

**OPTIMUM FARM PLAN FOR FOOD SECURITY IN
NIGERIA.**

**THE CASE OF SELECTED SMALL SCALE FARMERS IN ONDO STATE,
NIGERIA.**

BY

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ABSTRACT

The study determines the optimum farm plan for food security in Ondo – state. Data were collected from 100 farmers randomly selected from five (5) local government areas of the state namely; Idanre, Ile-Oluji/Oke igbo, Ondo West, Ondo East, and Odigbo local government areas. These data were analyzed using descriptive statistics such as frequencies, percentage, mean bar charts and pie charts. Inferential statistical analysis were done using multiple regression to determine the production function; cost and return analysis were used to analyze the gross margin and net farm income of the farmers. The optimum enterprise combination was determined by using linear programming.

The major findings from the respondents during the course of the study were highlighted as follows: 55% were between 31 to 50 years of age which is the active group and is the modal age. 95% of the respondents were male. More than half of the respondents (54.17%) had no formal education. 96.88% of the respondents were married. Most of the respondents (93.45%) took farming as their primary occupation. 79.09% of the respondents keep large family of between 0 to 10 household members. 96.88% of the respondents involved members of their household in farming while 69% relied on hired labour. 80.21% of the respondents acquired their farmland through purchasing. 78.12% of the respondents had been in farming for between 10 to 49 years i.e. farming experience of between 10 to 49 years.

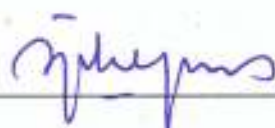
Most of the respondents (85.42%) were into farming for income stability and food security. 69.79% of the respondents possesses farmland sizes of

between 1.0 to 5.0 hectares of land. 93.75% of the respondents acquired their farm inputs directly from the market. More than half of the respondents (51.04%) transport their farm produce from the farm by head. Nearly all the respondents (90.68%) had no access to credit facilities. 69.79% of the respondents wish to continue in farming by reasons of income stability and food security. 78.12 % of the respondents encountered one problem or the other viz: (transportation, glut, credit spoilage). 35.42% of the respondents were faced with the problems of glut and credit purchase. 78.12 % of the respondents showed their desired for government intervention and assistance.

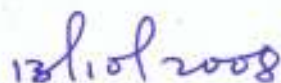
From the multiple regression analysis it was observed that all the independent variables played an important role in explaining the variability of each of the variables in optimum farm plan for food security. The enterprise(s) that contributed immensely to the farmers net income were the food crops and cash crop enterprises with a total net farm income per annum of 128,361.79naira and 115,685.95 naira respectively. The gross margin of each of the enterprises were 142,794.97 naira and 133,976.44 naira respectively. Linear programming was used to determine the total gross margin and to determine the profit line of the two enterprises; (food crops and cash crops) the equation was subjected to three constraints; land, capital and labour. The profit line is |4.3and 3.9| respectively. This is the optimal feasible solution.

CERTIFICATION

I certify that this project was carried out by **OLADUGBA, MOSUNMOLA LYDIA**,
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DATE

DEDICATION

This project is dedicated to the Almighty God, the giver of knowledge, my source of inspiration, the sustainer of my life and the strength of my life. And to my loving husband, Mr. Adeleke S. O, to my Children; Blessed and Anointed and to all my loving brothers and sisters.



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My utmost gratitude goes to God Almighty who created all things, to him be Glory, Honour and Majesty forever-Amen.

I sincerely appreciate the exclusive capability, talent and competence of my supervisor Dr. I. A. Ajibefun who in no small way contributed to the successful completion of this project. May God bless you. I am also grateful to the other academic staff of the Department of Agricultural Economics and Extension for their joint contributions to the successful completion of this programme. I must not but mention the efforts of the Departmental Technologist; Late Pastor Ajulo S. O. May his soul rest in perfect peace.

I am highly indebted to my loving husband Mr. Adeleke, Sobanke Olaosebikan, who made sure of bringing my vision into fulfillment through his moral, financial and spiritual support, thanks forever. My profound gratitude also to my Children; Blessed and Anointed for their love, prayers and full support, may God protect and uplift you forever-Amen.

I must not forget the efforts of my valuable brothers; Johnson, Kole, Kehinde, Idowu (Baba London), Philip, Eniola, Afolabi, Peter and my precious Sisters; Justina, Victoria and Temitope for their support and companionship. May God crown all your efforts with good success-Amen.

The contribution of my colleagues at Isero Grammar School, Odigbo, and Sister Yemisi (FUTA) are highly appreciated.

Finally, I cannot but acknowledge the efforts of my Church Pastor and his wife, Pastor and Mrs. Afolabi Emmanuel C. A. C. "Jesus is Able Ministry" Odigbo for their prayers, love and kindness toward my entire family. God will crown you in Jesus name-Amen.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 FOOD SUPPLY PROBLEM

Food security is a major concern of every nation. Food distribution experts go so far as to say that urban food security could well become "the greatest humanitarian problem" of the 21st century. Food security is defined as "access by all people at all times to enough food for an active healthy life". There are various problems related to food distribution in the developing world. For a number of reasons; including drought, economic crises, civil unrest, war, inefficiencies and service breakdown will occur with great frequency. When they occur, even though the effects may be localized or temporary, it is the poor who suffer" (FAO publications 1998).

In Nigeria, a number of reasons have been given for the decline in agricultural and food production. These include: the cultivation of low yielding crop varieties, the absence of low cost and adaptable technology (Olayide, 1975). Lack of breakthrough in agricultural investment, unwillingness of the entrepreneurial class to devote organizational ability to agricultural/food production, and low status accorded to farmers in the society (Adeniran, 1989). That the food supply can be a problem even in economically stable countries, was shown by what happened in Britain in September 2000.

Apart from the factors that have acted to accelerate the growth in food demand and supply, the short fall is further aggravated by the disparity between the estimated annual population growth of 3.5% per annum compared with an

estimated 2.0% annual rate of food production (Ojo et al., 1993). The short fall leads to massive food importation which drained the country's foreign exchange earning during the 1960-1979 which worsen the nation agricultural economy. The trend of importation continued until the early 1980's when the Federal military government banned food importation in 1985 due to economic recession.

TABLE 1:1 NIGERIA FOOD REQUIREMENT AND AVAILABLE FOOD SUPPLY (2000-2010)

Year	Population (2.83%) Annual Growth (Millions)	Actual Food Requirment (Million Tonnes)- FAO	Total Food Production (Million Tonnes)	**Other Uses- Wastage (Million Tonnes)	Availble Food (Million Tones)	Available Calorie Intake Per/Caput/Day (Kcal)	Daily Food Intake Per Caput (Kg)
2000	117.40	51.42	127.84	58.49	69.35	2933	1.60
2001	120.72	52.88	132.95	60.83	72.12	3006	1.64
2002	124.14	54.37	138.27	63.29	74.98	3029	1.65
2003	127.65	55.91	143.62	65.79	77.83	3080	1.68
2004	131.26	57.49	149.55	68.42	81.13	3098	1.69
2005	134.98	59.12	158.52	72.53	85.99	3208	1.75
2006	138.80	60.79	168.04	76.85	91.19	3300	1.80
2007	142.73	62.52	178.12	81.53	96.55	3392	1.85
2008	146.77	64.29	191.47	87.61	103.86	3557	1.94
2009	150.92	66.10	205.84	94.18	111.68	3722	2.03
2010	155.19	67.97	221.27	101.25	120.02	3886	2.12

* Actual food requirement based on FAO
= (population x 1.2 kg/caput/day x 365 days
/ 1000)

** Other uses include: Export, Feed, Seed,
processing and Waste

Source: Base Line Data from F.M.A. & R.D.

