information in order to transform agricultural production in many developing countries. Adebayo (2006) posited that agricultural information is no doubt central in enhancing agricultural productivity and facilitating poverty alleviation among rural farmers. Information Communication Technologies (ICTs) has been identified to have capacity to empower rural farmers and enable them to make contribution to the development process (Munyua, 2000). According to Balit, (1998), "with new ICTs, rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they make decisions for their own development." Munyua (2000) also indicated that giving rural people a voice means giving them opportunity to express their views and opinions and become part of the decision making process. She posited that the new ICTs

have played a major role in diffusing information to rural communities.

Therefore, in order to address the current food crises in Nigeria, there is the need to ensure ready access to available and readily useable information by those requiring such information. Njoku and Ndeche (1999) asserted that agricultural and rural development should encompass a shift from the traditional techniques of agricultural production activities to new science-based methods, involving also new technological components, cultural practices, new crops and breeds of livestock and farming systems, but this can only be achieved when there has been a properly organised and communicated utilisable data and information. Furthermore, Ochu (2000) opined that the importance of proper information dissemination is regarded as a vital ingredient for promoting agricultural and rural development. Traditionally, in many African countries, the main sources of information to farmers are extension agents, radio, friends and relatives (Banmeke and Olowu, 2005). Munyua (2000) indicated that the weak linkages between researchers, extension workers and farmers have been a major constraint that has resulted in research findings not being applied by poor rural farmers. However, it has been found that ICTs can improve and strengthen these linkages which will also improve rural people's knowledge and information and subsequently improve food security (Munyua, 2000). According to Richardson (2003), there is general interest in exploring the Information and Communication Technologies as a cost-effective extension tool for information delivery and knowledge sharing among farmers.

According to Van Crowder and Fortier (2000), "in Latin America, FAO has applied ICTs in a project to establish farmer information networks – FARMNets - involving agricultural producers and farmer associations, extension services and NGOs in Chile and Mexico. Essential information on inputs, prices, markets, weather and credit are exchanged through the electronic network (via the Internet) to farmer organisations, co-operatives and local government. The project also provided training on how to analyze, retrieve and disseminate information of local relevance using ICTs." In a similar vein, the International Institute of Tropical Agriculture, Ibadan, Nigeria managed a project called Information and Communication Support for Agricultural Growth in Nigeria (ICS-Nigeria) funded by United States Agency for International Development (USAID). The project aimed to increase the quantity and quality of information available for increased agricultural production, processing and marketing. It also aimed to strengthen the capacity of farmer assistance organizations to package and disseminate information on agricultural technologies to farmers for poverty alleviation (Adekunle *et al*, 2004). In facilitating its vision, ICS Nigeria set up farmer resource centres in Nigeria where ICTs could be easily harnessed by the rural farmers assisted by extension workers to obtain information on agriculture which they can apply to help boost their productivity and standard of living. However, only the resource centre in Ago Are, Oyo State is functioning presently. Therefore, assessing the perception of

farmers that use this centre on the usefulness of the resource centre and the quality of information obtained is necessary to rectify emergent problems and make necessary improvements that will meet the needs of the farmers. It would also serve as a guide for the subsequent centres to be set up. The findings of this study could also provide insights into the effectiveness of integrating information resource centre model into the state-wide extension service programme.

Objectives of the Study

This main objective of the study was to assess respondents' perception of the Farmers Resource Centre at Ago Are, Oyo State, Nigeria as a source of information for improving agricultural productivity. The specific objectives were to:

i. describe the personal characteristics of the farmers that use the resource centre.
ii. ascertain the level of use of the facilities at the resource centres' facilities.
iii. identify the types of information sought by the respondents from the resource centre.
iv. assess the farmers' perception of the resource centre.
v. ascertain the problems encountered by the farmers in using the resource centre

Hypotheses of the Study

i. There is no significant relationship between the farmers' personal characteristics (age, sex, educational level) and their perception of the centre.
ii. There is no significant relationship between the type of information sought by farmers and their perception of the resource centre.

METHODOLOGY

This study was carried out in Oyo State located in South West Nigeria in 2006. The state covers an approximate area of about 35,743km^2. The climate is tropical in nature with the raining season between April and October and the dry season between November and March. The resource centre is located at Ago-are in the northern part of Oyo State which is a major agricultural zone of the state. The research design was a descriptive survey method. All the farmers that make use of the resource centre constitute the population of this study and the list of farmers was obtained from the register in the resource centre. A simple random sampling technique was used in selecting 60 farmers from a total of 98 farmers registered in the centre.

A structured questionnaire was the instrument used for data collection. The copies of the questionnaire were administered by enumerators with the assistance of the resident extension officer in retrieving some copies of the questionnaire. However, only 42 copies of the questionnaire were returned which was said to be due to the unavailability of the farmers. Forty one copies of the questionnaire were found useful for analysis. Both content and face validity of the instrument were established by a panel of experts consisting of faculty members. A pilot test was conducted with 10 farmers. The questionnaire reliability was estimated by calculating Cronbach's alpha which was found to be 0.87. Farmers' perception of the resource centre was ascertained using a 5-point Likert-

type rating scale on a list of twenty (20) perception statements. Data were analysed using simple descriptive statistics such as frequency counts, percentages, means and standard deviations. Chi-square and Pearson Product Moment Correlation were used in drawing inferences.

RESULTS AND DISCUSSION

Personal Characteristics

The personal characteristics of the respondents are presented in Table 1. Findings in Table 1 indicates that 75% of the farmers that use the centre are male which is not surprising because males tend to associate more than their female counterparts due to cultural reasons in the study area. A little above half of the respondents were between the ages of 25 to 50 years (56.1%) which is an indication that they are in the active age. Also, 68.3% of these farmers had no formal education, while 51.2% had more than 25 years farming experience.

Table 1: Distribution of respondents according to their personal characteristics (N= 41)

Characteristics	Frequency	Percentage
Sex		
Male	31	75.6
Female	10	24.4
Age (years)		
Below 25	5	12.2
25 to 50	23	56.1
Above 50	13	31.7
Educational level		
No formal education	28	68.3
Adult education	2	4.9
Primary education	3	7.3
Secondary education & above	8	19.5
Farming experience (Years)		
Less than 5	5	12.2
5 to 10	5	12.2
11 to 25	10	24.4
Above 25	21	51.2

Source: Field survey 2006

Level of use of the centre's facilities by the respondents

The level of use of the facilities of the resource centre is presented in Table 2. Results indicate that the information board (M = 3.05) is the facility that is often used by the respondents. This may be attributed to the fact that there are a number of such boards strategically placed in different locations in the community which makes it easily accessible to the farmers. Also, video presentations (M = 2.61) were frequently used by the farmers. This may be due to easy understanding of the video presentations as they found it very explanatory. Radio broadcast of information was also rated third. This is not unexpected as radio has been found to be a major source of information to farmers in South West Nigeria (Ajayi, 2003). The result shows that the use of Internet is not yet popular even though the facility is available at the centre. This may not be unconnected with the consistent break down of computer and the low level of education of the respondents which will make it difficult to access information on their own as they depend mostly on the resident extension officer for now.

Table 2: Frequency of use of the centres' facilities by the respondents

Facilities	Mean(M)	Standard deviation
Information board	3.05	1.16
Video presentation	2.61	1.24
Radio broadcast	2.49	1.18
Community help desk	2.46	1.28
Television broadcast	2.41	1.22
Internet	2.34	1.31
Rental facility	2.07	1.03

Source: Field survey 2006
Likert type scale: Regularly 4, Occasionally 3, Rarely 2, Never 1.

Types of information sourced in the resource centre

Findings in Table 3 shows that information on fertilizer (M = 3.75), harvesting time and methods (M =3.69) and market (M = 3.58) are the most regularly sourced information at the centre. They also occasionally sourced for information on many other farming activities such as time of planting, new crop varieties, sources of planting materials, processing methods and training programme.

Table 3: Types and frequency of information sought by respondents in the resource centre

Information types	Means(M)	Standard deviation
Fertilizer application and agents	3.75	0.92
Harvesting time and methods	3.69	0.86
Market information	3.58	0.65
Time of planting and spacing	3.28	0.88
New crop varieties	3.23	0.74
Planting materials sources	3.14	0.82
Processing methods	2.95	0.99
Training programme	2.79	0.95
News	2.78	1.13
Storage and preservation of crops	2.78	1.13
Income generating activities	2.65	1.18
Agrochemical agents	2.56	0.79
Rural enterprise development	2.40	1.03
Credit sources	2.39	1.02
Weather forecast	2.14	1.04
Entertainment	1.95	1.03

Source: Field survey 2006
Scale: Regularly = 4, Occasionally = 3, Rarely = 2, Never = 1

Respondents' perception of the farmers' resource centre

Results in Table 4 indicate the respondents' perception of the farmers' resource centre. Respondents either strongly agreed or agreed with most of the statements provided. The first rated ones are that the farmers have benefited a lot from the centre (M =4.37), the centre is an important source of obtaining information (M = 4.24) and that the centre has enhanced farmers' agricultural productivity (M = 4.24). This reveals that the farmers have a high perception about the usefulness of the resource centre in meeting their needs and enhancing their productivity. However, there are some of the statements that respondents agreed with that need to be given special attention such as the rental facilities are too expensive (M = 3.46). This is because this factor can affect the usefulness of the centre just as it was pointed out in Table 5 that breaking down of computers was one of the major constraints faced by respondents in using the centre.

Table 4: Respondents' perception of the resource centre

Perception statements	Mean	Standard deviation
I benefit a lot from the centre	4.37	0.94
The centre is an important source of obtaining information	4.24	0.91
The centre has enhanced my agricultural productivity	4.24	0.91
The staff of the centre are friendly	4.24	0.79
I get relevant and up-to-date information	4.22	0.85
The staff often assist with the facilities	4.15	0.82
The centres' TV & video presentations are educative	4.05	1.07

The centre is easily accessible	4.02	1.08
I enjoy spending my free time at the centre	3.90	1.06
I often find solution to my production problems at the centre	3.83	1.30
The staff are proficient and efficient	3.83	1.01
The centre is not too far from my home	3.76	1.01
The centre is well organized	3.51	1.18
The rental facilities are too expensive	3.46	1.20
The centre is not a recreational place	3.44	1.51
The environment at the centre is conducive	3.39	1.35
The centre has sufficient facilities	3.22	1.45
The facilities are not too sophisticated	2.76	1.48
The centre has sufficient number of staff	2.71	1.32
The centre's facilities function properly	2.63	1.51

Source: Field survey 2006
Likert-type scale: Strongly disagree = 1, disagree =2, undecided =3, agree =4, strongly agree =5.

Problems encountered by respondents in using the resource centre

The major problem often encountered in using the facilities of the resource centre is presented in Table 5. The main problem usually faced by the farmers is the frequent breakdown of the computer facility (M = 3.72). Also, the respondents noted that the rental equipment are inadequate (M = 2.83). This may be attributed to the insufficiency of staff that is well grounded in computer operations. Furthermore, the centre seems not to be able to provide enough farm machinery for hire to the farmers.

Table 5: Gravity of problems encountered by the respondents at the resource centre

Problems	**Means**	**Standard deviation**
Computer breakdown	3.72	1.87
Inadequate rental facilities	2.83	1.78
Complexity of equipment	1.95	1.62
Language problem	1.68	1.60
Excessive protocol	1.71	1.45
Non-cooperation of staff	1.27	1.09

Source: Field survey 2006
Likert type scale: Very serious = 5, Serious =4, Undecided =3, Not serious =2, Not a problem = 1

Relationship between farmers' personal characteristics and their perception of the resource centre

Findings in Table 6 show that there are no significant associations between age (χ^2 = 3.145; P > 0.05), sex (χ^2 = 0.680; P > 0.05), educational level (χ^2 = 5.851; P > 0.05) and the farmers' perception of the resource centre. This finding reveals that farmers' age, sex and educational level do not affect the perception about the resource centre by the farmers. Some of the results are not unexpected because the resource centre is expected to be accessible to a wide variety of people irrespective of their age, sex but it is surprising that the level of education is not significant as it is expected that those with higher education will have a higher perception than those with low education (Adekoya and Ajayi (2000).

Table 6: Relationship between farmers' personal characteristics and perception of the resource centre

Variables	df	Chi-square value	Decision
Sex	1	0.678	Not significant
Age	2	3.145	Not significant
Educational level	3	5.851	Not significant

Source: Field survey 2006

Relationship between the type of information sought by respondents and their perception of the Farmers' resource centre

Result of the correlation analysis indicates a positive and a significant relationship between the type of information sought by the farmers and the perception of the resource centre ($r = 0.28$; $P<0.05$). This finding is not unexpected because the type of information received from the centre might affect the perception one has about the centre.

Table 7: Relationship between the type of information sought and the perception of the resource centre by farmers

Variable	r-value	p-value	Decision
Types of information sought	0.28	0.004	significant

Source: Field survey 2006

CONCLUSION AND RECOMMENDATIONS

The results presented here show that farmers have a good perception of agricultural information resource centre as they perceive the centre as an important means of getting up-to-date information needed to boost their agricultural production. However, the use of Internet by the farmers is still very low due to the frequent break down of the computers in the centre and probably low level of education of the farmers. It can therefore be posited that resource centre is becoming a more veritable tool that can be utilized in information dissemination in the developing countries just as it has been in the developed countries. Therefore it is recommended that:

i. Similar resource centres should be established in a pilot scheme in some other parts of the country so as to integrate it into the extension delivery system of the country.
ii. There is a need to organize frequent training for farmers in the use of the centre's facilities.
iii. There is a need for adequate maintenance of the centre's facilities to avoid constant breakdown which could lead to a low perception of such centres by farmers.
iv. Resource centres when established should only play a complementary role with extension personnel as the importance of personal contact cannot be undermined in extension delivery.

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Gender Roles in Cassava Processing Activities among Processors in Ogo-Oluwa Local Government Area of Oyo State

*Ogunleye, K.Y., R.G. Adeola and I. O. Ibigbami
Department of Agricultural Economics and Extension,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria.
*Corresponding author.
e-mail: kennygd2001@yahoo.com

Abstract: This study examined the male and female roles in cassava processing activities in Ogo-Oluwa local government area of Oyo state Nigeria. A multi-stage random sampling technique was used to select 40 males and 40 females to make a total 80 respondents. Interview schedule was the main tool used for data collection while frequency counts, percentages, Chi-square and t-test were used in analyzing the data. The results show that 65% of the respondents are within the age range of 31-50 years, and that 82.5 % are married. Significant relationship exist between sex $\chi 2 = 5.00$ $P<0.05$), educational status ($\chi 2=38.375$, $P<0.05$) marital status ($\chi 2=144.100$, $P<0.05$) and occupation ($\chi 2=77.304$ $P<0.05$). However, there is a significant difference between males and females participation in cassava processing activities ($t= -4.269$ and $P< 0.05$). The difference indicate that women are more involved in cassava processing than men and women are likely to gain proportionally more if the investment and development efforts are shifted in their favour.

Keyword: Gender, Cassava processing activities, Cassava Processors.

INTRODUCTION

Food is one of the basic needs of man but its provision is not always adequate for all nations especially in developing countries. This insufficiency of food had led man to better ways of producing it. Thus, agriculture, the art and science of the cultivation of land and livestock production is a major occupation of both males and females in developing countries including Nigeria (Ajayi, 1995). Nigeria is now diversifying its economic resources and efforts are being intensified to revamp the agricultural sector once again in order to achieve sustainable economic development of which part of government policies aimed at stimulating the production of cassava products for both local use and export trade. (RMRDC, 2004)

Cassava has been neglected for a long time in Nigeria, but has now become a key food security crop with many comparative advantages over cereals. It is highly adaptable to marginal soils and erratic rainfall conditions, it is rich in carbohydrate allowing for multiplicity of use, it is highly resistant to pests and diseases and it can maintain constant supply throughout the year.

Cassava also became popular with the introduction and implementation of SAP since 1986 with increasing output. This policy made those imported cereals to be more costly, making cassava a relatively cheap source of energy. This increasing trend in output has continued to make Nigeria, the world leading producer of cassava since the beginning of 1990s with an estimated contribution of 40 million metric tonnes per annum and an average yield of 10.2 tonnes per hectare (National report, 2006).

Over the years, it is believed that some crops are designated as "women crops" for planting and processing. These include vegetables, groundnuts and cassava while yam and tree crops such as cocoa and palm produce are said to be men's (Ajayi, 1995). Adegeye *et al* (1999) also asserted that women are active in the cassava industry and that they are more predominant in the processing and marketing than men folk who dominate the production of cassava roots. He further stated that women activities in root production have increased due to men's off farm employment or part-time work off the farm therefore women are involved in weeding, harvesting, transportation, storage, processing and marketing.

Gender is a term often associated with roles and responsibility of males and females in the society as a social classification of sex. It is the socio-cultural differences between males and females as against the biological differences (Sinkaiye, 2005). The interrelations of these roles produce a mutual understanding of each other's capabilities and constraints at different stages of life.

"Gender" is a concept used in social science analysis to look at roles and activities of men and women (IITA, 1996). Thus, the focus of gender analysis is not biological differences between men and women but rather on their experiences as members of society. Gender roles give us insight into issue affecting women and it is focused mainly on the relationship of both men and women to the social and economic structure of a society.