TABLE 1:2 TOTAL VALUE AND GROWTH IN TOTAL VALUE OF NIGERIA'S FOOD IMPORTS, 1970-1990 (1970 = 100.00).

Year	Total value (million)	Growth total value (1970=100.0)	Annual% change
1970	58	100.0	51.7
1971	88	151.7	12.1
1972	95	163.8	53.4
1973	126	217.2	53.4
1974	156	269.0	51.8
1975	278	432.8	63.8
1976	439	756.9	24.1
1977	702	1,210.3	453.4
1978	1,110	1,913.8	703.5
1979	1,105	1,905.2	-8.6
1980	1,500	2,586.2	681.0
1981	1,820	3,137.9	551.7
1982	1,642	2,831.0	-06.9
1983	1,297	2,236.2	594.8
1984	43	2,453.4	782.8
1985	941	1622.4	169.0
1986	807	1,391.4	-231.0
1987	1,647	2,839.7	1,448.3
1988	1,220	2,103.4	-736.3
1989	2,006	3,458.6	1,355.2
1990	3,764	6,489.7	3,031.1
Mean	1,038.67	774.79	395.54
S.D.	(881.74)	(1,522.27)	(920.93)

Source: Central Bank of Nigeria: Annual Report and Statement of Accounts, various issues.

Analysts believe that rapid urban growth will present enormous challenges to food suppliers and distributors. It is estimated that by the year 2007, over half of the world's population will live in cities. "Supplying city dwellers with safe and affordable food will strain the food supply and distribution chain to the breaking point". (FAO publication, 1998). Attainment of food security is a matter of utmost concern at both household and national levels. The questions that arise therefore: (i) Are the farmers operating at optimum level of food production in the area? (ii) What is the cost and revenue

structures of the farmer? In order to answer these questions, the study will have the following general and specific objectives.

1.2 OBJECTIVES OF THE STUDY

The broad objective of this study is to determine optimum farm plan for food security in Nigeria. The broad objective would be achieved through the following specific objectives:

- (a) analyse the socio-economic characteristics of the respondents.
- (b) estimate cost and returns to the farmers, and
- (c) determine the best enterprise to combine in order to achieve best level of production.

1.3 JUSTIFICATIONS FOR THE STUDY

Food security is a fundamental challenge confronting the global community at the beginning of the 21st century with increasing globalization and interdependence, the consequences of food insecurity and hunger are, environmental degradation, social strife, conflicts, diminished economic growth and spill-over effects of hunger. Right now, the food available worldwide would be sufficient to meet the needs of earth's population if it were distributed according to need. But as it is, some 840 million people go to bed under-nourished every night (FOA Publication, 1998). It is therefore necessary to devote serious attention to studying issues on food security. This study is therefore justified as it will analyse optimum farm plans in relation to food security among small scale farmers in the study area.

1.4 SIGNIFICANCE OF THE STUDY

The government at Federal, State and Local or grass root levels have been making considerable efforts by initiating and executing agricultural schemes to solve food problems in Nigeria. The findings from the study would help the policy makers at both levels to formulate and execute rightly the appropriate policy and programme to put in place at various levels to address the problem of food insecurity in the country through optimal farm plan. The result of this study would serve as basis for further research work on optimum farm plan and attainment of food security.



CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 FOOD SECURITY: CONCEPTS AND DEFINITIONS

Food security is important at household, national and global levels. According to Siamwalla and Valdes (1984) food security is the ability of countries, regions or households to meet levels of consumption on yearly basis. Similarly, the committee on world food security defines food security as the physical and economic access of household members to adequate food without undue risk of losing the access. Food security for individuals is often the main focus of attention; there are also household, national and international dimensions of food security. Olayide (1998) explains each of these dimensions; at the household level; food security implies adequate access to food over time, at the national level; food security connotes adequate availability of food from all sources to meet the per capita requirement of the population overtime. And at the international level, food security means adequate global food availability and adequate capacity by food -deficit countries to import or otherwise acquire food in required quantities from food -surplus countries.

Sharma (1992) pointed out three dimensions toward food security, these dimensions or components are; physical access to food, economic access to food and sustainability of access to food.

PHYSICAL ACCESS TO FOOD: This relates to issue of food supply or food availability.

ECONOMIC ACCESS TO FOOD: Is concerned with the capacity to purchase or acquire food i.e effective demand for food.

SUSTAINABILITY ACCESS TO FOOD: These deals with those food supply and demand that determined the ability of a nation or household to enjoy stable, sustained physical and economic access to food over time. Furthermore, food security is not synonymous with food sufficiency. Food sufficiency is a state of affairs in which a nation or household is able to satisfy its food requirement from its own food production activities without recourse to argumentation through food import or transfer of other external supply facilities. Food security on the other hand is possible without food –sufficiency if there is adequate capacity to acquire additional food from external source to meet requirement (Olayide, 1998).

2.2 THE STATE OF FOOD SECURITY AND POVERTY IN NIGERIA

Agriculture in the Nigerian economy is acknowledged to be the dominant sector of the economy employing about 70%of the population. Paradoxically, despite Nigeria's immense human and material resources as well as a favourable climate, Nigeria remains a poor country. It is ironic that over 50% of Nigerians are poor in a country that earns over US \$15billion annually. The emergency of oil in the early and mid 1970's completely derailed the country as agriculture was relegated to the back seat with declining national investment ever since (Adu, 2005).

According to the United Nations report (1999), Nigeria's human poverty index (HPI) was 41.6% which places Nigeria among the 25 poorest nations in the world, compared with other African countries like Zimbabwe (17.3%), Botswana (22.9%), Kenya (26.1%), Lesotho (27.57%), Ghana (32.6), Egypt (34.8%) and Zambia (35.1%). Nigeria, with a life expectancy of 52 years, adult literacy of 55.6%, infant mortality (below 5 years) of 146 per 1000 live births and where about 70% of the population do not have access to potable water, health care and electricity is indeed a poor and food insecure country.

Table 2.1 shows the trend in poverty levels in Nigeria between 1980 and 1996.

TABLE 2.1 TREND OF POVERTY LEVEL (1980-1996)

Year	Poverty level%	Estimated total population (million)	Population in poverty (million)
1980	27.2	65.0	17.7
1981	46.3	75.0	34.7
1992	42.7	91.5	39.3
1996	65.6	102.3	67.1

Source: Federal Office of Statistics: Poverty Profile in Nigeria (1999)

Out of the five functions ascribed to agriculture in national economy and development, the provision of food and fibre stands out clearly as a major role needed for healthy development of the people and the growth of industries and thus, for food security and poverty reduction. Before the discovery of oil in the 1960's, agriculture accounted for over 60% of the gross domestic product (GDP). However, the share of agriculture in the GDP fell from 45.59% in 1971 to 20% in 1980 but increased to 41.22% in 1991 not as a result of increased



agricultural production but as a result of the fall in the value of oil exports. The situation has continued to be daunting given the declining fall of agricultural out-put in the country.

Table 2.2 SECTORAL CONTRIBUTIONS TO THE GDP (1999 – 2003)%

Sector	Years					Average 1999- 2003
	1999s	2000	2001	2002	2003	
Agriculture	35.31	26.29	30.60	31.18	27.03	30.08
Industry	36.93	51.99	46.95	43.00	47.50	45.27
Building and construction	0.86	0.69	0.74	0.72	0.62	0.73
Whole sale and retail trade	15.20	11.62	12.41	14.17	14.50	13.58
Services	11.70	9.43	9.25	10.93	10.35	10.34
Total	100.00	100.00	100.00	100.00	100.00	100.00

N.B: Industry; include crude petroleum, mining and quarrying.