Objectives of the Study

The general objective of the study is to determine roles of men and women in cassava processing activities. The specific objectives of the study are to:

i. examine the personal characteristics of cassava processors in the study area.
ii. identify forms into which cassava is processed.
iii. ascertain various activities performed by male and female in cassava processing in the study area.
iv. identify constraints militating against processors in processing cassava.

Hypotheses of the Study

i. There is no significant relationship between selected personal characteristics (sex, marital status, level of education) of the respondents and the problems faced in processing their produce.
ii. There is no significant difference between male and female participation in cassava processing activities.

METHODOLOGY

The study was carried out in Ogo-Oluwa Local Government Area of Oyo state with the local government headquarters at Ajaawa. Ogo-Oluwa local government area is approximately located between the longitude of 3'51.18' and 3'58.9' East of Greenwich meridian and the Latitude 7'30.3' and 7'40.2' North of the equator with rainfall between 1500 and 2000mm and temperature between 23'C and 27'C Isotherms in January. It is situated at 233.2meters above sea level and the general elevation is between 178m and 220m above sea level (OYSADEP, 2001). The vegetation of the zone is derived savannah. The climatic and soil conditions of the study area favour the extensive production of food crops like cassava, yam, maize, vegetables, tomatoes, and cash crop like cocoa and cashew.

Sampling procedure and Sample size

Ogo Oluwa local government area is an extension block of the Oyo State Agricultural Development Programme (OYSADEP). The block is made up of eight cells from which the sample for this study was taken. A multistage random sampling technique was used in selecting the respondents for this study. Four cells were randomly selected from the block. From each selected cell, two villages were then randomly chosen. Thereafter, ten cassava processors were purposively selected from the chosen villages with equal number of male and female processors to arrive at a total sample of 80 respondents. A structured interview schedule was developed based on the objectives of the study to collect information from the respondents. Frequency distribution, percentages, Chi-square and T-tests were used to analyse the data.

RESULTS AND DISCUSSION

Personal Characteristics

Table 1 shows that majority (65 %) of the respondents are within the age range of 31-50 years with 16.3% in age range of 21-30 years and 18.7 percent in age range of 51 years and above . This indicates that majority of the respondents are still in their productive years. This finding agrees with Amao *et al* (2005) who noted that most processors are within the age of 45 years and below. Majority (88.7%), of the respondents had one form of education or another with 42.5% of them having primary education, 26.2 % had secondary education while 11.3% had no formal education. The result further showed that 82.5 % of the processors were married and 13.8 percent were single while a handful were either divorced (1.3 %) or widowed (2.5 %). Christianity and Islam were religion practiced by 47.5 % and 52.5% of the respondents respectively.

Table 1: Personal Characteristics of the respondents

Characteristics	Frequency	Percentage (%)
Age (years)		
21-30	13	16.3
31-40	28	35.0
41-50	24	30.0
51 and above	15	18.7
Educational Level		
Primary	34	42.5
Secondary	21	26.3
Adult Education	16	20.0
No formal education	9	11.3
Marital Status		

Single	11	13.8
Married	66	82.5
Divorced	1	1.30
Widowed	2	2.50
Religion		
Christian	38	47.5
Muslim	42	52.5
Membership of Association		
Yes	69	86.3
No	11	13.8
Total	**80**	**100.0**

Source: Field Survey, 2006
* Multiple Responses

Cassava Products by Gender

Table 2 reveals that all the females (100%) were involved in processing cassava to gari and *lafun* while very few males were involved in *gari* (90%) and *fufu* (20%). Majority (87.5%) of the females' process to *lafun* while 12.5% of males process to cassava flakes.

Table 2: Gender Distribution of respondents according to cassava products produced

	Female		**Male**	
Forms	*Freq.	%	*Freq.	%
Gari	40	100 .0	36	90.0
Fufu	40	100.0	8	20.0
Lafun	35	87.5	10	12.5
Others	21	52.5	2	5.0

Source: Field Survey, 2006
*Multiple responses

Sources of Information

The result from Table 3 below shows that 26.2 % of the respondents got their information from OYSADEP through the extension agents. More than half (56.3%) of the respondents got information about processing activities from radio while 73.8% obtained information related to their processing from the existing processors. This implies that few of the processors got their information from the extension agents while about equal proportions of them got it from those who have been into processing of the cassava products before and radio

Table 3: Distribution of Respondents by Sources of Information.

Sources	* Frequency	Percentage (%)
Extension agent	21	26.2
Existing processors	59	73.8
Radio	45	56.3

Source: Field Survey, 2006.
*Multiple Responses

Sources of cassava for Processing

Table 4 indicates that some farmers own the land on which they farm, while others rent. Some obtain their cassava from their personal farm; some buy it from others. The result showed that majority (72.5%) of the processor got cassava for processing from their personal farm. RMRDC (2004) had earlier validated this finding when they reported that most processors have cassava farms from which a great proportion of their roots are obtained. Also 47.5 percent got cassava from family plot while very few either purchase (6.3%) or get from friends.

Table 4: Distribution of respondents by sources of cassava tubers for processing

Sources	**Frequency**	**Percentage (%)**
Personal Farm	58 *	72.5
Purchased	5	6.3
Family farm	38	47.5
Friend	2	2.5

Source: Field Survey, 2006.
*Multiple Responses

Processing Activities Performed by Respondents.

Table 5 reveals that, 30.0 percent female and 85.0 percent male are involved in grating. All (100.0%) female and 20 percent male are involved in peeling while 70.0 percent and 87.5 percent are involved in pressing. Also, 100.0 percent female and 27.5 percent male are involved in frying, 70.0 percent female and 35.0 percent of male are involved in crushing .For sorting into various particle size, 70.0 percent female and 2.5 percent male are involved .In drying, 87.5 percent female and 22.5 percent male are involved in drying. This implies that both men and women play different but complimentary role in cassava processing. This may be due to the fact that some activities are very strenuous and require male participation.

Table 5: Distribution of cassava processing tasks of respondents' by gender

	Female		Male	
Tasks	Freq.	%	Freq.	%
Grating	12	30.0	34	85.0
Peeling	4 0	100.0	8	20.0
Pressing	28	70.0	35	87.5
Frying	40	100.0	11	27.5
Crushing	28	70.0	14	35.0
Sorting	28	70.0	1	2.5
Drying	35	87.5	9	22.5
Other tasks	38	95.0	5	12.5

Source: Field Survey, 2006

Constraints faced by respondents in cassava processing

Table 6 shows the constraints faced by respondents as either serious, mild or not a constraint. Spoilage during processing was a serious constraint to 46.3% while 38.8% claimed it to be a mild constraint and 15.0% said it was not a constraint. Spoilage in store was considered a serious constraint with 31.3% of the respondents while 38.8% agreed that it is mild constraint and 30.0% did not see it as a constraint. The result also shows that 45.0% of the respondents were seriously affected by inadequate or lack of storage facilities while 32.5% agree that it is mild constraint and 22.5% said it is not a constraint. It can be inferred that cassava products could not be stored for a long time due to non-availability of storage facilities which compel them to produce on a small scale in order to maintain its quality and meet the consumer's satisfaction. Time spent on processing is a serious constraint for 81.3% of the respondents while 11.3% considered it as a mild constraint and 7.5% of the sampled respondents claimed that the time spent on processing is not a constraint. Cost of labour is a serious constraint for 10.0% of the respondents while 52.5% agreed that it is a mild constraint and 37.5% said it is not a constraint. Cost of labour was not a major constraint to the processors probably due to the use of family labour

The result further explained that 8.8% of the respondents said that availability of transport to processing site is a serious constraint while 40.0% see it as a mild constraint and 51.2% of them are of the opinion that it is not a constraint. This may be due to nearness of their farms to the processing sites. Availability of improved technology was shown in the Table to be a serious constraint by 41.3% of the respondents while a similar proportion of them see it as a mild constraint and 17.5% agreed that it was not a constraint. This is an indication that the respondents feel more comfortable using the traditional methods of processing rather than the

expensive improved technologies since lack of storage facilities have limited them to produce on small scale.

Table 6: Distribution of respondents according to constraints faced in cassava processing

	Serious Problem		Mild Problem		Not a Problem	
Constraints	Freq	%	Freq	%	Freq	%
Availability of capital	20	25	57	3.8	3	71.2
Spoilage during processing	37	46.3	31	38.8	12	15.0
Spoilage in store	25	31.3	31	38.8	24	30.0
Availability of storage facilities	36	45.0	26	32.5	18	22.5
Cost of labour	8	10.0	42	52.5	30	37.5
Transporting to processing site	7	8.8	32	40.0	41	51.3
Improved processing implement	33	41.3	33	41.3	14	17.5
Time spent on processing	65	81.3	9	11.3	6	7.5

Source: Field Survey, 2006

Test of Hypothesis

Results of Chi-Square tests showing relationship between some selected personal characteristics of the respondents and the problems faced in processing cassava

Result of Chi-square analysis showed that age (x^2=20.626 P>0.05) and religion (x^2=0.200 P>0.05) of the respondents were not significantly related with the problem faced in cassava processing .This implies that the problem encountered during processing is not created or increased by a person's age and religion therefore this could be due to the importance of cassava in Nigerian diets .However, sex (x^2=5.00 P<0.05), educational status (x^2=38.375, P<0.05) marital status (x^2=144.100, P<0.05) and occupation (x^2=77.304 P<0.05) showed significant relationship with problem faced in cassava processing. However, the result showed that processors encounter problems during processing because they are either male or females since some tasks are strenuous for females. For example, water expressing and some tasks are easy for males to do because they are considered women's task. Also men do not have time for processing because they still go in search of other work that could earn more income for the family but women are being involved in household chores and food processing. This finding also agrees with that of Ilevbaoje (2002) that both men and women spend about an average of 8 hours working on the field but women, on the other hand, under-take other activities.

Educational status showed positive significant relationship. Education increases exposure to useful information and this will likely enhance their level of knowledge and adoption of improved processing techniques that makes processing easier.

Marital status was found to be significant. The implication is that married respondent will have access to family labour and thus reducing the labour related constraints in cassava processing. It is clear that the number of families that rely on cassava as major source of carbohydrate in Africa is considerably high.

Table 7: Chi-square analysis of cassava processors' personal characteristics and problem faced during processing

Personal Characteristics	X^2 value	df	p-value	Remark
Age	20.625	34	0.966	Not significant
Sex	5.000	1	0.025	Significant
Educational	38.375	4	0.000	Significant
Marital Status	144.100	3	0.000	Significant
Religion	.200	1	0.655	Not Significant
Occupation	77.304	3	0.000	Significant
Transportation from processing Site	63.519	2	0.000	Significant

Source: Field Survey, 2006

Result of T-test for cassava processing activities

Table 8 showed significant difference (t – test = -4.269; $p < 0.05$) in processing activities of cassava between males and females. The data also revealed that there was a significant difference between the mean scores of females X= 8.3673 and males X=6.6333. It implies that the processing activities which females performed were different from that of males.

Table 8: Results of T- tests showing differences in cassava processing activities by gender

Activities	Sex	N	Mean	Standard Deviation
Processing Activities	Male	40	6.6333	1.5196
	Female	40	8.3673	1.8785
t- test for Equality of Means				
	t	df	p-value (2- tailed)	
Use of Equal Variances Not assumed	-4.492	71.17	0.000	

Source Field Survey, 2006

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it is evident that more females participate in cassava processing and whenever males are involved, they play complementary roles. Cassava granules (Gari), cassava paste (fufu) and cassava flakes (lafun) were the common products into which cassava is processed into with *gari* being the most common amongst the products. Information on processing was obtained mostly from other processors while the fresh tubers were sourced from personal farms and family farms. Water expressing was the only task in which males' outnumbered females.

Inadequate capital and storage facility, cost of labour, lack of improved processing equipments and time spent on processing were problems faced by processors at varying degrees of either serious or mild. However, transporting of cassava was not a problem to processors. This could possibly be due to nearness of the farms to processing sites. It is therefore recommended that agricultural extension agencies should intensify efforts in disseminating improved processing technologies to processors especially women so as to reduce problems faced during the processing.

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Profit Efficiency among Cocoyam Producers in Osun State, Nigeria

Ogunniyi, L .T
Department of Agricultural Economics and Rural Development,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria
e- mail: titiogunniyi@yahoo.com

Abstract: This paper employs a translog stochastic frontier model to examine the profit efficiency of cocoyam production in Osun State, Nigeria. Farm-level data were collected from a sample of 120 cocoyam farmers. The average profit efficiency level was 12 percent. The result from the translog frontier profit function shows that corm and dummy variable for soil are important factors explaining changes in profit. The result also shows that family size, farm size, mulch and credit contribute negatively to loss of profit while farming experience tends to increase loss of profit. Loss of profit in cocoyam production can be reduced significantly by increasing farm size, using of mulch and having better access to credit.

Keywords: cocoyam; profit efficiency; stochastic frontier function;

INTRODUCTION

Cocoyam, Taro (*Colocasia esculenta*) is one of the most important crops in Nigeria. It has been reported to be the third most important staple root / tuber crop after yam and cassava in Nigeria, second to cassava in Cameroon and first in Ghana (Knipscheer and Wilson, 2000; Echebiri, 2004). In term of volume of production, Nigeria is the largest producer in the world, accounting for about 40% of the total production (Onwueme, 1978; Eze and Okorji, 2003). However, Onwueme (1991) noted that the global average yield is only about 6000kg/ha. It is the most widely cultivated crop in both western and eastern region of the country in terms of area devoted to it and number of farmers growing it. Indeed, almost every household grow it. Farmers need to be more efficient in their production activities, but also to be responsive to market indicators, so that scarce resources are utilized efficiently to increase productivity as well as profitability, and ensure supply to the urban market. Therefore, the principal solution to increasing food production lies in raising the productivity of land by closing the existing yields gaps and developing varieties with higher yield potential.

Cocoyam is important, not only as food crops but even more as a major source of income for rural households. In Nigeria, cocoyam is mostly produced in the eastern region e.g. Imo-state and western region e.g. Osun State. Cocoyam is composed of 70-80% water, 20 – 25% starch and 1.5- 3% Protein and significant amount of vitamins and its protein content is very high compared with that of other tropical tuber crops (Onwueme, 1991).

As a food crop, cocoyam has some inherent characteristics, which makes it attractive, especially, to the producer in Nigeria. Firstly, it is rich in carbohydrates, especially starch and consequently has a multiplicity of end

uses. Secondly, it is available all the year-round, making it preferable to other, more resistant to drought, pest and diseases and it's tolerance of a variety of climatic and soil conditions on the farm. It is one of the recognised crops in Osun State. Apart from the tuber, other parts of the cocoyam plant are of domestic significance. For instance, the leaves and petioles, may be cooked and eaten as a vegetable, According to above state, taro is a valuable staple carbohydrate food, relatively easy and inexpensive to produce. It has become a staple food for most Nigerians, not only among rural people but also among the urban dwellers (Wilson, 1980).

Compared to grains, cocoyam is more tolerant in low soil fertility and more resistant to drought, pests and diseases. Furthermore, its roots are storable in the ground for months after they mature. Where cocoyam production system aim to produce human food, animal feed or industrial raw materials, yield is not the only objective. A further qualification of the earlier simple objective is that money is often the ultimate product which is required from the system through the sale of the crop materials. Profit from the system and an adequate return on investment are important considerations. Maximum yield may not be a sensible objective of the level of inputs required to produce high yields results in uneconomic returns. Efficiency in the use of financial resources in growing crops is an important factor. This can be expanded by emphasising the need to market the crops in such a way as to maximize returns (Harper, 1999). As noted by Zubair and Hunter (2000), the cultivation of cocoyam is not encouraging as the yield per hectare is still low. One of the reasons for the low yield may not be unconnected to dismal and little attention farmers give to cocoyam when compared with cassava and yam that are close substitute root/tuber crops. According to NRCRI (2003), the ignorance of the nutritive value and diversities of the food forms from cocoyam by a large percentage of the populace is a major limiting factor to general acceptability and extensive production of the crop.

For profit efficiency of cocoyam farmers to be increased, there is need for the qualitative extension services among farmers. Their performance and interest in this respect have to be raised. However, events of the past decade have shown that many Nigerian farmers neither perform well despite having access to extension services. Cocoyam farmers can be helped to obtain high yield through introduction of modern and effective farm technologies and improved varieties by the extension services, which bring about expected result to the farmer. The objective of the study therefore, was to examine the profit efficiency among cocoyam producers in Osun State, Nigeria, and identify the sources of loss of profit/loss among cocoyam farmers.

Concepts of Profit Efficiency

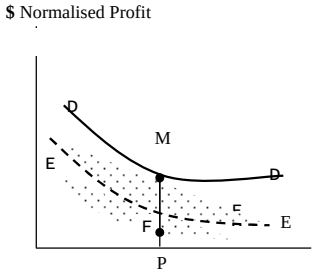
The question of how to measure efficiency has received considerable attention in economic literature. A profit function is an extension and formalization of the production decisions taken by a farmer. According to production theory, a farmer is assumed to choose a combination of variable inputs and outputs that maximize profit subject to technology constraint

(Sadoulet and De Janvry, 1995). Following the work of Farrell(1957), efficiency can be defined as the ability to produce a given level of output at lowest cost. The concept of efficiency has three components: technical, allocative and economic. Technical efficiency is defined as the ability to achieve a higher level of output, given similar levels of inputs. Allocative efficiency deals with the extent to which farmers make efficiency decisions by using inputs up to the level at which their marginal contribution to production value is equal to the factor cost. Technical and allocative efficiencies are components of economic efficiency (Abdulai and Huffman, 1998).

Lau and Yotopoulos (1971) and Yotopolous and Lau (1973) therefore popularized the use of the profit function approach, in which farm- specific prices and levels of fixed factors are incorporated in the analysis of efficiency. The advantage of using this approach is that input and output prices are treated as exogenous to farm household decision making, and they can be used to explain input use.

Adesina and Djato(1996) defined profit efficiency as the ability of a firm to achieve potential maximum profit, given the level of fixed factors and prices faced by the firm. Aigner *et al* (1977), however, showed that profit function models do not provided a numerical measurable of firm-specific efficiency and popularised the use of the translog production frontier approach. The stochastic frontier approach has gained popularity in firm- specific efficiency studies. Example of recent application includes (Ali and Flinn, 1989; Kumbhakar and Bhattacharyya, 1992; Ali *et al*, 1994).

Figure 1 shows the stochastic profit frontier function adopted from Ali and Flinn (1989).The stochastic profit frontier function is an extension of incorporating farm level prices and input use in the frontier production function. The incorporation of the farm specific level prices leads to the profit function approach formulation Ali and Flinn, 1989; Wang *et al*, 1996). A production approach to measure efficiency may not be appropriate when farmers face different prices and have different factor endowment (Ali and Flinn, 1989). Hence the use of stochastic profit functions to estimate farm specific efficiency directly (Ali and Flinn, 1989; Ali *et al*, 1994; Wang *et al*, 1996). The profit function approach combines the concepts of technical, allocative and scale inefficiency in the profit relationships and any errors in the production decision translate into lower profits or revenue for the producer (Rahman, 2003). Profit efficiency is defined as the ability of a farm to achieve highest possible profit given the prices and levels of fixed factors of that farm and profit inefficiency in this context is defined as the loss of profit from not operating on the frontier (Ali and Flinn, 1989).



Normalized input price given fixed resources P_i/Z_j

Source: Ali and Flinn, 1989

Figure 1: Frontier MLE and OLS Stochastic Profit Function

In the context of frontier literature, DD in figure 2 represents profit frontier of farms in the industry (the best practice firm in the industry with the given technology). EE is the average response function (profit function) that does not take into account the farm specific inefficiencies. All farms that fall below DD are not attaining optimal profit given the prevailing input and output prices in the product and the input markets. They are producing at allocativelly inefficient point F in relation to M in Figure 1. Profit inefficiency is defined as profit loss of not operating on the frontier. In Figure 1, a firm operating at F, is not efficient and its profit inefficiency is measured as FP/MP (Ali and Flinn, 1989; Sadoulet and De Janvry, 1995).

In agriculture, a farmer has to pay attention to relative prices of the inputs such that the production is undertaken at the point where the isoquant is tangent to isocost line. If that is not done, economic efficiency is not achieved. The farmer may be able to achieve technical efficiency but not allocative efficiency. This inefficiency could arise from a number of sources, which include access to appropriate information in a timely manner or lack of skills to take advantage of modern agricultural inputs. Basically, what is being referred to here is the managerial ability of the farmer. The farmer should be able to make decisions that lead to optimal utilization of resources and this requires accurate information on availability of the new varieties, the inputs, and access to markets

METHODOLOGY

The study was carried out in Osun State of Nigeria. The state is one of the 36 states in Nigeria. It is located in the southwestern part of the country. The state has a land area of 8802 square kilometres and a population of 3,423,535 (NPC, 2006). The state is agrarian and well suited for the production of permanent crops such as cocoa and oil palm and arable crops (maize, yam, cassava and cocoyam) because of favourable climatic conditions. The annual rainfall is between 1000mm and 1500mm with daily temperature of about 30^0C. The people live mostly in organized settlements, towns and cities.

The data for this study were primary data collected from 120 cocoyam farmers selected from Atakumosa East and Atakumosa West Local Government Areas (LGAs) of Osun State, Nigeria. The sampling procedure used was multistage sampling technique. The first stage involved a purposively sampling of the two LGA based on the population of the cocoyam farmers and size. The second stage involved a simple random selection of 60 respondents from each LGA. Data were collected with the use of a structured questionnaire designed to collect information on the output, inputs, prices of outputs and inputs and some socio-economic characteristics of the farmers in the study area (education, experience and family size).

Descriptive statistics (mean, minimum and maximum) and stochastic frontier profit function were used to analyze the socio-economic characteristics and profit efficiency respectively.

The implicit general from of the translog profit frontier is defined as:

π = f (p_1, p_2, p_3, z_1, D) exp ej …….. (1)

Where

π = normalized profit (#) defined as gross revenue less variable cost, divided by price of output (p_y).

P_1, normalised price of mulch (#) computed as total expenditure on much divided by price of output (p_y)

P_2, normalised wage of labour as total expenditure of labour divided by price of output (p_y)

P_3, normalised price of corm (#) as total expenditure on corm divided by price of output (p_y)

Z_1 depreciated charges on farm implements

D soil dummy (D = 1 for fertile soil and 0 for problem soils)

Ej error term defined as v-u …….. (2)

The model specified as equation (i) was first estimated using ordinary least squares (OLS) techniques. The estimates of the partial regression coefficients, and σ^2 were used as starting values for the maximum likelihood estimation (MLE) of the model.

The profit efficiency of the j^{th} farm is given by exp (-uj) or profit inefficiency by exp (1-exp (-uj).

Profit loss due to inefficiency was then calculated as maximum profit at farm – specific prices, fixed factors, and soil dummies multiplied by farm- specific profit inefficiency. Profit loss is defined as the amount that has been lost due to inefficiency in production given prices and fixed factor endowments and is calculated by multiplying maximum profit by (1-Pe)

Maximum profit per hectare is computed by dividing the actual profit per hectare of individual farms by its efficiency score.

PL = maximum profit (1-PE)

Where PL =Profit loss

PE = profit efficiency.

To identify factors associated with profit loss, ordinary least squares (OLS) multiple regression model was estimated.

PL =f (Z_1, Z_2, Z_3, Z_4, Z_5, Z_6, Z_7,e)

Where Z_1 is the years of schooling;Z_2 is the years of farming experience; Z_3 is the family size; Z_4 is the total area of land (ha); Z_5 is the family labour used (mandays); Z_6 is mulch used (kg); Z_7 is credit use (dummy variable 1 for own capital, 0 for borrowed capital); and e is error term.

A linear function, using profit loss as the dependent variable, was estimated to determine the significance of these factors to profit inefficiency.

RESULTS AND DISCUSSION

Estimation of Profit Function

The OLS and MLS estimates of Equation (1) on a per hectare basis are presented in Table 1. The estimated partial regression coefficients is similar between the OLS and MLE models, as expected, the intercept is higher and standard errors are lower for the MLE estimates. The result of the analysis shows that corm and dummy variable for soil were statistically significant at 1%. This indicates that corm is an important factor explaining changes in profit. Also the dummy variable has an

inverse relationship with profit implying that the more the use of good soils the lesser the profit.

The estimated sigma- squared (σ^2) is significantly different from zero at the 5% level. This indicates a good fit and the correctness of the specified distributional assumptions of the composite error term. The observed significance of σ^2 at the 5% level conforms to (Hjalmarson *et al*, 1996; Sharma *et al*, 1999; Rahman, 2003). This suggests that conventional production function is not an adequate representation of the data. Moreover, the estimate of gamma (γ), which is the ratio of the variance of farm-specific profit efficiency to the total variance of profit, is 0.948. This means that more than 94.8% of the variation in profit among the farms is due to differences in profit efficiency.

Table 1: OLS and Maximum Likelihood Estimate of Profit Frontier Function.

Variables	OLS	MLS
Constant	2398.23(839.42)	2402.56(840.69)
Ln P_1	-1.38 (-0.45)	-1.67(-0.74)
Ln P_2	-0.044(-0.031)	-1.48 (-1.22)
Ln P_3	7.86(3.03)*	8.68(4.26)*
Ln Z_1	-11.62(-1.26)	-4.92(-0.53)
D	-203.52(-7.44)*	-224.57(8.38)*
½ Ln P_1^2	0.54(3.04)*	0.411(2.94)*
½ Ln P_2^2	-0.042(-0.81)	0.0054(0.11)
½ Ln P_3^3	0.064(0.26)	-0.018(-0.084)
½ Ln z_1^2	1.04(1.59)	0.54(0.99)
½ D	1.83(1.60)	1.18(1.30)
Ln P_1 LnP_2	-0.039(-0.21)	0.029(0.21)
Ln P_1 LnP_3	-0.048(-0.17)	-0.089(-0.37)
Ln P_1 LnZ_1	-0.15(-0.38)	-0.031(-0.11)
Ln P_1 D	-1.19(-1.91)**	-0.74(-1.50)
Ln P_2 LnZ_3	0.073(0.43)	0.060(0.44)
Ln P_2 LnZ_1	0.029(0.20)	0.14(1.10)
Ln P_2 D	0.058(0.40)	0.066(0.59)
Ln P_3 LnZ_1	-1.01(-3.37)**	-1.05(-3.53)*
Ln P_3 D	0.028(0.80)	0.38(1.44)
Ln Z_1 D	-0.48(-1.03)	-0.70(-1.69)***
Log likelihood	-414.60	-405.00
σ^2		344.17(2.08)**
R^2	0.700	

Source: Data analysis, 2007

Figure in parentheses are the t – value
* Estimates are significant at 1% level of significance
** Estimates are significant at 5% level of significance
*** Estimates are significant at 10% level of significance

Profit Efficiency

The distribution of profit efficiency of cocoyam production is presented in Table 2. The profit efficiency ranged between 0.000187 and 0.429 with an average of 0.12. The average profit efficiency score of 0.12 implies that the average farm producing cocoyam could increase profits by 88% by improving their technical and allocative efficiency. Farmers exhibit a wide range of profit inefficiency ranging from 57.1% to 99.9%. Ohajianya (2005) reported mean profit efficiency level of 0.32 for cocoyam producers in Nigeria. Rahman (2003) reported mean profit efficiency level of 0.77 for Bangladesh rice farmers. The Table also shows that majority (35%) of the respondents have profit efficiency less than 0.05 while just 2.5% had between 0.36 and 0.45 profit efficiency.

Table 2: Frequency Distribution of Profit Efficiency for Cocoyam Farmers in the Study Area

Profit Efficiency	Frequency	Percentage
<0.05	42	35.0
0.06-0.15	41	34.2
0.16-0.25	20	16.7
0.26-0.35	14	11.7
0.36-0.45	3	2.5
Mean	0.120	
Minimum	0.000187	
Maximum	0.429	

Source: Field survey, 2007

Frequency Distribution of Profit Loss

Estimation of profit-loss given prices and fixed factor endowments revealed that

cocoyam farmers are losing to the tune of N71,738.98k, which could be recovered by eliminating technical and allocative inefficiency. Majority of the respondents (33.3%) showed a profit loss of more than N 60,000 while 25% had profit loss of between 0 and N10,000. The largest farm- specific profit loss was N271,568.94k (Table3)

Table 3: Frequency Distribution of Profit Loss by Cocoyam Farmers in the Study Area.

Range of profit-loss (N / ha)	Frequency	Percentage
0-10,000	30	25.0
10001-20,000	21	17.5
20001-30,000	12	10.0
30001-40,000	7	5.8
40001-50,000	8	6.7
50001-60,000	2	1.7
> 60000	40	33.3
Mean	71738.98	
Minimum	44.99	
Maximum	271,568.94	

Source: Field survey, 2007

Determinants of Profit Loss

The OLS estimates of the relationship between loss of profit and farm household characteristics is presented in Table 4. The result showed that there is a significant and negative relationship between experience and loss of profit. This implies that cocoyam farmers with more years of experience exhibited significantly more loss of profit than farmers with less years of experience. Farmers with more family size exhibited significantly less loss of profit than farmers with less family size. Large farms did not exhibit a significantly higher profit loss than smaller farms, a finding consistent with those of (Saleem, 1978; Bravo, 1984; Ohajinya, 2005). Farmers who used mulch experienced significantly less loss of profit than farmers who did not use mulch. Credit non availability contributed significantly to higher loss of profit among cocoyam farmers.

Table 4: Determinants of Profit Loss by Cocoyam Farmers in the Study Area

Variables	Coefficients	t-ratio
Constant	19951-695	1.234
Education	-3369.830	-0.959
Experience	-555.706	-2.269**
Family size	2795.934	2.126**
Farm size	32649.081	11.836*
Labour	2.577	0.346
Mulch	38063.789	5.224*
Credit	20117.7	2.975*
R^2	0.918	
F-value	180.248*	

Source: Result from data analysis, 2007.

* Estimates are significant at 1% level of significance

** Estimates are significant at 5% level of significance

CONCLUSION AND RECOMMENDATION

The study results from the regression analysis showed that the major variables affecting loss of profit were experience, family size, farm size, mulch and credit availability. Years of experience has a negative influence on loss of profits. The study results also showed that the majority of cocoyam farmers were not operating on the profit frontier, given the technology and that there was potential to do so by eliminating the observed inefficiencies. Loss of profit in cocoyam production can be reduced significantly by increasing farm size, using of mulch and having better access to credit. Also, measures to promote effective soil fertility management will improve efficiency.

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The Roles of Youths in Maize Production in Surulere Local Government Area, Oyo State, Nigeria

*Oladipo, F.O., Ayandiji, A. and *Akande, M.

*Department of Agricultural Extension and Rural Development, Faculty Agriculture, University of Ilorin, Kwara State

Department of Agricultural Economic and Extension, Faculty Agriculture, Bowen University, Iwo, Osun State

e-mail: banji22aug@yahoo.com

Abstract: Maize (zea mays), is one of the oldest and widely cultivated cereals in the world. It provides food for man and livestock. The roles performed by the youths in maize production in Surulere Local Government Area, Oyo State, Nigeria cannot be overemphasized. Random sampling method was used in choosing five villages used from which 120 youths as respondents, and structural interview schedule was used. Data analysis was done with descriptive statistical tools and the hypotheses were tested with the Person Moment Correlation. The study revealed that, 83.3% of the selected youths were male and 17.5% have no formal education, 65% were single. Age and level of education were not significant to participation in land preparation while gender is negative. Also, youths engaged in post-harvest activities (such as milling, drying, processing e.t.c) in the study area. It is recommended that education and training, financial support, and extension package should be provided for the youths to boost maize production.

Keywords: Roles, Youths, maize production.

INTRODUCTION

Maize (Zea mays) is one of the oldest and widely cultivated cereals. It provides food for man and feed for livestock. In many parts of West Africa, it is a staple food and is sometimes grown on a garden scale where it cannot be grown as a farm crop. It is an important source of carbohydrate and if eaten in the immature state, provides useful quantities of Vitamin C. The yellow grain varieties also contain Vitamin A (FAO, 1990). Maize thrives best in a warm climate and is now grown in most of the countries that have suitable climatic conditions. Its growth depends more on a high mean temperature. It will ripen in a short hot summer can will withstand extreme heat. A large amount of water is needed during the growth of maize. Its average maturing period is relatively short and this makes it possible to grow at fairly high latitudes. Maize, or corn, is one of the main staples of West Africa. It originated in the American continent, probably in Guatamala or Mexico. Maize is an important food crop grown in much of Nigeria, Ghana and to a lesser extent in Sierra Leone. It can be grown in areas with a rainfall higher than 760mm a year. In drier area guinea corn is grown instead of maize (Komolafe *et al*, 1981).

Nigeria population was 131, 839,73 in July 2006 (National Population commission,

2006), with a land area of 923.8 sq km in 2005. World development indicators in 1990, Nigeria had 43% of its population working in agriculture. In 1977-79, the population of youths aged 15-17 totalled 12.4 the 15years old were more likely to work in agriculture, particularly male youths (Education Statistics, 1999).

The word Youth is mostly used to refer to a person who is neither an adult nor a child, but, somewhere in between. This is scientifically referred to as an adolescent and in most English speaking countries or commonly referred to as a teen or teenager (Wikipedia, 2006). Arokoyo *et al* (1992), consider youth as people who have the age maturity but have not yet acquired the full right and duties of adult life. Youth have some potentials which needs to be tapped for economic growth and their role in economic development may have been neglected, and problems of using primitive tools in land clearing, weeding and inadequate fertilizer to improve soil fertility, pests attack on storage crops which leads to lost of large quantities of farm produce and reduction in quality which constitute a great danger to food security.

Objectives of the Study

The general objective of the study is to examine the roles played by the youths in maize production in the study area. The specific objectives are to;

i. determine the demographic characteristics of the youth in the study area;
ii. ascertain the specific roles that youth play in executing the cultural practices involved in maize production.
iii. ascertain post-harvest handling activities used by youth in the area.