Source: CBN (2003) Annual Report and Statements of Account P. 136.

2.3 CHALLENGES OF FOOD SECURITY

The challenge of feeding growing populations is complicated where there is widespread poverty. Many large cities in the developing world, such as Dhaka, Freetown, Guatemala city, Lagos (Nigeria), and Lapaz, already face poverty rates of 50 percent or more. When discussing food supplies for such populations, analysts make the distinction between availability and accessibility. Food may be on sale in city markets that is available – but this is of little comfort to the urban poor if the prices is beyond their reach. It has been noted that as the income of some city dwellers rises, they demand and consume a greater quantity and a wider variety of food-stuffs. The urban poor on the other hand, have difficulty, purchasing sufficient food to meet their

needs and preferences. Such poor family may have to spend between 60 and 80 percent of their total income on food. Many households cannot even meet their minimum dietary requirements, and the inevitable result is malnutrition.

As cities grow, the surrounding field once dedicated to agricultural production are progressively lost to new housing, industry and roads. Consequently, crop lands are being pushed further away from the cities they feed. Often, little or no food is grown within the cities, and meat arrives from distant rural areas. In many developing countries, the roads along which produce is transported from farms to cities are inadequate. This means longer transportation times, greater wastage and at the end, higher prices to consumers, many of whom are very poor. Many developing nations are seeing millions of new inhabitants flow into already overcrowded cities in search of better living conditions, jobs, goods and services. In West Africa, for example, only 14 percent of the population lived in Urban areas in 1960. By 1997 the urban population was 40 percent and by 2020, it is believed, the figure will rise to 63 percent. (FAO, publication 1998). Stepping up the flow of food into urban areas to feed all these hungry mouths is a mammoth tasks. It requires the synchronized efforts of thousand of farmers, packers, truckers, traders, and handlers as well as the use of thousands of vehicles. Yet, in some places, the increase demand for food from urban centers is outstripping the capacity of surrounding areas to provide it.

In many areas it is not usual for rapid urban growth to take place haphazardly and illegally. The results are an unhealthful and insecure

environment with high crime. According to FAO publication 1998 "Feeding the cities" – "cities administrators in the developing world find themselves struggling to cope with burgeoning populations in a physical environment that is really only adequate for a fraction of the inhabitants". Most of the African markets are often not planned but spontaneous, they lack even the most rudimentary facilities; the markets are poorly maintained and badly managed.

Unhygienic conditions resulting from increasing amounts of organic and inorganic waste create health risks. As a response to inadequate, unreliable or irregular access to food supplies, city dwellers, like many in Kano, Nigeria, attempt to cultivate any vacant land that might be available. Yet, most of these people have no formal rights to that land. They thus risk eviction and the destruction of the produce they toil to cultivate.

The list of issues faced by rapidly growing cities seems endless. International organizations, planners, and administrators are doing what they can to resolve them. Their strategies include promoting rural food production and providing adequate access, as well as building new roads, markets and slaughter house. They see the need to promote private investment in warehouse facilities improve access to credit for farmers, traders, and transporters and enforce appropriate trade and hygiene regulations. Yet, analysts observe that despite all the efforts that have been made, many local authorities fail to recognize and respond appropriately to the issues involved. Even when they do, available resources are insufficient to address the problems. Urban populations will continue to grow and these problems (hunger, malnutrition, and poverty) will only grow with them – "unless we take action now".

There are however, good reasons to believe that the problems of food supply and distribution will soon be solved.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 THE SCOPE/STUDY AREA

The study was carried out in Ondo State which is one of the thirty-six states of the Federal Republic of Nigeria. The State, has an approximate land area of 14,793,189 square kilometers and a population of 3.4 million (2006, Census). The State is made up of eighteen Local Government Areas. It lies on the tropics and the climatic condition is of two distinct seasons; the rainy season (April – October) and dry season (November - March). The temperature through out the year ranges from 21°C to 29°C while the humidity is relatively high. The people of the State are predominantly Yoruba with different dialectical groups viz: Akoko, Owo, Ondo, Ikale, Ilaje and Akure. The Ijaw-Arogbo and Ijaw – Apoi are not of Yoruba Origin. Ondo State is an Agrarian state and besides farming, the inhabitants also engaged in various occupations such as trading, manufacturing, commerce and white collar jobs. The field work for this study covered five Local Government Areas (LGAs) randomly selected from the State. The LGAs were: Idanre, Ile-Oluji-Okeigbo, Ondo West, Ondo-East and Odigbo. These LGAs constitute the areas where most of the cash crops and food crops were produced in larger quantity in Ondo State.

3.2 POPULATION AND SAMPLE

The study covered five Local Government Areas of the State namely: Ile-Oluji/Oke Igbo, Ondo West, Ondo East, Odigbo Local Government Areas.

In Idanre Local Government Area, four towns/villages were randomly selected. These include; Alade, Atosin, Owena and Ofosu. Oluwasola, Ramonu, Lipanu and Idiitoko were the towns/Villages selected in Ile-Oluji Okeigbo Local government Area. In Ondo-West; Laye, Bagbe/Igunshin Logara and Motadole/Litaye were selected. Likewise, Bolorunduro, Oboto, Igba, and Agho-lesin (Owena) were selected in Ondo-East. Finally, Alagbade, Akintola, Omifon and Gada were selected in Odigbo local Government Area.

Five respondents were chosen from each of the four towns/villages selected, making a total of twenty respondents in each of the Local Government Areas. The respondents in the study area were interviewed through a well structured questionnaire and the community leaders who helped in educating them on the subject matter.

Data for the study were collected using field survey. A well structured questionnaire was used to collect information from the selected respondents. With the assistance of the extension agents in each of the Local Government Areas, the list of towns/villages in each of the Local Government Areas were obtained. A total of one hundred copies of questionnaire were administered in the selected areas. The study was also descriptive in design as information about the variables of the study were collected as they existed at the time of the data collection.

3.3 THE RESEARCH INSTRUMENT USED FOR DATA COLLECTION

The instrument used for collecting data from the respondents was structured interview schedule designed for the study (Appendix A). Primary data (field survey) was obtained from the structured questionnaire. Secondary data were also obtained through the review of related literatures. The interview schedule was divided into eight sections. These are briefly described subsequently in this report:

SECTION A: Demographic/Socio-economic information. This section contained variables, which are selected personal characteristics of the respondents.

SECTION B: General farm information: The variables under this section include, farm location, farm distance from respondent residents, method of farm acquisition, farming experience, farm size, source of input means of transportation of farm produce and why are the respondents into farming.

SECTION C: Information on Labour: The respondents were asked various questions on the type(s) of labour used, what operation the respondents hired labour for and the cost spend on the type(s) of labour used.

SECTION D: Information on credit facilities: Variables under this include the type of operation the respondent borrow money for, the source of their loan, the term of the loan borrowed, the amount borrowed last, the last time the respondent borrowed money and the problems encountered.

SECTION E: General problems faced by the respondents. Here the respondents were asked various questions ranging from the assistance they got from the government, the general problem(s) on farming and the way out.

SECTION F: Records on last cropping season. The variables under this section include the cropping pattern, type of crops, crop output, price of each produce in Naira, cost of labour, quantity of crop harvested, quantity sold, quantity stored for next planting season, and the proportion for household consumption.