Hypothesis of the Study

H_0: A significant relationship does not exist between the selected demographic characteristics of the youths (Age, gender and level of Education) and their involvement in maize production.

H_1: A significant relationship exists between the selected demographic characteristics of the youth (Age, gender and level of Education) and their involvement in maize production.

METHODOLOGY

A purposive sampling method was used to select five villages as the sample, these includes; Iresa-Apa, Iresa-Adu, Arolu, Oko and Iranhin. 120 youth were purposely sampled in the study area.

The major method used for data collection was the use of questionnaire and complimented with an interview. This was done to guide some of the respondents with little or no education. Descriptive statistics such as frequency counts, percentages were used for demographic characteristics and the Pearson Product Moment Correlation was used for testing the hypothesis.

RESULT AND DISCUSSION

Table 1 revealed that, 8.3% of the respondents were less than 15 years, 35.8% between 15-20 years, 35.0% were between 20-25years while 20.8% of the respondents fall between 25-30years. This showed that, most of the respondents fall between the ages of 15-20 years; these youth are less cautions of undertaking new risks thus implore and adopt new methods in order to enhance their economic

position. 83.3% of the respondents are male while 16.7% are female. That means, male are more involved in maize production than female in the area, this is due to the fact that male are more involved in farming.

Table 1 also shows that 60.0% were Christians, 26.7% were Muslims and 9.2% belong to traditional religion. This is due to the fact that, both Christianity and Islamic are the common religions in Nigeria .It was shown in Table 1 that, 65.8% of the youths were single, 25.8% were married and 8.3% divorced. The bulk of the youths were still single, this may be due to the fact that, they still depend on their parents in one way or the other because, they were not mature enough to be on their own. While 8.3% who were divorced may be due to their early marriage or as a result of pre-marital sex, which result in pregnancy when they were not ready to have a home.

It was also found out that 17.5% have no formal education, 7.5% made it up to primary level, 41.7% had post-primary education while 33.3% acquired higher level of education. This findings supports (Torimiro, 1995) that majority of rural youths are literate.

Table 1. Distributions based on respondents demographic characteristics

Age	**Frequency**	**Percent**
Less than 15years	10	8.3
15 – 20 years	43	35.8
20 – 25 years	42	35.0
25 – 30 years	25	20.8
Gender		
Male	100	83.3
Female	20	16.7
Religion		
Christianity	72	60.0
Islam	32	26.0
Traditionalist	11	9.2
No response	5	4.2
Marital Status		
Single	79	65.8
Married	31	25.8
Divorced	10	8.3
Educational Level		
No formal Education	21	17.5
Primary Education	9	7.5
Secondary Education	50	41.7
Tertiary Institution	40	33.3
Total	120	100.0

Table 2 shows that, 50.9% agreed that, tractor is available for land clearing, while 49.2% disagreed. Also, 96.7% agreed that, hoe and cutlass are used in land clearing 2.5% undecided. Moreover, 83.3% agreed that, they are personally involved in clearing the land, and 18.3% disagreed. This implies that, hoe and cutlass are more used in clearing the land and that, youths are also personally involved in land clearing.

Table 2. Distributions based on land clearing

	SA F (P)	**A F (P)**	**U F (P)**	**SD F (P)**	**D F (P)**
Tractor is available for land clearing.	29 (24.2)	32 (26.7)	-	29 (24.2)	30 (25.0)
Hoe and cutlass are used in land clearing.	72 (60.0)	44 (36.7)	1 (.8)	1 (.8)	2 (1.7)
You are personally involved in land clearing.	63 (52.5)	37 (30.8)	2 (1.7)	15 (12.5)	3 (2.5)
Labour is hired in land clearing.	39 (32.5)	56 (46.7)	3 (3.5)	6 (5.0)	16 (13.5)

Table 3 below revealed that, 87.5% agreed that, youth involved themselves in maize planting and 79.2% were against the use of machine in maize planting, that means, youth also partake in maize planting.

Table 3. Distributions based on maize planting

	Yes Frequency	Percent	No Frequency	Percent
Youth make use of machine in planting your maize	21	17.5	95	79.2
Labour is employed in maize planting.	78	65.0	38	31.7
Youths involve themselves in maize planting.	105	87.5	11	9.2

In Table 4 below, it is observed that 79.2% agreed that, chemical is used in controlling weed, 17.5% disagreed. Also, 90.8% were in support that, hoe and cutlass are used in controlling weed, while 6.6% disagreed. More so, 81.7% agreed that, labour is hired during weed control and 13.3% disagreed.

Table 4. Distributions based on weed control by the respondents

	SA F (P)	A F (P)	U F (P)	SD F (P)	D F (P)
Chemical is used in controlling weed.	53 (44.2)	42 (35.0)	1 (.8)	13 (10.8)	8 (6.7)
Youth make use of hoe and cutlass in controlling weed.	76 (63.3)	33 (27.5)	1 (.8)	4 (3.3)	4 (3.3)
Labour is hired during weed control.	54 (45.0)	44 (36.7)	5 (4.2)	9 (7.5)	7 (5.8)

From Table 5, it is shown that 88.3% agreed that, chemical is used in controlling pest and disease and 89.2% supported that, matured maize on time are used to control pest and disease. This implies that, chemical and prompt harvesting of maize are used to control pest and disease in the study area.

Table 5. Distributions based on Pest and Disease Management

	SA F (P)	A F (P)	U F (P)	SD F (P)	D F (P)
Chemical is used in controlling pest and disease	66 (55.0)	40 (33.3)	3 (2.5)	9 (7.5)	1 (.8)
Resistance variety is planted to reduce pest and disease.	52 (43.3)	35 (29.2)	2 (1.7)	23 (19.2)	7 (5.8)
Matured maize is harvested on time to avoid invasion of pest and disease.	77 (94.2)	30 (25.0)	4 (3.3)	4 (3.3)	3 (2.5)

Table 6 revealed that, 80.8% of the respondents agreed that, their village tradition permits them to own land. While 15.8% disagreed, 71.7% owned a piece of land for farming, 16.0% did not, and 33.3% work on their father's farm and 6.7% on rentage. This findings show that youth in the study area owns a piece of land for farming and thereby contribute to maize production in the area. In relation to this, Jibowo (1992) stated that, in Southwest Nigeria, the father gives a small portion of land to the son to practice his own independent farming during his spare time.

Table 6: Result of correlation analysis

	Land Clearing	Maize Planting	Acquisition of Land
Age	r = -.109 P = .237	r = .163 P = .080	r = -.009 P = .314
Gender	r=.275** P = .002	r = .164 P = .079	r = .022 P = .822
Level of Education	r = .157 P = .086	r=.305** P = .001	r = .024 P =.811

** = significant

Table 7 revealed that, majority of the respondents performed post-harvest handling activities such as storage, milling, drying and processing. This is because youth in the study area were industrious and major work force who carried out the major activities in the study area.

Table 7. Distributions based on post-harvest activities used

Post-harvest activities	youth	Percentage
Storage	100	83.3
Drying	89	74.1
Processing	110	91.6
Shelling	90	75
Milling	95	79.1

Multiple responses

Hypothesis of the Study

The hypothesis of the study, stated in null form, is as given below;

H_0: A significant relationship does not exist between the selected demographic characteristics of the youths (Age, gender and level of Education) and their involvement in maize production.

The hypothesis testing was pursued between some selected characteristics of the respondents and their level of involvement in maize production. Involvement in maize production was measured via the activities of maize production enterprise in which the respondents are involved in. Pearson's correlation was used to measure association between the variables. Fasina (2004) used Pearson's Moment Correlation in measuring the participation of children in Agriculture.

1. Age of respondents being personally involved in land clearing and acquisition of land was observed to be negatively correlated but not significant, which means that, the older the youth the less they involve in those activities and may prefer to make use of hired labour. But, positive correlation was observed in maize planting. It means that, the older the youths, the more they involve in maize planting.
2. Gender of respondents to land clearing was observed to be positively correlated and significant. The reasons for this may be due to the fact that, land clearing is tedious and more energy involved and that is why male are more involved in maize farming than female. Also, male youths are agile and energetic, have strength than female and can do some of the works that their female counterparts may not be able to do.
3. Level of education of the respondents to maize planting was observed to be negatively correlated but significant. This means that, the higher the level of education of the respondents, the less they are involved in maize planting. This can be adduced to the exposure and level of civilization of the respondents might have changed their orientation and see farming as a dirty job. They may also feel superior and themselves as not be in the same category with those who are not educated.

Null hypothesis is rejected and alternative accepted. Sex and level of education were significant to the involvement of youth in maize production in the study area, while age is not significant. This is in agreement with Pur *et al* (2007) that age was not an influencing factor in participating in agricultural activities.

CONCLUSION AND RECOMMENDATION

Based on the findings of the study, youth played a prominent role in maize production. The age distribution indicated that they were energetic, agile and within the economically active range that favours agricultural production. However, majority of the respondents engage in land clearing, planting, weed, and pest management. The result also revealed that sex and education have positive correlation while age has negative correlation to maize production. Also the youth were involved in post harvest operation.

Based on the findings of the study, the following recommendations were made:

1. There is need for extension and educational departments to work together in providing the youth with education and training to support their role in maize production.
2. Extension package on weeds and pests control should be made to reduce the amount spent on weeds and pests control.
3. Government should provide the youth with financial assistance to assist them in post harvest operation.

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Evaluation of the Operational Performance of the Nigerian Agricultural Credit Cooperative and Rural Development Bank (NACRDB) in South-Western Nigeria

*Olagunju, F. I. and **R. Adeyemo

* Department of Agricultural Economics and Rural Development,

Ladoke Akintola University of Technology, Ogbomoso, Nigeria

** Department of Agricultural Economics, Obafemi Awolowo University, OAU, Ile Ife.

e-mail: olagunju.fi@lautechaee-edu.com

Abstract: This study examined the performance of small-scale farmers in Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), in terms of repayment in Oyo and Ondo States. A multistage sampling procedure was used to select 300 respondents using both primary and secondary data to accomplish the objectives. The Tobit regression results on loan repayment of Log-likelihood function (-17.99385) showed that farm experience, farm location, cost of obtaining loan, visitation, borrowing frequency and education with normalized coefficients of –0.0285, -0.0661, -0.1196E^{-04} 0.1048, 0.0518 and 0.0112 respectively were very important factors in determining the repayment performance of the beneficiaries in the institution. The study showed that the institutions considered were characterised by untimely delivery of loan owing to complicated, cumbersome and time-consuming procedures in loan processing/approval decision. The decomposition of repayment elasticities employed in this study indicated that the elasticity of value of loan repaid in good times was more than the elasticity of probability of repayment since the amount of loan size recovered has a long way to go in enhancing the lending capabilities of the institutions. The results of the study therefore provided a baseline data for policy formulation needed to facilitate accessibility of farmers to agricultural loans and enhance loan repayment performance.

Keywords: Tobit, Decomposition, Decision, NACRDB, Credit.

INTRODUCTION

In the less developed countries (LDCs), the role of agricultural credit is closely related to providing needed resources which farmers cannot source from their own available capital. In this regard, the provision of agricultural credit has become one of the most important government activities in the promotion of agricultural development in Nigeria. One of the reasons for the decline in the contributions of agriculture to the economy is lack of a formal national credit policy and paucity of credit institutions, which can assist farmers. Credit (capital) is viewed as more than just another resource such as labour, land, equipment and raw materials (Rahji, 2000). According to Shepherd (1979) credit determines access to all of the resources on which farmers depend. Consequently, provision of appropriate macroeconomic policies and enabling

institutional finance for agricultural development is capable of facilitating agricultural development with a view to enhancing the contribution of the sector in the generation of employment, income and foreign exchange (Olomola, 1997).

In 1999, the Nigerian Agricultural Cooperative Bank was merged with other Agricultural production facilitating banks like the People's Bank of Nigeria (PBN) and the risk assets of the Family Economic Advancement Programme (FEAP) to become an integrated banking system called the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB). It was to grant loans for agricultural production for the purposes of storage, distribution and marketing connected with such production to any state, group of states or any institution for on-lending to farmers, group of farmers or corporate body subject to the states or group of states or state institutions guaranteeing repayment of the loan. The major problems however facing these agricultural credit programmes, irrespective of the institution channel, are low credit recovery rates and patronage.

In the words of Armah and Park (1998) "unless substantial recoveries are made from overdue debts, not only will lending institutions be unable to issue out more loans, there might also be difficulties in meeting legal obligations as they may become crystallized. They also contended that as repayment is the question in lending, the aim of financial assessment is to ensure that the prospects of repayment are high. For any financial organisation like NACRDB, the issue of survival is considered to be very important. For such to avoid liquidation, a component unit at each branch offices must remain afloat to realize some profit and must ensure sustainability, that is, for the institutions to remain in business, it has to cover not only its cost of operations but leave a margin of profit. Thus, in granting loans the financial institutions must ensure repayment; which is implicit in the credit worthiness of the intended beneficiaries.

No matter what the final objectives of credit institutions may be, it is basically the generation of concrete benefits to the borrowers, which make for the success or failure of the credit programmes. It is therefore essential that a full recognition and understanding of the borrower's point of view, interest and problems be considered in relation to the credit recovery of the institutions concerned. Hence, the need to look into the factors guiding the repayment performances of loan beneficiaries in relation to the volume of loan approved, disbursed and recovered by the credit institutions over a period of time.

The Tobit model specification

Tobin (1958) devised what became known as the Tobit (Tobin's probit) or censored normal regression model for situations in which y is observed for values greater than 0 but is not observed (that is censored) for values of zero or less. The standard Tobit model is defined as

$y_i^* = x_i\beta + \varepsilon_i$

$y_i = y_i^* \quad \text{if } y_i > 0$

$y_i = 0 \quad \text{if } y_i \leq 0$ ……. (1)

where y_i^* is the latent dependent variable, y_i is the observed dependent variable, x_i is the vector of the independent variables, β is the vector of

coefficients, and the ε_i 's are assumed to be independently normally distributed: $\varepsilon_i \sim N(0, \sigma^2)$ (and therefore $y_i \sim N(x_i\beta, \sigma^2)$). It should be noted that observed 0's on the dependent variable could mean either a "true" 0 or censored data. At least some of the observations must be censored data, or y_i would always equal y_i* and the true model would be linear regression, not Tobit. Maximum- likelihood estimation of the Tobit model is straightforward. Let *f* (.) and F(.) denote the density function and the cumulative density function for y*. Then the model implies that the probabilities of observing a non- zero y are *f* (y) and p(y* < 0) = F(0), respectively. The log–likelihood function for the model is therefore

$$InL = \left(\prod_{yi>0} f(yi) \prod_{yi=0} F(0)\right) = \sum_{yi>0} Inf(yi) + \sum_{yi=0} InF(0) \quad \text{……..…….. (2)}$$

because y* is normally distributed (as the ε's are normally distributed), *f* (.) and F (.), and therefore the log–likelihood function, can be re expressed in terms of the density function and the cumulative density function of the standard normal distribution, ϕ (.) and Φ (.), and the log-likelihood function can be written in the familiar form:

$$InL = \sum_{yi>0}\left(-In\sigma + In\phi\left(yi - xi\beta\right)\right) + \sum_{yi=0} In\left(1 - \Phi\left(\frac{xi\beta}{\sigma}\right)\right) \quad \text{...(3)}$$

Maximum likelihood estimation can then proceed in the usual fashion. To interpret the estimation results, the Marginal Effects (ME) of the independent variables on some conditional mean functions should be examined. In the familiar OLS model y = xβ + ε, there is only one conditional mean function, E (y) = xβ, and M E (y)/ $Mx_k = \beta_k$, where x_k is the k^{th} independent variable. This makes interpretation easy: β_k measures the marginal effect on y of the k^{th} independent variable. In the Tobit model, though, there are three different conditional means: those of the latent variable y*, the observed dependent variable y, and the uncensored observed dependent variable y / y > 0. Accordingly, interpretation depends on whether one is concerned with the marginal effect of x on y*, y, or y / y > 0. Once one determines which marginal effect one is interested in, one simply examines the marginal effects of x on the appropriate conditional expectations. The three marginal effect expressions are derived using standard results on moments of truncated/censored normal distributions (Green, 1997) as follows:

$$\frac{ME(y^*|x) = \beta}{Mx} \quad \text{…….. 4}$$

$$\frac{ME(y|x) = \Phi\beta}{Mx} \quad \text{…….. 5}$$

$$\frac{ME(y|y)\rangle ox}{Mx} \quad \text{…….. 6}$$

where

δ(α) = λ(α)(λ(α) – α), λ(α) = ↓(α)/(1- Φ (α)), and α = -(xβσ).

Equation (5) can be decomposed into two parts for ease of interpretation (McDonald and Moffit 1980). Roncek (1992) provides an example.

Clearly, only for the latent index y* can β be interpreted as the marginal effects of the independent variables. There can be cases in which the mean of the latent y* is of central

interest, but when the data are censored the mean of the observed y is usually of greater interest.

The cumulative normal distribution is viewed as a desirable transformation in this case since it relates a variable (number of standard deviations from the mean) which has a range from minus infinity to plus infinity to another variable (a probability) which has a range from zero to one. In this way, an unconstrained variable can be "transformed" into a new variable, which is bounded. To overcome these problems, studies by Rosett and Nelson (1975), McDonald and Moffit (1980), Norris and Batie (1987), have employed the Tobit model in one form or the other in their various studies. Gustafson, *et.al*. (1991) employed the Tobit analysis to investigate the decision process taken in credit evaluation of agricultural loan officers, while Siles *et.al*. (1994) employed the Tobit model to estimate the effect of socio-economic factors on the probability of loan approval. This model would be most appropriate in that according to Tobin (1958), Amemiya (1978), Akinola and Young (1985), the Tobit model assumes that the dependent variable has a number of its value clustered at a limiting value usually zero and uses all observations between those at the limit and those above the limit, to estimate a regression line. If no observations are available on the individual loan sizes then the sample is said to be truncated. This is to be preferred, in general, over alternative techniques that estimate a line only with the observations above the limit.

The Tobit model is therefore viewed as a hybrid of the discrete and continuous model, which will simultaneously analyse the borrower decision about whether or not to repay loan, and determines the quantity of the repaid loan size. The technique can be used to determine both changes in the probability of being above the limit and changes in the value of the dependent variable if it is already above the limit. This can be quantified for useful and insightful deductions (McDonald and Moffit, 1980).

METHODOLOGY

The study was conducted in Oyo and Ondo states in southwestern Nigeria. Southwestern Nigeria comprises of six states viz: Lagos, Ogun, Oyo, Osun, Ondo and Ekiti states. The study was conducted on the Nigerian Agricultural Cooperative and Rural Development Bank limited (NARCDB) being the national/apex agricultural credit institution in Nigeria. A multi- stage sampling technique was used to select the respondents. Firstly, Oyo and Ondo States were purposively selected because they had higher number of the banks' branches with high number of agricultural loan applicants. The lists of the applicants were collected from each of the state offices of Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), six branches were purposively chosen based on the concentration of the applicants. Finally, in the last stage, having found that the average number of applicants for each branch was 250 during the preliminary survey period, 10 percent of the number, that is, 25 applicants were randomly selected from each branch of the bank in the state. Since there are 6 bank branches in each state so there are 12 (twelve) branches in all. Twelve agricultural officers were interviewed for the purpose of the

study. Therefore 25 multiplied by 12 = 300 made up the sampling size for the beneficiaries.

The study made use of both primary and secondary data to accomplish the objectives. The data for this study contained the 2003/2004 production year. Two different sets of structured questionnaires were used in the collection of primary data. The first sets were directed at the Agricultural Officers of the banks in connection with the banks and beneficiaries. The second sets, were directed at the agricultural loan beneficiaries of the institutions. Secondary data were sourced from the bank's draft operating manual, official publications of CBN, such as statistical bulletin, published reports on Agricultural Credit and Banking and notes on Nigeria Agricultural Bank, Federal Office of Statistics Publications and International Financial Statistics published by the World Bank.

The conceptual model

To determine the effect of various explanatory factors on loan repayment as well as the extent of determining the loan size repaid, this study follows from Gustafson *et al* (1991), LaDue *et al* (1992) and Siles *et al* (1994). Loan repayment decisions are assumed to be based upon the strength of feeling of the i^{th} borrower to repay the loan. According to Gustafson *et al* (1991), agricultural officers are assumed to make loan repayment decision based upon an objective of utility maximization. If j represents various sizes of loan where j = 1 for the large amount of loan and j = 2 for the small amount of loan, then the non – observable and unavailable underlying utility function, which ranks the preference of the i^{th} borrower, is given by $\mu (M_{ji}, A_{ji})$. Thus the utility, derivable from the various sizes of loans repaid depends on M, which is a vector of farm and farmer– specific attributes of the loan beneficiary and A, which is a vector of attributes associated with the sizes of loan repaid. Although the utility function is unobserved, a linear relationship is postulated between the utility derivable from a j^{th} loan size and the vector of observed farm, farmer specific characteristics, X_i (e.g. farm size, age, gender, project type, experience of farmer), and the loan specific characteristic (e.g. small or medium, long term), project type specific characteristics (e.g. food crops, cash crops), institutional characteristics (e.g. extension contact), location specific characteristics (e.g. agro ecological zones) and a disturbance term having a zero mean, e_j: $\mu_{ji} = \beta_i X_i + e_{ji}$ $j = 1,2: i=1, \ldots,n$ ….(7)

and $X_i = F_i(M_i, A_i)$ ……(8)

Beneficiaries are assumed to repay a loan size that gives them the largest utility. Thus, equation (8) does not restrict the function F to linear, such that as the utilities μ_{ji} are random, the ith borrower will select the alternative

j = 1 if $\mu_{1i} > \mu_{2i}$ or if the unobservable (latent) random variable

$Y^* = \mu_{1i} - \mu_{2i} > 0$ ……..……..…(9)

Since the primary aim is to interpret the dependent variable in the model as the probability of making a choice, given information about X_i there is need to use some notion of probability as the basis of the transformation. This involves translating values of X_i, which may range over the entire real line, into a probability that ranges in value from 0 to

1. A monotonic transformation is also required since it is desirable that the transformation should maintain the property that increases in X_i are associated with increases (or decreases) in the dependent variable for all values of X_i. According to Pindyck and Rubinfeld (1997), the cumulative probability function provides a suitable transformation. This is defined as one having as its value the probability that an observed value of a variable X_i (for every X_i) will be less than or greater than the threshold value. Since all probabilities lie between 0 and 1, the range of the cumulative probability function is the (0, 1) interval.

Hence, the standard cumulative normal distribution of $X_i\beta$ is expressed as:

$$F(X_i\beta) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{Y_1} e^{\frac{-s^2}{2}}\, ds \qquad \ldots\ldots..(10)$$

Where, s = a random variable which is normally distributed with mean zero and unit variance. Thus, the probability that $Y_i = 1$ (i.e. that the lender approves a loan) is a function of the independent variables:

$P_i = P_r(Y_i = 1) = P_r(\mu_{1i} > \mu_{2i})$

$= P_r(\beta_1 X_i + e_{1i} > \beta_2 X_i + e_{2i})$

$= P_r[e_{1i} - e_{2i} > X_i(\beta_2 - \beta_1)]$

$= P_r(\mu_i > X_i\beta)$

Therefore, $P_i = P_r(Y_i = 1) = F_i(X_i\beta)$..... (11)

Where: P_r = a probability function, μ_i = a random disturbance term $(e_{1i} - e_{2i})$; $\mu i \sim N(0, \sigma^2 1)$. X = the n × k matrix of the explanatory variables, β = k × 1 vector of parameters to be estimated. $F(X_i\beta)$ = cumulative distribution function for μ_i evaluated at $X_i\beta$. Thus, the probability that a borrower will repay a certain loan size is a function of the vector of explanatory variables, the unknown parameters and the error term. However, equation (11) cannot be estimated directly without knowing the form of F. following Rahm and Huffman (1984), it is the distribution of μ_i that determines the distribution of F. therefore, if μ_i is normal, F will have a cumulative normal distribution.

The functional form of F (which is the decision component of the model) can be specified as a linear combination of observable explanatory variables as:

$$Y^*_i = \beta X_i + \mu_i \ldots\ldots\ldots\ldots\ldots(12)$$

This can be represented algebraically for the i^{th} borrower as:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_N X_N \ldots\ldots; \quad i = 1, 2, \ldots N$$

such that

$$Y_i = \begin{cases} 0 & if \;\; Y_i^* \le T \\ Y_i^* & if \;\; 0 < Y_i^* < 1; \\ 1 & if \;\; Y_i^* > T \end{cases} \qquad (i = 1, 2, \ldots, n)$$

$\ldots\ldots\ldots(13)$

where, Y_i = observed dependent variable e.g. the size of the loan repaid by the i^{th} borrower. Y^*_i = non- observable latent variable representing the continuous dependent variable when decision is made on the loan size. (e.g. loan repaid). T = non- observable threshold (cut- off) point, N = number of observations.

Since the disturbance term, μ_i, is a function of the independent variables, an attempt to estimate equation (13) using Ordinary Least Square (OLS) will result in biased and inconsistent estimates (Maddala, 1983). If Y^*_i is assumed to be normally distributed, then consistent estimates can be obtained by performing a Tobit estimation using an iterative Maximum Likelihood Algorithm (White, 1978).

The use of maximum likelihood estimation guarantees that the parameter estimates will be asymptotically efficient and the appropriate statistical tests can be performed. This means that all the parameter estimators are asymptotically normal, such that test of significance analogous to the regression t- test can be performed (Pindyck and Rubinfeld, 1997). The likelihood function is of the form:

$$L = \sum_{t=1}^{s} \log\left[1 - F(\sigma\ Y_t - I_t)\right] + \sum_{t=S+1}^{N} \log\ f(\sigma\ Y_t - I_t) \quad \ldots\ldots\ldots\ldots (14)$$

Where F_i and f are the cumulative normal distribution function of μ_i, and T is the critical (cut-off) value which translates $Y^*_{i>}$ T, as borrower repaid, and $Y^*_i \leq T$, as borrower refuse to pay. The Tobit model (Tobin, 1958) therefore measures not only the probability that a borrower will repay the loan but also the influence of the loan size if repaid. Thus, equation 13 is a simultaneous and stochastic decision model. If the non-observed latent variable Y^*_i is greater than T, the observed qualitative variable Y_i that indexes repayment becomes a continuous function of the explanatory variables and 0 otherwise (no repayment).

RESULTS AND DISCUSSION

Loan Disbursement, Repayment and Default

Some definite pattern on the proportion of loan repayment to loan disbursed is revealed from Table 1. Over the years, the amount repaid had been lower than the amount due for repayment with the rate ranging from 28.19 percent in 1999 to 78.02 percent in 2001. The decreasing rate of repayments by the beneficiaries over the years had made it impossible for the institution to meet the cash requirement for its borrowers, especially in some projects.

The study further revealed that out of the overall volume approved, about 2,216 were not disbursed. A number of varying reasons were adduced for this and these ranged from improper completion of application forms, unsatisfactory visitation/ inspection reports on proposed projects, inability to produce guarantors and relevant records as well as the failure of the applicant to return the appropriate satisfactory document as expected. In essence, the number of "non disbursement" accounted for 17.4 percent out of the overall approval made for the period under consideration.

The highest number of repaid loans (78 percent) was recorded in the year 2001 while the least repayment was recorded in 1999 with 28 percent (Table 3). This could be attributed to merger effects of the Nigerian Agricultural Cooperative Bank limited with other agricultural production facilitating banks like peoples' bank of Nigeria (PBN), integrated banking system of Nigerian Agricultural Credit and Rural Development Bank (NACRDB). The repayment performance index within the period 1996 – 2000 was low when compared with that of the period 2001-2006 (Table 2). This could be attributed to the fact that there was a lack of consistency in the growth performance of the agricultural sector in the period 1981-2000 with some evidence of unstable or fluctuating trends, probably due to policy instability and inconsistencies in policies and policy

implication. This probably reflects the declining trend in the Federal Government's investment priority in the agricultural sector.

Table 1. Volume of loan disbursement and repayment

Year	Amount repaid (N)	Amount due (N)	Repayment rate (%)
1996	3,020,218.00	5,893,496.00	51.25
1997	6,421, 033.00	10,540,958.28	60.92
1998	3,662,101.00	9,049,879.20	40.47
1999	680,314.00	2,413,281.40	28.19
2000	2,682,428.00	4,636,436.48	57.86
2001	9,998,279.00	12,815,756.00	78.02
2002	11,831, 468.00	15,312,133.40	77.27
2003	17,893,926.00	23,329,596.36	76.70
2004	21,812,603.00	29,246,390.96	74.58
2005	9,988,279.00	13,815,756.00	76.02
2006	8,998,279.00	11,815,756.00	75.02

Source: NACRDB'S Record, OYO & ONDO States.

LPI= Loan Repayment Index

The repayment performance index within the period 1996 – 2000 was low when compared with that of the period 2001-2006 (Table 2). This could be attributed to the fact that there was a lack of consistency in the growth performance of the agricultural sector in the period 1981-2000 with some evidence of unstable or fluctuating trends, probably due to policy instability and inconsistencies in policies and policy implication. This probably reflects the declining trend in the Federal Government's investment priority in the agricultural sector. The pattern of low repayment index (LRI) movement in the latter period was a reflection of government priority for agriculture and recent increase in public sector salaries thereby improving people's purchasing power. Following from this is the high demand for products and more importantly the degree of compliance of the banking system with the agricultural credit guidelines. The level of disbursement each year is regarded as a function of the preceding year's repayment performance of the beneficiaries as implicit in the recovery of loans by the bank (Table 2). The high default rate could also be attributed to the poor monitoring and supervision in the management structure. On the average, the agricultural credit assistants do visit the applicant's farms only once before the loan is given to them. The supervision and monitoring activities are either carried out randomly or never at all during the period of farming. It was discovered that there is little or no extension role being carried out. This could therefore result to diversion of loan into other things apart from agricultural activities for which it was meant.

TABLE 2. Summary of the NARCDB loans repayment performance (1996-2007)

Year	Loan Vol. Approved	Loan Vol. Disbursed	Amount Repaid	Amount Due	Outstanding Balance	BBR (1)	LRI (2)	BDR (3)	LDI (4)
1996	6,415,200	5,080,600	3,020,218	5,893,496	2,873,278	46.5	48.2	53.5	51.8
1997	10,804,690	9,087,033	6,421,033	10,540,958	4,119,252	48.8	53.1	61.2	56.9
1998	8,405,150	7,801,620	3,622,101	9,049,879	5,427,778	40.3	41.4	59.7	58.6
1999	4,608,600	2,080,415	680,314	2,413,281	1,732,967	42.2	43.8	57.8	56.2
2000	5,817,315	3,996,928	2,682,428	4,636,436	1,954,008	40.7	41.5	59.3	58.5
2001	12,733,640	1,048,066	9,998,279	12,815,756	2,817,477	53.9	54.8	46.1	45.2
2002	15,483,414	13,200,115	11,831,468	15,312,133	3,480,665	57.9	56.7	42.1	43.3
2003	22,941,731	20,111,721	17,893,926	29,329,596	5,435,670	63.6	64.8	36.4	35.2
2004	27,816,372	25,212,406	21,812,603	29,246,390	7,433,787	65.3	69.2	34.7	30.8
2005	23,941,731	20,111,721	17,893,926	29,329,596	5,435,670	65.6	68.8	35.4	34.2
2006	28,816,372	25,212,406	21,812,603	29,246,390	7,433,787	67.3	79.2	34.7	32.8

Source: Adapted From NACRDB Data, 2007
BRR= Borrower's Repayment Rate
BDR=Borrower's Default Rate
LDI= Loan Default Index

Nature of Repayment Problems

The delinquency and default problems observed among the beneficiaries can be evaluated in four categories. They are (i) borrower related causes; (ii) causes related to loan utilization; (iii) lender- related sources; and (iv) extraneous causes. The borrower- related causes include sickness such as infections; burden of other debts and family problems. The causes which are related to loan utilization are low sales; fall in product prices; low or poor yield; low product prices; low demand for product; perishable nature of product; pest attack and weather condition (especially inadequate or too much rainfall).

The lender- related causes are high interest rate and late disbursement of loans. Other critical but extraneous factors are fuel scarcity, poor transportation and communication system and high cost of transportation. One category of causes appears to be particularly troublesome judging by the high proportion of borrowers who attributed their inability to repay to it. This cause is associated with loan utilization. Table 3 showed that the poor transportation system in the rural areas which is a major impediment to produce marketing was regarded by 92 percent of the respondents as the cause of their inability to repay on schedule. The production related problems are poor yield, high incidence of pests and diseases and inclement weather. The unsatisfactory weather condition (especially inadequate or too much rainfall) is the most crucial production- related problems as indicated by 62 percent of the respondents. These factors need to be taken into consideration in fully understanding the effects of loan use on repayment performance in the rural financial system.

Table 3. Causes of Loan Repayment Problems among the Beneficiaries

Causes	% of Respondent*
Borrower-related	
Ill- health	32
Burden of some other debt	6
Family Problems	8
Lender- Related	
High interest rate	12
Late disbursement Lag	15
Loan use related	
Low sales	92
Fall in product prices	88
Poor yield	12
Low product prices	68
Perishable nature of products	3
High incidence of pest and diseases	4
Inclement of weather condition	62
Low demand for product	68
Extraneous factors	
Fuel Scarcity	56
Poor transportation system	92
High transportation cost	22

Source: Field Survey, 2005
*Multiple responses

Tobit Regression Results on Loan Repayment for NACRDB

Tobit regression estimates for NACRDB showed that the coefficient of the variables FRMZE, HHZE, DSBMT, FRMLOC, VISIT, and BRWFQCY were significant at 0.01, 0.05 and 0.10 levels while the coefficients the variables LOANVOL, EDUC, SEX, NFI and COBT were not significant (Table 4). All the coefficients of the significant variables have

positive signs except for the variables HHZE, and FRMLOC that exhibited negative signs. All the coefficients of the non-significant variables exhibited positive signs except FRMZE and COBT. The positive relationship of the coefficient of variable FRMEXP with loan repayment is in line with the *a priori* expectation. The primary determinants of a potential borrower's capabilities are experience in business and the quality of the financial information provided as far as the banks are concerned. Based on their exposure, it could be adjudged that they possess greater ability to predict possible problems and likely solutions that result in higher income.