SECTION G: Livestock production and sales record. Variables include: Type of animal, current number, number sold last, amount sold, cost of medication, cost of feed.

SECTION H: Other business engaged by the respondent, income generated and problem(s) encountered.

3.4 RESEARCH PROCEDURE

Primary data were collected from one hundred respondents spread across the selected Local-Government Areas. A well structured questionnaire was used to collect relevant data from the respondents. Personal interview was done in their language (Yoruba) and responses were entered and recorded in English language against each of the questions.

There were two variables in this study; These were the dependent variable and the independents variables. The dependent variable was the optimum farm plan for food security in the state while the independent variables were the resources like land, labour, capital etc.

**TABLE 3:1 DISTRIBUTION OF QUESTIONNAIRE AMONG
RESPONDENTS**

LOCAL GOVERNMENT AREAS	NUMBER OF QUESTIONNAIRE
IDANRE (i) Alade (ii) Atosin (iii) Owena (iv) Ofosu	5 5 5 5
ILEOLUJI-OKEIGBO (i) Oluwasola (ii) Ramonu (iii) Lipanu (iv) Idi-Iroko	5 5 5 5
ONDO WEST (i) Laye (ii) Bagbe/Igunshin (iii) Logara (iv) Motadole/Litaye	5 5 5 5
ONDO EAST (i) Bolorunduro (ii) Oboto (iii) Igba (iv) Agholesin (Owena)	5 5 5 5
ODIGBO (i) Alagbede (ii) Akintola (iii) Omifon (iv) Gada	5 5 5 5
Total	100.0



3.5 ANALYTICAL PROCEDURE

3.5:1 DESCRIPTIVE STATISTICS

The Socio-economic characteristics of the respondents were descriptively presented using frequencies, percentages, and cumulative percentages.

3.5:2 BUDGETARY/COSTS AND RETURNS ANALYSIS

Budgetary analysis was carried out using data collected on cost and returns for each enterprise in the study area. The respective enterprise Gross Margin (GM;) and Net Farm Income (NFI) were calculated from the formula:

$$GM = TR - TVC \text{ ----- (i)}$$

Where:

GM = Gross Margin from each enterprise (j^{th})

TR = Total Revenue from j^{th} enterprise

TVC = Total Variable Cost of j^{th} enterprise

TC = TVC + TFC ----- (ii)

Therefore: NFI = TR - TC ----- (iii)

Where:

TC = Total Cost of j^{th} enterprise

TFC = Total Fixed Cost of j^{th} enterprise

NFI = Net farm income or revenue of j^{th} enterprise.

The cost elements in the study were the cost of hired labour, imputed cost of family labour, cost of inputs and interest on loan.

3:5:3 LINEAR PROGRAMMING

The basic linear programming (LP) model is specified to maximize the Total Gross Margin (GM) for each of the enterprise to ascertain the most optimal enterprise combination and production levels within the limit of the resource constraint specified. The model is specified as:

$$\text{Maximize: TGM} = \sum_{j=1}^n C_j X_j \text{ ----- (iv)}$$

Subject to:

$$\sum_{j=1}^n a_{ij} X_j \leq b_i \text{ ----- s(v)}$$

$$(i = 1, 2, \dots, 4)$$

and $x_j \geq 0$ (non-negativity constant).

Where:

TGM	=	Total Gross Margin to be maximized.
C_i	=	Gross Margin of each enterprise (j^{th})
X_j	=	Size of each enterprise (Ha)
n	=	The number of enterprises ($n = 1, 2 \dots 4$)
a_{ij}	=	The amount of i^{th} resources needed for j^{th} activity.
b_i	=	The maximum level of i^{th} resources available during the period of production.

The alternative enterprises (X) examined are:

X_1	=	Cash crops
X_2	=	Food crops
X_3	=	Fruits
X_4	=	Vegetable

The list of constraints (bi) investigated in this study are:

- B_1 = Land
- B_2 = Labour (pre-planting and post planting)
- B_3 = Capital (equipment, tools, seeds, fertilizer etc)

3:5:4 SENSITIVITY ANALYSIS

The maximum levels of the various constraints (bi's) available were later varied at 5 and 10 percent levels and the Gross Margin and the level of resources used were held constant. This was done in order to investigate the effects of the possible changes in resources available on the optimal solution obtained. It was used to test the stability of the optimal plan under varying resources regimes.

3:5:5 MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis using the Ordinary Least Square (OLS) techniques was used to examine how the socio-economic factors of the respondents influence output.

The estimated model is implicitly stated as:

$$Y = f(x_1 \dots x_n) \text{ where } n \text{ varies from } 1 - 7$$

$$Y = \text{Total production or output}$$

$$X_1 = \text{Age of respondents}$$

$$X_2 = \text{Sex of respondents dummy (m = 1, fm = 0)}$$

$$X_3 = \text{Educational qualification}$$

$$X_4 = \text{Years of farming (farming experience)}$$

$$X_5 = \text{Farm size}$$

X_6	=	Number of children
X_7	=	Number of children involve in farming
e	=	error term.

APRIORI EXPECTATIONS

- (i) Age of respondents (x_1): Increase in the age of respondents can increase or decrease production, hence revenue, thus the coefficient is expected to have positive influence over the output ($b_i > 0$) i.e. from equation (v)
- (ii) Sex of respondents (x_2): The male respondents is expected to have higher production than the female.
- (iii) Educational qualification (x_3): Increase in the level of education is expected to create more effectiveness in the use of available productive resources, thus, it is logically expected that the variable will have positive influence on the output.
- (iv) Farming experience (x_4): The more the years of experience, the more it is expected that the farmers will have acquired and master the use of the available resources. Therefore, it is expected that the coefficient of the variable should carry positive sign in relation to the dependent variable (Total Revenue).
- (v) Farm size (x_5): the larger the farm size, the larger the level of output hence, it is expected that the farm size should have a positive influence on the output.

- (vi) Number of Children (x_6): The number of household is expected to have a positive influence on the output. Therefore, positive relationship is expected to be between the number of children in the house and the level of production.
- (vii) Number of Children involve in farming (x_7): Labour is expected to have a positive relationship with the level of production.

Three functional forms were estimated with the aim of selecting the lead equation based on economic (a-priori expectation), and statistical (t-value) criteria. The three functional forms are; linear, semi-log and double log. They are explicitly stated as:

$$\begin{aligned}
 Y_i &= b_0 + \sum(b_i X_i) + e \text{----- Linear function} \\
 Y_i &= \ln b_0 + \sum(b_i \ln X_i) + e \text{---- Semi-log function} \\
 \ln Y_i &= \ln b_0 + \sum(b_i \ln X_i) + e \text{----- double log function}
 \end{aligned}$$

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4:1 DEMOGRAPHIC/SOCIO-ECONOMIC

CHARACTERISTICS OF THE RESPONDENTS.

In this section, some salient socio-economic characteristics of the respondents were discussed. An understanding of these will provide a basis for proper discussion of the result obtained.

4:1:1 AGE

The respondent's ages ranged between 20 - 82 with a mean of 54:53 years. The modal age range of the respondents was between 41 - 50 years which represent 29.17%. This was followed by the age ranges of 61-70 years, 51 - 60 years with respective percentages of 22.92 and 18.75. There were sharp decline in the number of respondents involved from ages 21-30 years, 31 - 40 years, 71-80 years and 81 years and above with respective percentages of 6.25, 7.29, 14:58 and 1.04 respectively. Table 4:1:1. The result shows that most of the respondents were within the economically active population and therefore, constitute a good labour force in food production to enhance food security in their society.