The coefficient of the variable HHZE conformed to the *a priori* expectation that the burden imposed by a large family was likely to squeeze agricultural resources from which loan could be repaid. The implication of this is that borrowers with lower number of household members would meet their repayment obligation better than those with high number of household members. The *a priori* expectation in terms of disbursement lag was based on the essence of timeliness in agricultural production. Most agricultural activities are time bound and if production credit is delayed beyond the critical period of production, such a credit would no longer be relevant or at best sub - optimally utilized. This would invariably create condition precedent to default particularly when viewed from the perspective that even in the most extreme case of non - utilization of the loan; certain costs related to approval transaction would still have to be borne by the borrowers. The implication of this result is that loans that are timely disbursed are fully repaid as at when due.

The coefficient of the variable BRWFQCY conformed adequately to the *a priori* expectation. This variable was used as a proxy to measure whether a borrower was a regular or an irregular customer. The banks maintain a policy under other credit schemes wherein it is expected that a customer must have operated his account consistently for twelve months before eligible for a credit facility. The whole essence is to familiarize with the customer, under-study his character, consider his business acumen and managerial competence as well as acquaint with his various sources of income. The result from this study therefore indicates that a regular customer is more likely to meet his credit obligation than his irregular counterpart. The positive (non significant) sign exhibited by the coefficient of variable EDUC was as expected, that is, borrowers with higher level of education would have a better repayment performance on the basis of the fact that such farmers would readily respond to improved technologies and innovations that could enhance a better returns from farm investment. The non-significance of the variable's coefficient contradicts the assertion. A possible reason is that the institutions were not directly linked to any extension services agency such that the degree of exposure to improved techniques by borrowers were uniform and such, adoption decision by farmers were directly attributable to willingness. In essence, the result showed that the adoption of better farm management practices by the farmers was more of a chance phenomenon based on the best practices in the

farming locality with scant regard to the level of education of the borrowers.

Table 4. Tobit parameter estimates of loan repayment for NACRDB

Variable	Normalized Coefficients	Standard Error	Asymptotic t – ratio
Constant	0.7473	0.3521	2.1222
LOANVOL	$0.9127E^{-06}$	$0.1459E^{-0}$	0.625
EDUC	0.0112	0.0077	1.458
FRMZE	-0.0285	0.0244	-1.168*
FRMEXP	0.0091	0.0048	1.900*
HHZE	-0.0421	0.0213	-1.977**
SEX	0.0705	0.0761	0.926
NFI	$0.305E^{-05}$	$0.306E^{-05}$	0.996
DSBMT	0.1122	0.0671	1.673*
FRMLOC	-0.0661	-0.0173	-3.820***
COBT	$-0.1196E^{-04}$	$0.5114E^{-0}$	-0.234
VISIT	0.1048	0.0282	3.718***
BRWFQCY	0.0518	0.0234	2.214**

Source: Field Survey, 2007
*** Significant at 0.01 levels
** Significant at 0.05 levels
* Significant at 0.1 levels
Log - likelihood Function = -17.99385

The predicted probability of Y > Limit given average var. (i) = 0.483333
The observed frequency of Y > Limit = 0.2253
Mean square error = 0.719667
Standard error of estimate = 7.365

Decomposition of total elasticity change of the dependent variable

The decomposition of elasticity of the expected value of loan repayment for NACRDB in the study area is shown in Table 5. The computed elasticities from the model showed that marginal changes in various characteristics increase the expected value of repaid loan than it increases the probability for loan repayment. The volume of loan disbursed to borrowers LOANVOL is expected to increase the total elasticity by 53 percent decomposed into 24 percent increment for probability of loan repaid and 28 percent increment in the value of loan repaid. This implies that additional increase in the volume of loan given the beneficiary will increase the probability of repaying the loan by 24 percent while it will influence the value of the loan repaid by 28 percent. EDUC, FRMZE, and HHZE were estimated to have similar effects on the total repayment elasticities and its components. In each case, the total elasticities of -0.67, -1.29 and -0.16 respectively consist of –0.37, -0.82, -0.08 due to intensity of loan size repaid and -0.31, 0.15 and -0.71 attributable to elasticity of probability of loan repayment. This means that increase in the number of years spent in the school, hectares of land used, and the household will reduce the probability of repayment by 31 percent, 15 percent, and 71 percent respectively. The negative impact of education on repayment performance tends to confirm the viewpoint of Olomola, (1999) regarding the behaviour of educated individuals in terms of repayment of informal loans. According to him, educated individuals have better chances of securing white – collar jobs. The tendency to move from place to place in search of better job opportunities imply that they can be considered as bad credit risks by informal lenders. Moreover, their frequency of relocation also implies that they are unlikely to have reputation within the community that can make them attractive to lenders and even socio groups that are coming together for savings and credit purposes.

The total elasticity value of disbursement lag DSBMT is -3.37 decomposed into -1.84 and -1.53 for value of loan repaid and probability of loan repayment respectively. This result implied that a one percent increase in the disbursement lag would reduce the value of the

loan repaid by 1.8 percent and the probability of loan repayment by 1.5 percent. This is a reflection on the pattern of loan processing not in terms of procedures but the time it takes an applicant to collect the loan after submitting an application. Loan processing involves a number of stages over which the zonal officers have no control and which may involve procedures that can affect the DSBMT.

The decomposition of elasticity of the expected value of loan repayment for NACRDB in the study area is shown in Table 36. The computed elasticities from the model showed that marginal changes in various characteristics increase the expected value of loan repaid than it increases the probability for loan repayment. The volume of loan disbursed to borrowers FRMEXP is expected to increase the total elasticity by 30 percent decomposed into 9.6 percent increment for probability of loan repaid and 21 percent increment in the value of loan repaid. It is important to stress here that some dynamic incentives are associated with the banks' lending programme, which may affect the behaviour of individuals with experience of borrowing from the banks. For instance, the loan size of first-time borrowers is lower than that of borrowers who have been granted loans more than once. Theoretically, the repeated nature of the loan transactions and the threat to cut off any future lending when loans are not repaid may enhance efficiency.

TABLE 5. Decomposition of the elasticity of loan repayment for NACRDB

Variable	Elasticity of Probability of Loan Repayment	Value of Loan Repaid	Total Elasticity
LOANVOL	1.7373	3.7269	5.4643
EDUC	0.1189	0.2551	0.3739
FRMZE	-0.2078	-0.4457	-0.6534
FRMEXP	0.0969	0.2080**	0.3051
HHZE	-0.7400	-1.5900**	-2.3300
SEX	0.1324	0.2840	0.4164
NFI	0.1718	0.3683	0.5400
DSBMT	0.6900	1.4800*	2.1780
FRMLOC	-1.5900	-3.4300***	-5.0200
COBT	-0.1099	-0.2359*	-0.7597
VISIT	0.5199	1.1223***	1.6422
BRWFQCY	0.3196	0.7017**	1.0213

Source: Field Survey, 2005
****Significant at 0.01 level
**Significant at 0.05 level
* Significant at 0.1 level

SUMMARY AND CONCLUSION

Contrary to the widely held belief, the results showed that loan volume, farm size and net farm income did not have significant influence on loan repayment though, delay in disbursement, distance of farm location to the bank, cost of obtaining the loan, non-frequent visit made by the bank officials and low borrowing frequency from the institution tend to reduce repayment ability.

It was found that loan characteristics like disbursement lag and cost of obtaining loan have to be taken as control variables for an effective analysis of determinants of the repayment performance. Traditional variables like educational level, sex or size of the family were not significant in loan repayment hence should not be used to determine the loan size. The present study, using suitable model

specification and assuming that all parameter estimates would remain stable over time, shows that the models of the type estimated will greatly inform the evaluation of prospective farmers for loan benefit.

Decomposition of repayment elasticities indicated that the elasticity of value of loan repaid in good times was more than the elasticity of probability of repayment, since the amount of loan size recovered has a long way to go in imploring the lending capabilities of the institutions. The volume of loan disbursed from the institution was not enough to meet adequately the financial needs of the respondents. In addition, the distances of the credit offices to the locations of most beneficiaries were too long which invariably increased the cost of obtaining loan and reduced the repayment ability.

It can also be concluded that the repayment rate of NACRDB was improving and this implied a remarkable- progress of this Scheme so the continuation of the agricultural loan scheme is desirable. The study elicited facts on the challenges of extending loan facilities to farmers in Southwestern Nigeria. The results of the study therefore provided a baseline data for policy formulation needed to facilitate accessibility of farmers to agricultural loans and enhance loan repayment performance. The study was able to establish the improvement and remarkable progress recorded by the beneficiaries of NACRDB and thus the continuation of the agricultural loan scheme is desirable. The decomposition of repayment elasticities employed in this study indicated that the elasticity of value of loan repaid in good times was more than the elasticity of probability of repayment since the amount of loan size recovered has a long way to go in enhancing the lending capabilities of the institutions.

RECOMMENDATIONS

The following recommendations are made on the basis of the findings of this study.

1. The significance of visitation on probability of repayment indicates that regular visit by the bank officials and probably processing of loan application for the applicant (farmer) right on the field would significantly improve the credit repayment rate. In this wise, the farmers would not only save the transportation cost component of obtaining the loan but the opportunity cost of time would also reduce significantly.
2. The fact that the study confirmed the significance of loan disbursement lag in reducing repayment ability points to the crucial importance of timeliness in loan negotiation and delivery. When loan delivery misses the critical period of use, there is the tendency that such a loan would be diverted to relatively less productive or utterly unproductive activities. Thus, the problems of inadequate skill personnel, bureaucratic procedures, and stringent conditions for fulfilment prior to disbursement and instalmental disbursement, which are always sources of delay, must be eliminated to allow the credit market to function effectively. Hence there should be timely release of capital allocations, bearing in mind that agricultural activities are exceedingly time specific.

3. In other to reduce the time lag between loan application and the release of funds, it is recommended that power be delegated to Zonal Officers to grant credit to small farmers directly and huge amount (>N 250,000) need be referred to the headquarters. In addition, there is need for the modification of the credit delivery system to include the cooperative and community based organizations as delivery channels to reduce transaction.
4. An enabling environment should be created for improved loan recovery like a legal unit in NACRDB (under an autonomous setting) to prosecute loan defaulters.

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Modeling Efficient Resource Allocation Patterns for Food Crop Farmers in Nigeria: An Application of T- MOTAD Analysis

Salimonu K.K.[1], Falusi A.O.[2], Okoruwa V.O[2] and Yusuf S.A.[2]

[1]Department of Agricultural Economics and Extension, Ladoke Akintola University of Technology, Ogbomoso

[2]Department of Agricultural Economics, University of Ibadan, Ibadan

e-mail: salimonu.kk@lautechaee-edu.com

Abstract: A single all encompassing objective of profit maximization has been conceived in models suggesting efficient resource allocation patterns for farmers in Nigeria. The results of such studies may be mis-specified if the farmers make production decisions in the face of risk that characterized Nigerian Agriculture. In this study, resource allocation behaviour among the farmers was modeled and efficient patterns were suggested. A two-stage random sampling procedure was used in the collection of primary data in Osun State. Data collected from 165 respondents were analyzed using descriptive statistics and Target Minimization of Total Absolute Deviation (T-MOTAD). Alternative efficient allocation plans suggested were of higher expected returns than the existing farmers' plan in the study area thus satisfying the increase income objective. The profit maximization model was associated with higher risk than the suggested efficient plans. It is concluded that farmers rather possess multiple objectives in their allocation behaviour other than single objective of profit maximization.

Keywords: Resource allocation, T-MOTAD, Food Crop

INTRODUCTION

Expenditure on food in Nigeria accounts for a substantial proportion of total households' expenditure (Amaza and Olayemi, 1999; Yusuf, 2006). Population pressure, especially urban population is a significant factor that exerts pressure on the increased demand for food. The disparity between population growth and increased population in Nigeria was described by NISER (2001); the population increases by 3.2 percent annually while food production increases by 2.5 percent. This therefore necessitates that the production of food crop be increased in order to meet the growing demands.

Food production decisions are made mainly by small scale farmers who represent 95 percent of the total food crop farming units in the country and produce about 90 percent of the total food output (Okuneye and Okuneye, 1988; as cited by Adejobi, 2004). These farmers use two principal resources, land and labour (Dipeolu and Akintola, 1999), others are owned and borrowed capital and purchased inputs; agro-chemical, fertilizer, etc and are often faced with severe price and yield variation (Isik, 2002). Viewing that efficient use of these resources stands

paramount; studies have extensively investigated the allocative efficiencies among farmers. While some results have shown that farmers were efficient (Holden and Shifraw, 1997; Amaza and Olayemi, 1999) others showed that they were inefficient (Fafchamps, 1998; Adejobi, 2004). It is the concern of this study that these results may be mis-specified if these small farmers make production decisions in the face of risk that characterised Nigerian agriculture. Apprehension of risk induces certain behaviour into a farmer and this would grossly affect the resource use and allocation and consequently his investment.

The rural poor are risk averse as they are always skeptical of losing the little resources that they have at their disposal and thus specialize on low risk – low return activities (Collier and Gunning, 1999).These farmers are therefore more of risk minimisers contrary to the neo-classical principle of profit maximisation. In essence, the household tends to obey a safety – first principle that assumes the individual's objective is to minimise the probability of experiencing a short fall in income below a certain initial level (Sekar and Ramasamy, 2001). The practical implication is that fewer resources are devoted to risky or perceived risky activities given the fact that a single crop failure can threaten a household's livelihood. In line with this thought, the farmer should rightly be seen as trying to satisfice between goals rather than maximise particular economic magnitudes (Kooten *et al*, 1986). Satificing behaviour refers to a situation under which farmers allocate their available resources among competing production alternatives in such a way as to attain a satisfactory level of overall performance in terms of a defined set of aspiration levels of their pre-specified objectives of production (Aromolaran and Olayemi, 1997).

The concern of this study becomes more important in that most predictions, projections and farm planning for small farmers are carried out without adequate consideration and incorporation of farmers perception of risk and uncertainties inherent in farming. Land area devoted to any crop varies from farmer to farmer depending on expectations and subjective probability attached to each crop success. The degree of risk manifested by individual farmer can thus be derived from the observed behaviour. Thus, for a farmer with given production resources, the way those resources are allocated among enterprises shows his perception of risk inherent in each enterprise (Berbel, 1990). Therefore ignoring production and or output price uncertainty or risk preferences of farmers would lead to misleading estimates of the effectiveness of policies set at improving agricultural development in the country. The objective of the study is therefore to develop a risk- efficient resource allocation pattern for the farmers.

Hypothesis of the Study

There is no significant difference between the observed farm plan in the study area and the risk efficient farm plan

Research Methodology

The study was carried out in Osun State, Nigeria. The State was chosen because of its location in the rainforest region and the availability of food crops farmers. Also, available studies on food crops farmers in the

study area were not well focused on risk in farm planning; an attempt to fill this void provides a basis for Osun State as the study area. A two-stage sampling procedure was used in the collection of primary data in Osun State. The first stage involved a random selection of 30 village/farming communities from the three agro-ecological zones of the state's Agricultural Development Programme. The second stage involved a random selection of food crop farmers from each of the villages with probability proportionate to size of each village/farming communities. Data from 165 respondents were used for the analysis. Using structured questionnaires, data used included resources employed and costs, food crop choices, yield and prices. Secondary data were also obtained from Central Bank of Nigeria and Food and Agriculture Organization.

Analytical Framework

Data were analyzed using descriptive statistics and Target Minimization of Total Absolute Deviation (T-MOTAD). The descriptive statistics include Tables, frequency counts and percentages. Summary statistics like mean, standard deviation, and coefficient of variation were also employed. Linear programming is widely recognized as a method for determining a profit maximizing combination of farm enterprises that is feasible with respect to linear fixed farm constraints. The conventional deterministic model ignores uncertainty, however, and may lead to a farm plan that is unacceptable to a farm operator on the basis of previous experience (Hazell, 1971). This thus informs suggestion of allocation plan for farmers while element of uncertainties are adequately taken care of. Alternative risk efficient resource allocation pattern is therefore predictable through the use of Target MOTAD (Minimization of Total Absolute Deviation) model. The model formulation becomes useful because decision makers often wish to maximize expected return but are concerned about net returns falling below a critical target. This approach is in accordance with safety- first principle.