Nevertheless, the percentages of the respondents between the age range of 20 - 41 years are less, this might have been that most of the people that falls between this age range were in school or were engaged in other activities apart from farming in the cities. Likewise, the percentage of the respondents also decrease between the age range of 71 - 82 years. This means that as farmers

are getting older, there is a corresponding decrease in their level of production. This agreed with the findings of Ewuola (1985) and assertions by Oyatoye and Awoyemi, that farmers are aging out of the productive life.

TABLE 4:1:1 AGE DISTRIBUTION OF RESPONDENTS

Age Range (Years)	Frequency	Percentage	Cummulative Percentage
21-30	6	6.25	6.25
31-40	7	7.29	13.54
41-50	28	29.17	42.71
51-60	18	18.75	61.48
61-70	22	22.92	84.38
71-80	14	14.58	98.96
Above 81	1	1.04	100.00
Total	96	100.00	

Mean = 54:53, Range 20 – 82.

Source: Field Survey 2006.

4:1:2 SEX

From the study, male respondents represent 95.83% while female respondents made up 4.17%. Table 4:1:2. There were more male farmers in the study area. The reason might be that women are engaged in other activities apart from farming. These activities include: teaching, sowing, trading, home management etc. And women tend to be more at home than men by nature of the role they play as wives and mothers. Therefore, it afford them the opportunity of having the time to be involved in other activities apart from farming as ascertained by Ojumu (2002).



TABLE 4:1:2: GENDER DISTRIBUTION OF RESPONDENTS.

Sex	Frequency	Percentage	Cummulative Percentage
Female	4	4.17	4.17
Male	92	95.83	100.00
Total	96	100.00	

Source: Field Survey, 2006.

4:1:3 LEVEL OF EDUCATION

Olaitan (1984) stated that, a good agriculturist should be professionally skilled and possess a minimum of Nigerian Certificates in Education (NCE). On the other hand, Olotu (1992) highlighted the qualities of a good agriculturist as follows:

- Possession of sound knowledge of agriculture in its entire ramifications.
- He/she must be convinced in his/her mind the importance of actual experiences; this will aid him/her in emphasizing the importance of practical agriculture, and the use of innovations or new technology disseminated by the extension workers, to improve agricultural productivity which will invariably increase the rate of food security.

From the survey carried out, only 1.04% of the respondents had post-secondary education, 32.29% and 12.50% represented respondents with primary and secondary schools education respectively. Most of the respondents had no formal education and this represented 54.17% as shown in Table 4:1:3. The rate of illiteracy among respondent in the study area were very high. The reason for this might have been that most of the respondents had

no opportunity to attend school and those that attended school, might not necessarily completed their education.

The result of this is that the rate of adoption of technology or improved farm practice would be low. Since level of education is positively correlated with productivity and adoption of improved technology, Olayemi et al. (1986). It is therefore likely that farmers in the areas may not be adopting improved farm practices in their decision making process. Hence, the fear of food insecurity in the study area.

Table 4:1:3: DISTRIBUTION OF RESPONDENTS BY LEVEL OF EDUCATION

Level	Frequency	Percentage	Cummulative Percentage
No formal education	52	54.17	54.17
Primary education	31	32.29	86.46
Secondary education	12	12.50	98.96
Post-secondary education	1	1.04	100.00
Others.	-	0.00	100.00
Total	96	100.0	

Source: Field Survey 2006.

4:1:4: MARITAL STATUS

96.88% of the respondents were married, 3.12% of the respondents were single while none of the respondents were neither widowed nor divorced as presented in Table 4:1:4. This shows that the married were more interested in farming than the single and it might have been due to the fact that the male farmers rely on farming to cater for their household, since most of the

respondents were male (Table 4:1:2). The single might not be interested in farming. Perhaps, they were involved in other jobs to earn their living in the nearby cities/urban areas.

As ascertained by Olivio Argenti (1999), an FAO urban-food security specialist that; "the challenge of feeding growing populations is further complicated where there is widespread rural-urban migration in many cities in the developing world, such as Dhaka, Freetown, Guatemala city, Lagos and La Paz, already face poverty rates of 50 percent or more".

TABLE 4:1:4: DISTRIBUTION OF RESPONDENTS BY MARITAL STATUS

Status	Frequency	Percentage	Cummulative Percentage
Married	93	96.88	96.88
Single	3	3.12	100.00
Widowed	-	-	100.00
Divorce	-	-	100.00
Total	96	100.00	

Source: Field Survey 2006.

4:1:5 MAJOR OCCUPATIONS

The study revealed that 93.75% of the respondents were full-time farmers while the remaining 6.25% were involved in other non farming job (Table 4:1:5). The finding implies that most of the respondents were engaged in one farming activities or the other and the remaining few were engaged in other jobs apart from farming.

This findings correlates with the result from Table 4:1:3 (Distribution of respondents by level of education) where 54:17% of the respondents had no formal education and just 1.04% of the respondents had post-secondary

education. The high level of illiteracy would undoubtedly be a constraint to the farmer's participation, appreciation and adoption of modern farming techniques. Hence, food production is invariably affected. This might have been the reason while most of the respondents took farming as their major occupation/since their level of education can not fetch them white-collar jobs.

TABLE 4:1:5: DISTRIBUTION OF RESPONDENTS BY MAJOR OCCUPATION

Major Occupation	Frequency	Percentage	Cummulative Percentage
Farming	90	93.75	93.75
Non-farming	6	6.25	100.00
Total	96	100.00	

Source: Field Survey 2006.

4:1:6 HOUSEHOLD SIZE

Keeping of large family is common in African tradition. The family members provide farm labour to increase household's production enterprises. Respondents in the study area keep large families (Table 4:1:6). Where 79.09% have between one to ten household size, 8.62% of house size between eleven to fifteen, and 12.29% of household above sixteen. To cater for this large family, farmers would have to adopt strategies that ensure optimum combination of inputs in the farm.

4:1:7 HOUSEHOLD MEMBERS INVOLVED IN FARMING

Most of the respondents have household members of about five involved in farming activities, which represent a total of 96.88% and 3:12% represent

between six to ten household members that are involved in farming activities (Table 4:1:7). Thus, the use of hired labour to complement this family size.

4:1:8 SOURCE OF FARM LABOUR

It was observed that 68.75% of the respondents relied on hired labour for their farm operations in addition to the family labour (Table 4:1:8). The reason for this larger percentage of hired labour might have been to the fact that the total number of household members that are involved in farming operations and activities were minimal, hence, the use of hired labour which are readily available at every farming seasons. Hired labours are needed to complement the family labour rendered to the farmers that have larger farm lands to achieve their aims for optimal food production. Hence, food security.

TABLE 4:1:6: DISTRIBUTION OF RESPONDENT BY HOUSEHOLD SIZE

Household Size	Frequency	Percentage	Cumulative Percentage
0-5	41	41.71	42.71
6-10	36	37.38	79.09
11-15	8	8.62	87.71
16 and above	11	12.29	100.00
Total	96	100.00	

Mean = 7.9, range 1-17

Source: Field Survey, 2006.

TABLE 4:1:7: DISTRIBUTION OF RESPONDENT BY HOUSEHOLD INVOLVED IN FARMING.

Number Involved In Farming	Frequency	Percentage	Cumulative Percentage
0-5	93.0	96.88	96.88
6-10	3.0	3.12	3.12
11 and above	-	-	100.00
		100.00	

Mean = 2.65, Range 1 – 12

Source: Field Survey, 2006.