Mathematically, the model, which was modified by Tauer (1983) after Hazell (1971), is stated below:

Max E (Z) = n

$$\sum_{j=1} C_j X_j \quad \text{---------- (1)}$$

Subject to m

$$\sum_{j=1} a_{ij} X_j \leq bi \quad \text{---------- (2)}$$

n

$$\sum_{j=1} Crj\, X_j + y_r \geq T \quad \text{---------- (3)}$$

n

$$\sum_{j=r} P_r y_r = \uparrow, (\uparrow = M \text{ ----- } 0) \text{ --- (4)} \qquad (r = 1 \ldots..s)$$

X_j and $Y_r \geq 0$

Where E (Z) = Expected return of the plan or solution to the plan in naira

C_j = expected return of activity in Naira, (Mean return from each activity)

X_j = level of activity j

a_{ij} = technical requirement of activity j for resource i

b_i = level of resource i

T = target level of return in Naira (using the daily consumption requirement recommended by FAO)

Crj = return of activity j for state of nature or observation r in Naira

P_r = probability that state of nature or observation r will occur

↑ = a constant parameterized from M to 0

m = number of constraints or resource equations

s = number of state of nature or observation

M = Large number (represents the maximum total negative deviation of return of the model)

n= number of activities, or resource, or observation and their levels

y_r = deviation below T for state of nature or observation r.

$$y_r = \sum_{j=1}^{n} (Cr_j - C_j)X_j \quad \text{.....(5)}$$

Equation (1) maximizes expected return of the solution set. Equation (2) fulfils the technical constraints; equation (3) measures the revenue of solution under state r. If that revenue is less than the Target T, the difference is transferred to equation (4) via variable y_r. Equation (5) sums the negative deviation after weighing them by their probability of occurring, P_r.

In order to incorporate risk variable into the model, time series data on input level, yield and price are usually needed for each production activity (Hazell, 1971; Adubi, 1998; Oni, 2000 and Isik, 2002). For the purpose of this study, prices and yield for only three (3) years 2002, 2003, and 2004 were considered due to constraint in the information/data availability. Average prices, costs and yield data for 2002 and 2003 were collected from ADP in the study area while the study relied on farmers' memory for similar data for year 2004. The gross margins estimates for the three-year period for the respective crop production activities were then adjusted to their 2003 price values, using the consumer price index (CPI). The model is superior to other programming models for farm planning under risk because it is computationally efficient and it generates solutions that are not in conflict with second degree stochastic dominance (SSD) (Berbel, 1990). The model is a risk programming technique solved with a linear programme algorithm since it has a linear objective function and linear constraints. The computational procedure involved two steps; a conventional linear programming maximization problem was first formulated and solved. This gave the maximum return since safety first or risk constraints were not included. This represented the highest point on the risk- return efficiency frontier. The safety first element was then formulated in the second step as a matrix of deflated gross margins and the sum of negative deviations from the expected returns for each state of nature. This served as risk measure while a target level of return, T (an average amount required to provide for households' minimum financial needs) was set as risk constraints. As the total absolute deviation (TAD) was parameterized, selection of a set of risk efficient farm plan from the available possible points on the frontier becomes possible through the comparison of the standard deviation, coefficient of variation (measures of associated level of risk) and returns of activities or enterprises and farm plans generated by the programme.

The standard deviation (SD) was derived thus:

$$SD = D [\pi s / 2 (s-1)]^{1/2} \quad \text{----------} (6)$$

Where D = Mean negative deviation

s = number of observations or states of nature

π = 22/7

(Hazell, 1971)

The programming technique was based on the following assumed objectives of the farmers:

i. to provide adequate food in order to ensure at least minimum household food requirement,
ii. to earn adequate monetary income so as to meet minimum household financial needs,
iii. to maximize the return to the allocated resources

RESULTS AND DISCUSSIONS

Efficient Farm Plans and Models Comparison

The farmers' existing plan in the study area, risk minimized or efficient farm plans and the profit maximization farm plan are shown in Table 1. Plan I represents the farmers' existing plan, Plans II and III represent the modeled risk minimized or efficient farm plans while plan IV represents the profit maximization plan. The profit maximization plan IV has the highest return of N98, 861.24 and allowed the cultivation of only Maize/ yam and maize/vegetable enterprise combinations. However, this plan is associated with maximum variability of 33.06 percent in Table 2 and it is likely to be selected by a risk neutral or risk indifferent farmer.

Table 1. Cropped Area Distribution (Ha) Among Enterprises for the Various Farm Plans

	Farmers' Plan	Risk Minimized Farm Plans		Profit Maximization Plan
	I	II	III	IV
Returns in Naira per/ha	31,959.81	36,776.05	54,919.73	98,861.24
Maize	0.048 (2.21)			
Cassava	0.133 (6.20)			
Sorghum	0.04 (1.87)	0.018 (0.84)	0.15 (7.00)	
Yam	0.168 (7.80)	0.52 (24.18)		
Cowpea	0.005 (0.26)			
Maize/ Cassava	0.774 (35.90)	1.00 (46.51)	1.67 (77.70)	
Maize/ Yam	0.107 (5.00)	0.20 (9.30)	0.18 (8.40)	0.83 (38.60)
Yam/ Vegetable	0.011 (0.52)			
Maize/ Vegetable	0.131 (6.09)	0.26 (12.09)	0.09 (4.20)	1.32 (61.40)
Cassava/ vegetable	0.134 (6.24)			
Maize/Cassava/yam	0.318 (14.77)			
Cowpea/cocoyam	0.154 (7.14)		0.06 (2.80)	
Maize/cowpea/cocoyam	0.130 (6.02)	0.15 (7.00)		
Total Cropped Area	2.15 (100)	2.15 (100)	2.15 (100)	2.15 (100)
Percentage sole Cropping	18.34	25.02	7.00	0.00
Percentage Cropped Mixtures	81.68	74.90	93.00	100.00

Source: Computed from Linear Programming Results and T-MOTAD Model

Figures in Parentheses are the percentage cropped area

A return of N31, 959.81 per hectare was the actual level of the farmers' income as shown in the farmers' plan I (Table 1), while the return was N98, 861.24 when the farmers were assumed to possess only profit maximization objective. This shows that there is a pronounced difference between the farmers observed farm plan and profit maximization plan. The result is similar to the report of Osuji, (1978) and Adubi (1998); however, Osuji (1978) attributed this

discrepancy in the optimal and actual farm income to the fact that linear programming model aims at profit maximization alone whereas traditional farmers have additional objectives such as the maintenance of a minimum level of family self –sufficiency in food supply asides maximum farm income or gross margin. Given preference to these objectives; a set of feasible risk efficient farm plans were generated as Total absolute deviation (TAD) was parameterized. These are plans (II and III) which cover a wide range of available choices for the farmer on the basis of enterprise combinations and resource allocation.

In the risk minimized farm plans II and III, more enterprises entered the plans unlike plan IV, six of the 13 enterprises entered plan II while five of the 13 enterprises were allowed in plan III. Thus, the critical objective of household food security is achieved. Since the farmer and his household also consumed parts of what is produced, the programming was therefore constrained so as to satisfy the household minimum food requirements. The enterprises are as shown in Table 1. From the Table, the average farmer should allocate his resources in such a way that the six enterprises in Plan II are produced according to their hectrage allocations. The recommended allocation pattern depicts the most important enterprises as maize/cassava (1.00ha), yam (0.52ha), maize/vegetable (0.26ha), maize/yam (0.20ha), maize/cowpea/cocoyam (0.15ha), and sorghum (0.018ha). In plan III, the recommended allocation pattern is maize/cassava (1.67ha), maize/yam (0.18ha), sorghum (0.15ha), maize/vegetable (0.09ha), and cowpea/cocoyam (0.06). It could be observed that maize/cassava enterprise had the highest land allocation in the two risk minimized plans II and III (46.51percent and 77.70percent respectively). While sorghum had the least land allocation (0.84percent) in plan II, cowpea/cocoyam was the least (0.06) in plan III. In all the plans percentage crop mixtures were above 70 percent implying a mitigation strategy towards reducing the possible risk among the enterprises.

Trade-Off between Expected Return and Risk

The result shows that the returns in the risk minimized plans II and III (N36, 776.05 and N54, 919.73 respectively) were higher than the return in existing situation in plan I (Table 2); thus satisfying the increased income or limited out of pocket cash expenses objective. The risk (measured by coefficient of variation) and return levels of the four farm plans are as shown in Table 2. The trade-off between the expected income and the variance of income determines the suitability of any of these plans. The average farmer would be operating at a high-risk level of 33.06 percent if he adopts the profit maximization plan IV. The risk level would also be 26.53 percent if he maintains the existing plan I. However, these high risks levels can be averted if the average farmer shifts to enterprise mixes with less variability in returns to farm resources. These are plans II and III with minimized risk of 18.20 percent and 6.12 percent respectively.

Table 2. Risk and Return levels of Different Farm Plans

	Farmers' Plan	**Risk Minimized Plans**		**Profit Maximization Plan**
	I	II	III	IV
Expected Returns to the allocated Resources/ha	31,959.81	36,776.05	54,919.73	98,861.24
Minimized standard Deviation of Returns	8478.34	6695.78	3358.70	32688
Coefficient of Variation of Returns (%)	26.53	18.20	6.12	33.06

Source: Computed from Linear Programming Results and T-MOTAD Model

Test of Hypothesis Using the t –Test Statistics

The t-test was employed to test the significant differences in the expected returns to the allocated resources between the farmers' plan I and the other plans II, III and IV. The mathematical notation of the t statistics is given below following Sirkin (1995):

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\frac{S_1}{n_1^{(1/2)}} + \frac{S_2}{n_2^{(1/2)}}}$$

Where X_i = mean or expected return to the allocated resources

S_i = Standard Deviation

n_i = number of observation

Table 3 shows that the t- value was 1.15 for plan I and Plan II and was not significant while the t-value was 7.01 for plan I and plan III and was significant at $P < 0.01$. This shows that there exists no significant difference in the returns of plans I and II but a significant difference exists in the returns of plans I and III. However, the t-value was 5.87 for plans I and IV at a significant level of $P < 0.01$ implying a significant difference in the returns of plans I and IV. The interpretation of the result is that the allocation behaviour of the farmers in the study area was not really targeted at profit maximization only but to also minimize the probability risk occurrence. This is because the returns in the farmers' plan I had no significance difference with that of risk minimized plan II. Though a significant difference was observed between the returns of plan I and risk minimized plan III, it could still be observed on aggregate that the distribution of returns among the four plans shows that the return in plan I is closer to those of plans II and III than that of plan IV. The necessary deduction from the result is that the current allocation of the resources among the farmers is towards being risk efficient and farther from pursuing the profit maximization objective alone; hence the null hypothesis is accepted. This is in line with the study of Aromolaran and Olayemi (1997). In their study, the farmers were found to behave more like goals satisficers than single magnitude maximizers (profit maximization) in the process of making their resource allocation and production decisions.

Resource Use Patterns Across Models

The resource use status across the plans is presented in Table 4. A striking feature in the result is that land and cash on material inputs (fertilizers, agrochemicals, seeds and cuttings etc) were fully utilized in all the plans implying additional returns to the farmers (as given by the

shadow prices) as more units of these resources are utilized. It would also be observed that on a general note that the labour resource was not fully utilized in the plans. This implies an excessive use of family and hired labour (as shown by the slack variables).This invariably would have increased the production cost. Though it has been shown that labour resource is a major resource in crop production (Dipeolu and Akintola, 1999), however; this cost could be reduced using agrochemical options for operations like weeding and an increased yield through fertilizer options as suggested in the plans.

Table 3. t- Test Results

Different Farm Plans	**t-value**
Farmers' Plan I & Risk Efficient Plan II	1.15
Farmers' Plan I & Risk Efficient Plan III	7.01*
Farmers' Plan I & Profit Maximization Plan IV	5.87*

Source: Field Survey; 2005
*: indicates significant at P < 0.01

CONCLUSIONS, POLICY IMPLICATIONS AND RECOMMENDATIONS

The alternative resource allocation plans modeled for the farmers in the study area using T-MOTAD allowed more enterprises combination for production than the profit maximization plan. These plans also allowed the farmers to operate at a relatively reduced risk. The resource allocation behaviour of the farmers in the study area was closer to the modeled risk efficient plans than the profit maximization plan. Hence, the resource use and allocation pattern of food crop farmers is in consonance with the behavioural theory of a firm rather than the neo-classical principle of the economists. The results of the study indicated that in spite of prevailing risk sources; the food crop farmers have the potential to increase their crop yields and gross margin. This implies an important policy implication for strategies towards increased food production in the country. The sustainability of the farmers in this respect lies in resource availability. Farm management research and smallholder development programmes initiations through extension education on efficient allocation of resources by the government should be built.

Table 4. Resource Use Patterns Across Models

Resource	Plan1
Land (hectare)	2.15
Family Labour 1[1]	102
Hired Labour 1[1]	148
Family Labour 2[2]	102
Hired Labour	148
Cash on Material (N)	32,690.95
Borrowed Capital (N)	25,988.75

Plan II		
Resource Use Status	Slack	Shadow Price
Fully utilized	-	10039.68
Not Fully utilized	12.30	-
Not Fully utilized	6.50	-
Not Fully utilized	21.22	-
Not Fully utilized	30.53	-
Fully utilized	-	19.0
Not Fully utilized	8,618.09	-

Plan III Resource Use Status	Slack	Shadow Price
Fully utilized	-	1866.8
Fully utilized	-	44.6
Not Fully utilized	8.00	-
Not Fully utilized	11.8	-
Not Fully utilized	43.9	-
Fully utilized	-	19.0
Not Fully utilized	4,459.89	-

Plan IV Resource Use Status	Slack	Shadow Price
Fully utilized	-	2839.72
Not Fully utilized	11.39	-
Not Fully utilized	22.24	-
Fully utilized	-	44.60
Not Fully utilized	35.90	-
Fully utilized	-	3.40
Not Fully utilized	10223.6	-

Source: Field Survey, 2005
[1] Labour required in wet season (mandays)
[2] Labour required in dry season (mandays)

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Farmers' Assessment of Government Input Policy for Effective Agricultural Enterprises in Oyo State

Yekinni, O. T., K. K. Salimonu and K. Y. Ogunleye
Department of Agricultural Economics and Rural Development,
Ladoke Akintola University of Technology, Ogbomoso, Nigeria
e-mail: yekinni.ot@lautechaee-edu.com, taofeeq_yekinni@yahoo.com

Abstract: Problems of peasant agriculture are manifested through inconsistent agricultural policies that should have leveraged the situation; this particularly hinders the supply of extension services, farm credit, and other vital inputs to farmers. Agricultural policies in Nigeria, among other development policies, are often pursued on ad-hoc basis and in most uncoordinated manner. The study was conceived to assess agricultural input policy implementation in Oyo State. It hopes to identify the operational characteristics of the farmers, identify the felt need of the farmers and ascertain the relevance of the policy choices to the beneficiaries. The study was carried out in Oyo State. A multistage sampling procedure was used to select the farmer-respondents. The state was stratified on the basis of its three senatorial districts; three Local Governments areas were purposively selected in each of the three (3) senatorial districts on the basis of their spatial location; and 36 farmers were selected from the ADP's lists of the selected local government areas. Descriptive statistics such as frequencies and percentages were used to describe the data while Chi-square and t-test were used to pursue the hypotheses of the study.

Regarding the policies expected by the farmers, out of the listed input policy items, 64% indicated seeds/planting stock assistance, agro-chemicals (71%), fertilisers (67.8%), credit facilities (74.4%), farm machinery (73.2%), marketing assistance (67.5%), and storage facilities (77.3%) as the areas in which government policy interventions are required. Others such as extension service (33.8%), cash crop promotion (41.6%), food crop promotion (42.6%), livestock/poultry promotion (41.3%), fishery promotion (32.5%), mini-livestock promotion (40.1%) and rural development agenda (47.9%) were not considered as important areas in which government policy interventions are required by the majority of the respondents. There is significant relationship between the farmers in their choices of input assistance indicated. The results of test of relevance of policies implemented revealed significant difference, in most of the policy items, between the expected assistance and those received by the respondents from the governments. Those items that do not differ significantly (livestock/poultry promotion, fishery promotion, and mini-livestock promotion) are those that the respondents do not consider necessary for their enterprises.

The study established that the expectations of the policy beneficiaries are not met at all, which is an indication of serious policy gap hampering agricultural development. The benefit obtained by the beneficiaries are not spectacular for real agricultural development. Strategies to make agricultural policies to be demand-driven should be in-built into agricultural policy process.

Keywords: Agricultural enterprises, input policy, small-scale farmers

INTRODUCTION

More than 70% of the poor people in Africa live in rural regions, with most engaged in resource-dependent activities such as small-scale farming, livestock production, fishing, hunting, artisan mining, and logging. This small-scale production accounts for a significant percentage of the GDP of many African nations (World Resources Institute (WRI), 2005). According to Forum for Agricultural research in Africa FARA (2006), Sub-Saharan Africa (SSA) stands out as the only region where overall poverty and food insecurity continue to worsen. If the current trend continues, it is projected that 39.3% of the population will remain below the poverty line by 2015, when millennium development goal targets should have been achieved. Agriculture has a crucial role in stemming and reversing this trend.

Agriculture remains the main stay of the Nigerian economy, employing about 70 to 80% of the population, as is the case with most sub-Saharan African countries. Nigeria's economy is essentially agrarian but this does not mean that the country is agriculturally advanced. Peasant farming characterises agricultural practices; farm families engage in subsistence farming in which their needs determine the scale of production and wherein small plots of land are cultivated by individual owners or sub-owners following age-old methods which leaves them without much control on the yields. Family labour is mostly in use, which might be augmented with minor hiring of labour and labour exchanges with other farmers at peak. This system does not often make adequate use of modern farming techniques, capital input, advisory services and market information. Their technique and technology of production is not modern and involves a lot of drudgery, there is also the problem of lack of adequate infrastructure facilities in the rural areas, the duo of which serve as serious disincentive for youth involvement in agricultural practices.