TABLE 4:1:8: DISTRIBUTION OF RESPONDENT BY SOURCE OF FARM LABOUR.

Labour	Frequency	Percentage	Commulative Percentage
Hired Labour	66	68.75	68.75
Family Labour	30	31.25	100.00
	96	100.00	

Source: Field Survey, 2006.

4.2 GENERAL FARM INFORMATION

Variables such as method of farm acquisition, farming experience, reason for farming, farm size, sources of farm inputs and mode of transportation of farm produce are extensively discussed from the result obtained.

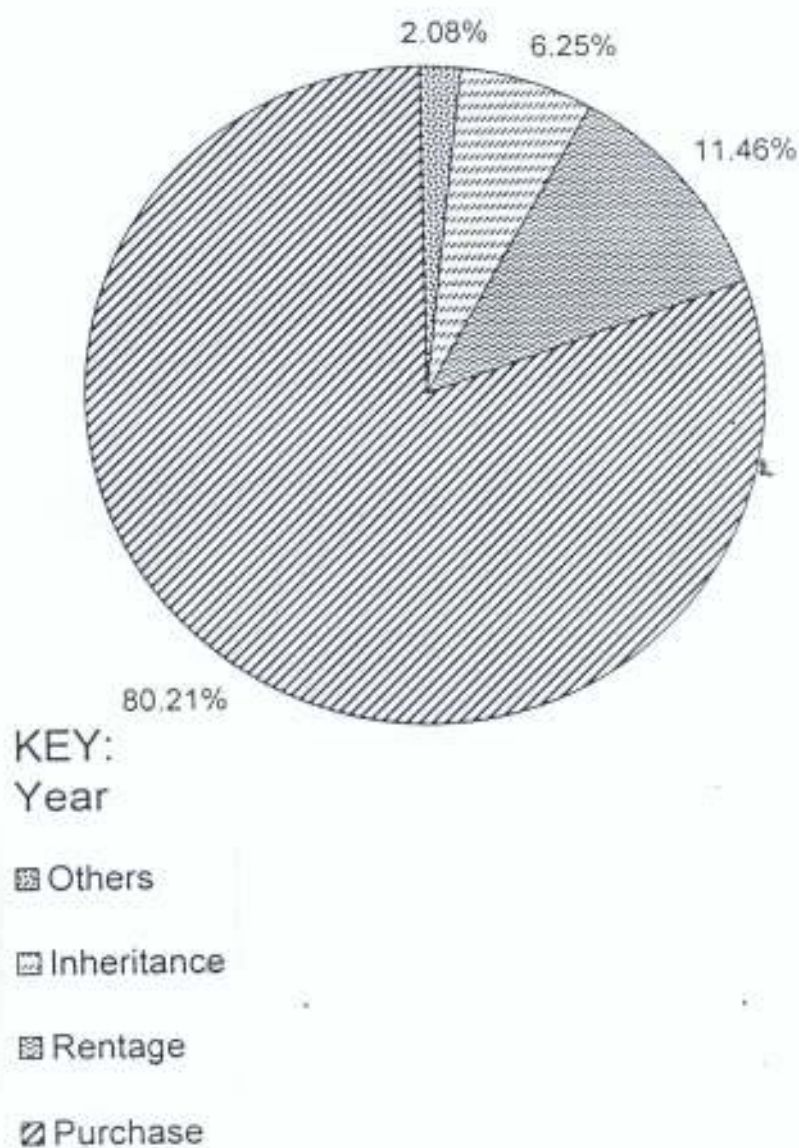
4.2.1: METHOD OF FARM ACQUISITION/LAND TENURE SYSTEM

The assertion that says that land is a free gift of nature means that every individual should have equal access to land, since, land is a major factor of production. The survey carried out in the study area was converse to this assertion. Because 80.21% of the respondents were rightful owners of their farm land by purchasing, 11.46% of the respondents represented those that acquired their farmland by rentage, 6.25% represents those that inherited their farmland while 2.08% of the respondent acquired their farm by other means which include leasing and gift. (Fig. 4:2:1).

The reason for the greater percentage of those that acquired their land by purchasing might had been to the fact that most of the farmers in the surveyed area migrated from Osun, Oyo, Kwara and Kogi States of Nigeria. This constitutes the non-indigenes of the state and they are not entitled to communal ownership of land. Thus, they resorted to becoming owners of land by purchasing. This invariably made them to be rightful owners of their farm lands and can go into the production of both food and cash crops which were either annually, biennially or perennially to increase food production and food security.

Fig: 4:2:1:

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY LAND TENURE SYSTEM

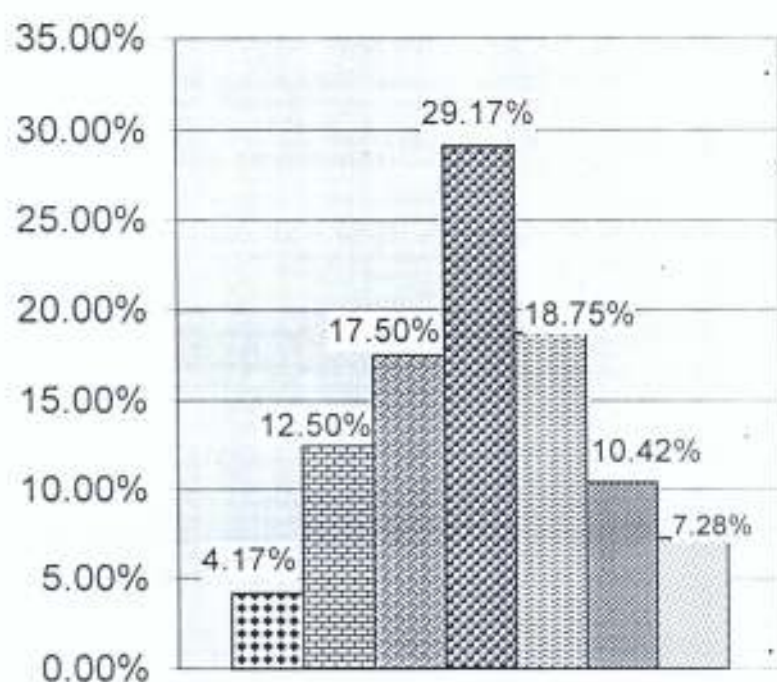


Source: Field Survey 2006.

4:2:2:FARMING EXPERIENCE

Fig. 4:2:2 shows the farming experience distribution of the respondents in years. From the figure most of the respondents had between ten to forty-nine years farming experience. This level of experience is sufficient for the farmers in the surveyed area to make sound judgments about their farming activities. Hence, they might had been associated with the risks involved in farming, and therefore, be more prudent, technically efficient in allocating their resources such that it would increase their production and level of income. Also, cost will be minimized by producing crops at the optimal level, hence food security.

**Fig: 4:2:2: DISTRIBUTION OF RESPONDENT
BY FARMING EXPERIENCE**



KEY:
Year

Mean 33:77, Range 2 – 70.
Source: Field Survey, 2006.

0	9
10	19
20	29
30	39
40	49
50	59
Above	

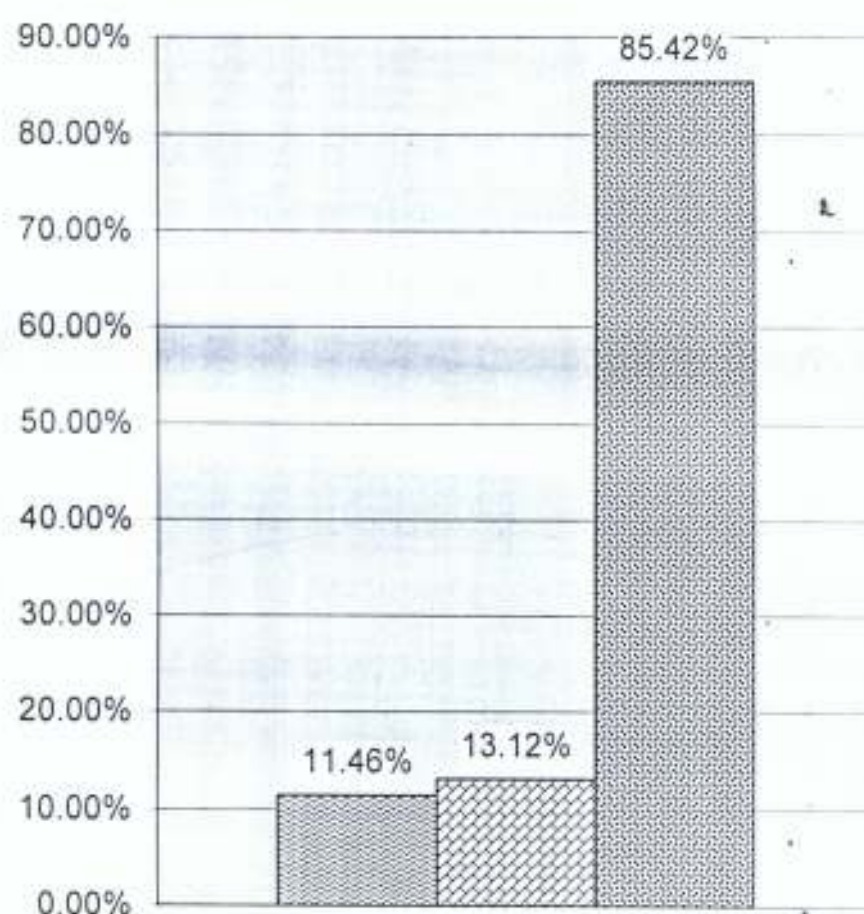


4:2:3: REASON(S) FOR FARMING

In developing countries such as Nigeria, the primary aim of food production is either to satisfy family food security or for cash or both. In addition, the goal of production also influences the types of crops cultivated and the extent of the commitment of scarce resources available for optimal production. According to Lupien and Merxa (1999), there had been a remarkable progress in increasing the quantity and quality of global food supplies and improving the nutritional status of the populace. Although, there has been general increases in production of some staple foods in Nigeria within 1970-1998 and per capita food production has been on the increasing (FAO, 1997).

Likewise from the research carried out in the surveyed area, it was observed that most of the respondents were into farming for a combination of food production and income stability (Figure 4:2:3). 11.46% the respondents went into farming for food production, 3.12% were into farming for income stability while 85.42% were into farming for both reasons. None of the respondents had other reasons for going into farming. This result is contrary to most economic thinking that farming is for profit. Farmers do not necessarily go into farming for profit maximization but for income stability and food security.

**Fig. 4:2:3: DISTRIBUTION OF RESPONDENTS BY REASON(S)
FOR FARMING.**



KEY:
Year

-  Food Production
-  Income Stability
-  Food Security

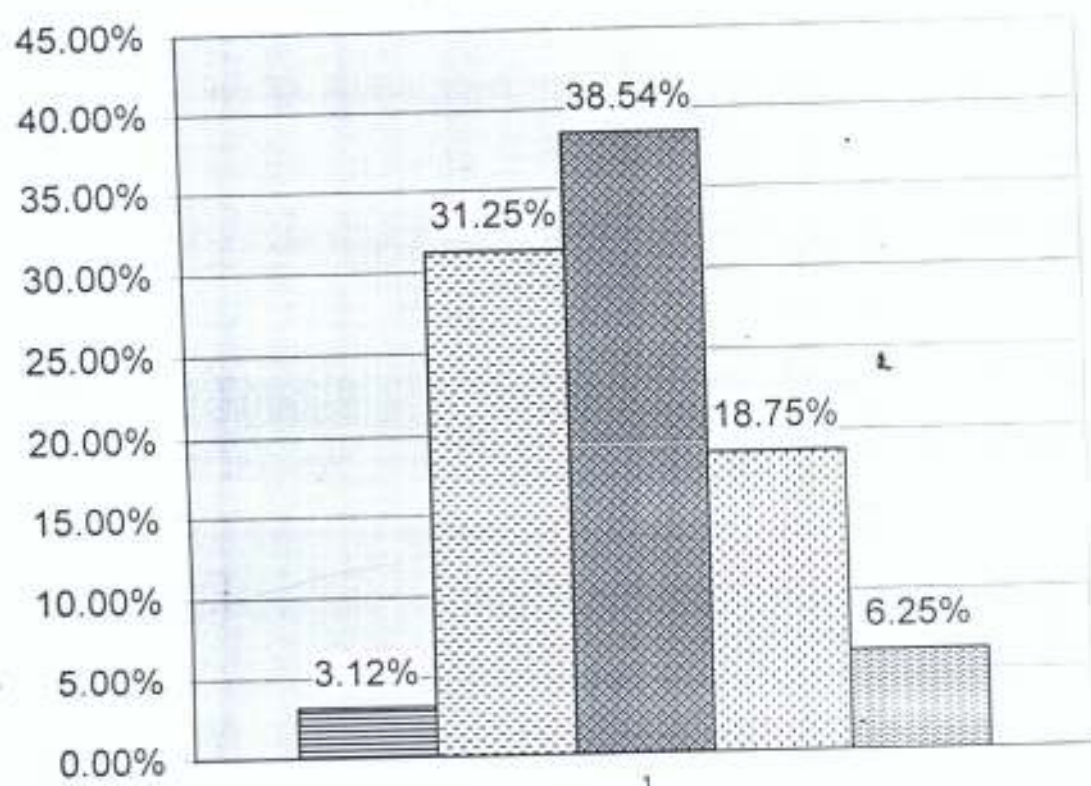
Source: Field Survey, 2006

4:2:4: FARM SIZES

Farm size is another important variable affecting the optimal plan for food security. Figure 4:2:4 shows the distribution of the respondents farm sizes. From the figure, 3.12% of the respondents had farm sizes of less than one hectare, 31.25% of the respondents had farmland of between 1.0 – 3.0 hectares, 38.54% represent farmers that had land sizes range of 3.1 – 50 ha, 18.75% had farmland range of 5.1 – 7.0 ha. And 6.25% of the respondents had farm land of above 7.1/ha. Most of the farmers cultivate between 1 to 5 hectares of land. This confirms the earlier findings that farmers in the developing countries cultivate small plots and their farming system is subsistence in nature.

It should be pointed out that most of the holdings were fragmented and scattered, thereby making mechanization difficult. However, it is note worthy that a large number of the farmers were prepared to adopt modern agricultural techniques to increase their food production in order to meet the pressing demand of their household food need, if bottlenecks to hectarage expansion were removed, especially that of inadequacy of funds.

Fig: 4:2:4: DISTRIBUTION OF RESPONDENTS BY FARM SIZE.



Mean = 4.53, range 0.5 – 11
Source: Field Survey, 2006.