Aggregate agricultural production declined up to early 1980 during the oil boom era, leading to a sharp decline in per capita real GDP in agriculture. By 1985, the index per capita real GDP of agriculture was 35% points lower than 1970 (FOS, 1999). Agriculture's GDP contribution, in the country, averaged N34,950.00 million between 1980 and 1985, and improved during the 1986 and 1996, moving from N40,500.00 million in 1986 to N59,389.00 million in 1996 (Arokoyo, 2003). The fact that the agricultural growth rate was lower than the population growth rate is the main concern regarding the performance of the sector. There has been corresponding sharp increase in the proportion of the country's food import bill, from 8.2% in 1989 to 20.5% in 1997 (Akin, 2000). The trend does not signify a good economic performance to the country. The President expressed concern on the situation thus "the current huge bill being incurred on food importation, is a potent threat to the economic and political stability of the country" (Guardian July 5, 2002).

Small-scale agriculture mainly takes care of the food needs of the farm families and produces little surplus for sale. Not less than 95% of Nigerian farmers are involved in peasant agriculture, while other categories of farmers employed on corporate and government

supported large-scale farms account for only 5% (IPC, 2006). The fact is that agricultural production is predominantly in the hands of a multitude of small-scale farmers who are largely unorganised and scattered throughout the country (Manyong *et al*, 2005). They are confronted by a mammoth of problem depicted by lack of enabling environment for effective and profitable enterprises. These problems are manifested through inconsistent agricultural policies that should have leveraged their situation; this particularly hinders the supply of extension services, farm credit, and other vital inputs to farmers. Agricultural policies in Nigeria, among other development policies, are often pursued on ad-hoc basis and in most uncoordinated manner (Ademilokun-Turton, 1992). This forms the basis of the under-development of the agricultural sector in the country. Idachaba (2000) conceptualised the problem as "policy gap" which is explained as the gap between the 'best-practice policies' and the actual policies pursued. He further lends credence to the need to probe the policy environment as the principal constraint to agricultural policy itself.

The problems of the agricultural sector are numerous; these challenges diminish its capacity to play its role effectively. These problems, according to FARA (2006), include the following:

i. Low internal effective demand due to poverty;
ii. Unfavourable external markets: African commodities face severe competition from subsidised farm products of industrialised countries;
iii. Institutional weaknesses for service provision to the agricultural value chain from pre-production to consumption;
iv. Limited access to science and technology and low human capacity to generate and adopt knowledge intensive skills;
v. Weak policy and regulatory mechanisms that do not adequately support participation of local communities and private sector in decision-making concerning the agricultural sector.
vi. Poor rural infrastructure (transportation, markets, storage, energy, credit, water management), which increases transaction costs and reduces competitiveness of products;
vii. Climatic risks.

Given the foregoing, the following research questions are stated to be answered by the study.

i. What are the operational characteristics of the farmers?
ii. What are the expectations of the farmers regarding government policy interventions in their enterprises?
iii. To what extents are the policies implemented relevant to the expectation of the farmers?

Objectives of the Study

The general objective of the study is to assess the agricultural input policy as it affects the agricultural practices of the farmers. The specific objectives of the study are to:

a. ascertain the operational characteristics of the farmers

b. determine the expectations of the farmers regarding policy interventions in their enterprises, and
c. ascertain the relevance of the agricultural policies that have been implemented

METHODOLOGY

Area of Study – Oyo State, one of the 36 states in the country, is the area of study of this project. It covers a total of 27,249 square kilometres of landmass. It has three (3) senatorial districts and thirty-three (33) local government areas, these are; Afijio, Akinyele, Egbeda, Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East, Ibadan South-West, Ibarapa, Iddo, Saki-West, Ifeloju, Irepo, Iseyin, Kajola, Lagelu, Ogbomoso North, Ogbomoso South, Oyo West, Atiba, Atisbo, Saki East, Itesiwaju, Iwajowa, Ibarapa North, Iyamapo/Olorunsogo, Oluyole, Ogo-Oluwa, Surulere, Orelope, Orire, Oyo, and Ona-Ara.

Agriculture is the main occupation of the people in the state. The climate favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew among others. The state equally has an agricultural development project named Oyo State Agricultural Development Programme (OYSADEP) with headquarters at Saki. A number of international and federal agricultural establishments are located in the state.

Sampling Procedure and Sample Size – A multistage sampling procedure was used to select the respondents of the study. Oyo state was demarcated on senatorial district basis. Three Local Governments were purposively selected in each of the three (3) senatorial districts on the basis of their spatial location to make nine (9) LGAs. From the ADP's list of farmers in the selected local government areas, 36 farmers were randomly selected across board for interview to give a sample size of 324. This was done in order to avoid lopsidedness in numbers selected from the LGAs; because equal representation of the respondents is deemed important to the study.

Measurement and Operationalisation of the Variables

The variables of the study were measured, operationalised and statistically analysed as given in the Table of analysis of objective given below:

Analysis of Objectives of the Study

Objective	Respondent	Data Requirement	Statistical Analysis
Operational characteristics of the farmers.	Farmers	• Agricultural enterprise of the farmers • Scale of enterprises of farmers • Years of experience in their enterprises	Descriptive statistics
Identify the felt needs of the farmers on which attentions are desired.	Farmers	• Areas in which government assistance are expected.	Descriptive statistics Chi-square
Ascertain the relevance of the agricultural policies that have been implemented.	Farmers	• Indication of farmers' expectation of government's interventions. • Indication of what was rendered.	t- test

RESULT DISCUSSION

Operational Characteristics of the Farmers

Table 1 shows the operational characteristics of the farmers. The result, in a multiple response format, shows that majority of the respondents (98.4%) were engaged in food crop production and 61.8% were involved in cash crop production. Equally, a sizeable proportion (38.8%) of the farmers were involved in farm produce marketing, 37.9% were involved in livestock production, 25.2% involved in poultry production and 24.0% are involved in mini-livestock production. Finally, the result shows that a meagre proportion (9.5%) is involved in fishery enterprise. The pattern of distribution of the scale of the farm of the respondents revealed that 36.9% of them have between <1 and 4 acres, 34.7% have between 5 and 10 acres of farmland while others 10.7%, 2.8% and 0.6% of 11 – 20 acres, 21 – 30 acres and 31 – 40 acres respectively. There were no responses from 14.2% of the respondents to this variable. This finding generally confirms the position of some authors (WRI, 2005; Arokoyo, 2003; Manyong *et al*, 2005) that majority of the Nigerian farmers are small-scale farmers given the proportion that are involved in food crop production. This study also established that most of the farmers are involved in more than one agricultural enterprise, albeit at varying degrees.

In terms of the years of experience in their respective agricultural enterprises, 17.4% of the respondents had between 1 and 10 years, 25.9% have between 11 and 20 years, and 32.5% had between 21 and 30 years. Others, 12.9% and 3.5% have 31 – 50 years and 51 – 70 years respectively. A proportion of 7.9% of them did not respond to this variable.

Table 1. Distribution of the Respondents by their Operational Characteristics

Operational Characteristics	Frequency	Percentage
Agricultural Enterprises*		
Food crop	312	98.4
Cash Crop	196	61.8
Livestock	120	37.9
Poultry	80	25.2
Fishery	30	9.5
Mini-livestock	76	24.0
Produce marketing	123	38.8
Farm size		
<1 – 4 acres	117	36.9
5 – 10 acres	110	34.7
11 – 20 acres	34	10.7
21 – 30 acres	9	2.8
31 – 40 acres	2	0.6
No response	45	14.2

Years of Experience		
1 – 10 years	55	17.4
11 – 20 years	82	25.9
21 – 30 years	103	32.5
31 – 50 years	41	12.9
51 – 70 years	11	3.5
No response	25	7.9
Total	**317**	**100.0**

* Multiple Responses
Source: Field Survey, 2006

Felt needs of the farmers on which attentions are desired

As shown in the Table 2, out of the listed input policy items, majority of the farmers indicated seeds/planting stock assistance (64%), agro-chemicals (71%), fertilisers (67.8%), credit facilities (74.4%), farm machinery (73.2%), marketing assistance (67.5%), and storage facilities (77.3%) as the areas in which government policy interventions are required. Others such as extension service (33.8%), cash crop promotion (41.6%), food crop promotion (42.6%), livestock/poultry promotion (41.3%), fishery promotion (32.5%), mini-livestock promotion (40.1%) and rural development agenda (47.9%) were not considered as areas in which government policy interventions are required by the majority of the respondents.

The distribution is not unexpected based on the fact that the input items on which the majority indicated interest are the regular inputs for their farming activities while others are not of direct relevance to them. Extension service was not considered as an important input; this might be because they have always had access to it. Given the fact that the respondents are ADP contact farmers, they have not experienced farming activities the services to have adequately appreciated its place as an important input to their enterprises.

Table 2: Distribution of the Respondents by their Expected Assistance from Government Policies

Nature of Assistance Expected	**Yes**	**No**
Seeds/planting stock	203 (64.0)φ*	113 (35.6)
Agro-chemicals	225 (71.0)	91 (28.7)
Fertilisers	215 (67.8)	101 (31.9)
Credit facilities	236 (74.4)	80 (25.2)
Farm machinery	232 (73.2)	84 (26.5)
Extension service	107 (33.8)	209 (65.9)
Marketing assistance	214 (67.5)	102 (32.2)
Storage facilities assistance	245 (77.3)	71 (22.4)
Export assistance	187 (59.0)	129 (40.7)
Cash crop promotion	132 (41.6)	184 (58.0)
Food crop promotion	135 (42.6)	181 (57.1)
Livestock and poultry promotion	131 (41.3)	185 (58.4)
Fisheries promotion	103 (32.5)	213 (67.2)
Mini-livestock promotion	127 (40.1)	189 (59.6)
Rural development agenda	152 (47.9)	164 (51.7)

* Figures in parentheses are percentages
φ Percentages do not add up to 100 because of missing responses
Source: Field Survey (2006)

Given the fact that the responses to the variable was obtained in a dichotomous format, Chi-square analysis was used to probe further whether there is significant relationship among the respondents in their choices of input policy items requiring government's intervention. The result of the analysis in Table 3 shows that there is significant relationship among the respondents in their choices of agricultural input items on which they expect government policy intervention except on rural development agenda (p=0.500). The lack of relationship in their

choice of rural development agenda among them can be explained by the fact that it is of distant relevance to the farmers and they are not able to link its relevance to their enterprises.

This finding means that the farmer-respondents are mostly unanimous in what they are expecting / requesting from the government in terms of input policy intervention for their agricultural enterprises development; but the fact is that those desires have been unattainable. This might be as a result of lack of beneficiaries' voice to have effectively press home their demands to the policy makers and implementers. The implication of this revelation is that "the potential gainers from the (correct) implementation of declared policy are not organised or organisable" (Idachaba, 1994).

Table 3. Chi-Square Analysis of the Respondents' Choices of Expected Assistance form the Government

Nature of Input Assistance Expected	Chi-square value	df	p	Remark
Seeds/planting stock	25.633	1	0.000	Significant
Agro-chemicals	56.823	1	0.000	Significant
Fertilisers	41.127	1	0.000	Significant
Credit facilities	77.013	1	0.000	Significant
Farm machinery	69.316	1	0.000	Significant
Extension service	32.924	1	0.000	Significant
Marketing assistance	39.696	1	0.000	Significant
Storage facilities assistance	95.810	1	0.000	Significant
Export assistance	10.646	1	0.001	Significant
Cash crop promotion	8.557	1	0.003	Significant
Food crop promotion	6.696	1	0.010	Significant
Livestock and poultry promotion	9.228	1	0.002	Significant
Fisheries promotion	38.291	1	0.000	Significant
Mini-livestock promotion	12.165	1	0.000	Significant
Rural development agenda	0.456	1	0.500	Not Significant

Source: Field Survey (2006)

Relevance of the agricultural policies that have been implemented

The farmers were asked to indicate, from a list of input policy items, the policies that have been implemented to their advantage. The aim is to establish whether there is significant difference or deviation between the expected assistance and the assistance obtained; and hence the relevance of the implemented policy items to the farmers.

The paired sample t-test was employed to test for difference between the responses of the farmers to each of the input items. The assistance expected and those obtained have been measured with dichotomous responses. The result of the analysis, as given in Table 4, revealed significant difference between most the expected assistance and those obtained by the respondents; Input supplies – seeds/planting stock (t=2.885, p=0.004), Input supplies – agro-chemicals (t=7.297, p=0.000), Input supplies – fertilisers (t=5.179, p=0.000), Credit facilities (t=9.384, p=0.000), Farm machinery (t=8.922, p=0.000) and Extension service (t=-13.586, p=0.000). The result of the other input items are Marketing assistance (t=13.331, p=0.000), Storage facilities assistance (t=27.715, p=0.000), Export assistance (t=19.522, p=0.000), Cash

crop promotion (t=2.046, p=0.000), Food crop promotion (t=1.023, p=0.307), Livestock and poultry promotion (t=1.016, p=0.311), Fisheries promotion (t=0.367, p=0.714), Mini-livestock promotion (t=5.210, p=0.000) and Rural development agenda (t=2.648, p=0.000).

This shows that those items that do not differ significantly are food crop promotion, livestock/poultry promotion and fishery promotion, which are part of the items majority of the respondents do not even consider necessary for their enterprises as shown in Table 2 above.

This means that those items that are required are not obtained and those obtained are not required. The items that are not significant are those that are not required by the majority and are not obtained by the majority. The implication of this is that the policy items that have been implemented, as assistance through policy interventions, did not meet the expectations of the respondents. Hence, the analysis indicates a lack of relevance of the policies implemented to the farmer-respondents. This revelation established and confirms the concept of 'policy gap' from the perspective of the farmers, which is a serious constraint to agricultural policy process (Idachaba, 2000).

Table 4. T – test Analysis between Expected Assistance and those gotten from the Government by the Respondents

Pair of Assistance Expected / Rendered	**T – value**	**df**	**P**	**Remark**
Seeds/planting stock	2.885	309	0.004	Significant
Agro-chemicals	7.297	309	0.000	Significant
Fertilisers	5.179	309	0.000	Significant
Credit facilities	9.384	309	0.000	Significant
Farm machinery	8.922	309	0.000	Significant
Extension service	-13.586	309	0.000	Significant
Marketing assistance	13.331	309	0.000	Significant
Storage facilities assistance	27.715	309	0.000	Significant
Export assistance	19.522	309	0.000	Significant
Cash crop promotion	2.046	309	0.042	Significant
Food crop promotion	1.023	309	0.307	Not Significant
Livestock and poultry promotion	1.016	309	0.311	Not Significant
Fisheries promotion	0.367	309	0.714	Not Significant
Mini-livestock promotion	5.210	309	0.000	Significant
Rural development agenda	2.648	309	0.000	Significant

Source: Field Survey (2006)

Summary of the Findings

Most of the farmers are involved in food crop production and are engaged in multiple agricultural production enterprises. Most of them equally have small farmland holdings of between <1 and 4 acres.

On the felt need of farmers, majority of the farmers indicated seeds/planting stock assistance, agro-chemicals, fertilisers, credit facilities, farm machinery, marketing assistance, and storage facilities as the areas in which government policy interventions are required. The areas that are not indicated are extension service, cash crop promotion, food crop promotion, livestock/poultry promotion, fishery promotion, mini-livestock promotion and rural development agenda were not considered as

areas in which government policy interventions are required by the majority of the respondents. A Chi-square analysis of their responses showed that they differ significantly in their choices of areas they expected policy interventions from the government.

To ascertain the relevance of policies that have been implemented vis-à-vis the expectations of the farmers, t-test analysis showed that only three policy items met the expectations of the farmers, which are livestock/poultry promotion, fishery promotion, and mini-livestock promotion. These policy items however happen to be those that were not considered necessary for their enterprises. This means that the agreement with their expectation, in those instances, is because they were not expected and they were not provided.

CONCLUSIONS

The study established that most of the farmers are small-scale holders and are mostly involved in food crop production enterprises. It equally revealed that they are usually involved in multiple agricultural production enterprises.

The study found that the respondents are unanimous in their expectations from the agricultural policies of the government. The lack of attainment of the desires may be due to lack of voice to press their demands.

The expectations of the respondents in terms of policy intervention were not met at all. The reason for this may not be too distant from lack of voice to actualise the interests of the farmers.

Lack of fulfilment of the beneficiaries' objectives by the input policies is an indication of serious policy gap on the part of the farmers and hence a serious implication for agricultural development in the country.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made;

i. Policy interventions for agricultural development should focus on the small-scale food crop farmers because they constitute the majority of agricultural production practitioners in the country.
ii. Agricultural input policy interventions should be made farmer-oriented in order to have desired result from such efforts.
iii. There is the need for agricultural research and development stakeholders to make conscious efforts at organising the farmers so as to make them more relevant for involvement in agricultural policy process in the country.

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