KEY:
Year

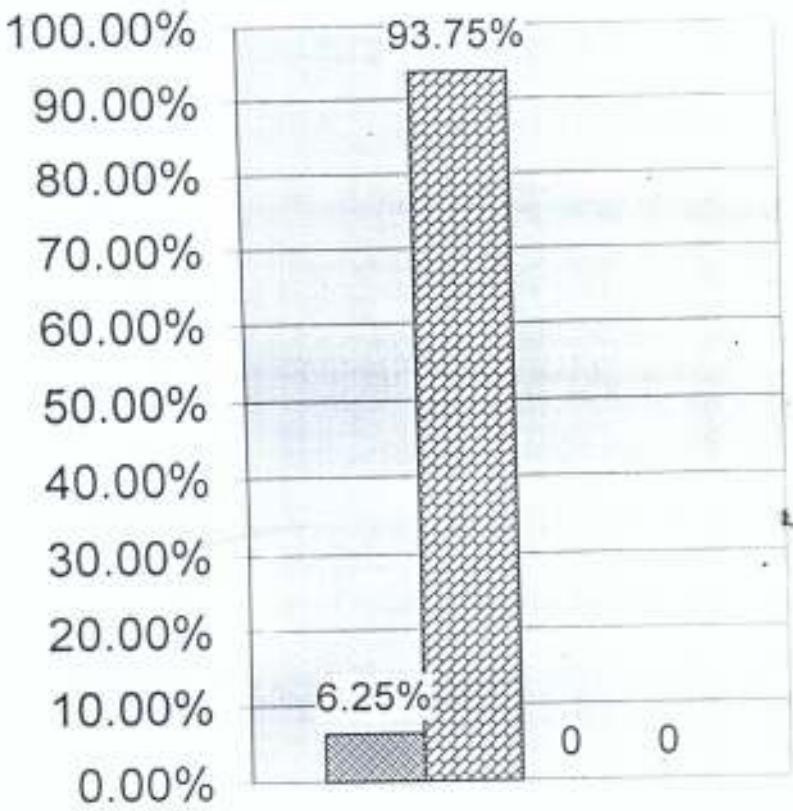


4:2:5 SOURCES OF FARM INPUTS

Nigerian government has been trying to give incentives to farmers in recent years, through various programmes and projects embarked upon. Such programmes and projects include; the Agricultural Development Programme (ADP's), Agricultural Input Project, FADAMA projects, and the establishment of Agricultural Bank; Nigerian Agricultural Corporative and Rural Development Bank (NACRD). According to Olayemi (1998), one of the goals of the special economic empowering policies and programmes that was put in place in recent time, was the special inputs and subsidy programmes for the poor and other vulnerable groups in and outside agriculture. The introduction of the recent technology in farming and its improvement in productivity has called for wider adoption of various inputs by the farmers. However, the awareness created by formal education played a greater role in the use of inputs in farming.

Figure 4:2:5 shows the distribution of respondents by source of farm inputs.

Fig: 4:2:5: DISTRIBUTION OF RESPONDENT BY SOURCE OF FARM INPUTS.



KEY:
Year

-  Government Agents
-  Market
-  Cooperatives
-  Others

Source: Field Survey, 2006.

The survey carried out showed that 6.25% of the respondents acquired their inputs from the government, 93.75% of the respondents acquired their inputs from the given market and none acquired inputs from the cooperatives or other sources. The implication of this is that farmers in the study area were likely to be faced with the problems of inputs adulteration and high cost of inputs procurement since most of them were deprived of acquiring their inputs from the government.

These, however, will affect the production and productivity of the farmers in the study area in meeting their aim of food security, because, most of them resorted to the use of crude farm implements and tools, and the use of unimproved (local bred) varieties of seeds which are readily available at the local market.

4:2:6 MODE OF TRANSPORTING FARM PRODUCE

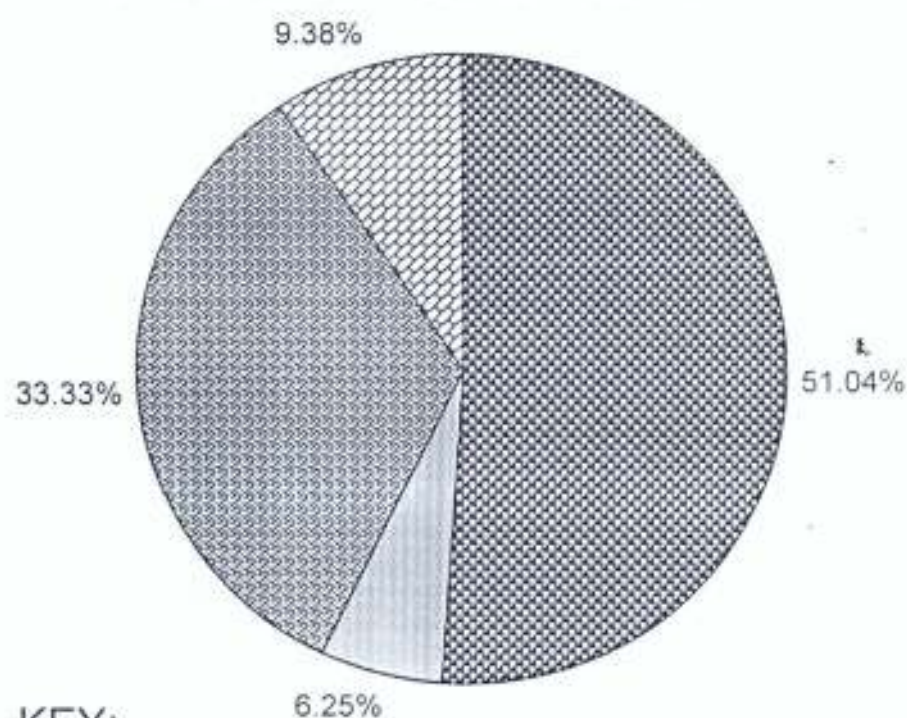
In developing countries, the most serious bottlenecks in development process is the provision of food of the right quality and quantity for the growing population as well as the adequate supply to the final consumers. Even, if food were adequately produced on the farms, which is not true of most developing countries, faulty storage, poor and or lack of processing and inefficient distribution systems do constitute a serious cause of hunger, starvation, soaring food prices, seasonal shortage etc. Transportation plays a vital role in the production and distribution of farm produce from the farm gate to the buyers or the final consumers.

The survey carried out showed that 51.04% of the respondents transport their produce from the farm gate to the final consumers by head, 33.33% represents those that transported their produce by means of motorcycles, 9.38% the respondents transported their produce to the market by means of van or motorcar while 6.25% preferred to sell their produce at the farm gate. Figure 4.2.6. The reason for the above result might have been to the fact that there were no accessible feeder roads to their various farms or they do not have enough fund to hire or board motor vehicle or van to the nearby market to sell their produce. The result of this is food waste and high rising costs of food supply, hence, food security may be adversely affected.

This agrees with the study of Olayide and Heady (1982), that inefficient transportation is a major source of food waste and high costs of food supply.



Fig. 4:2:6: DISTRIBUTION OF RESPONDENTS BY MODE OF TRANSPORTING FARM PRODUCE



KEY:
Year

-  Head
-  Farm Gate
-  Motorcycle /Bicycle
-  Van

Source: Field Survey, 2006.

4.3 ENTERPRISE COMBINATION

Enterprise combination was generally practiced in the study area to avoid total crop failure. This could be due to the favourable weather and environmental conditions that are predominant in the study area.

The table shows the average contribution of each enterprise to individual farmer's cash income and percentage total farm income derived from each enterprise during the last cropping season.

TABLE 4.3.1 ENTERPRISE COMBINATION OF SAMPLE FARMERS

Crop/Livestock	% Of Farmers Growing Particular Crop	Average Cash Income Per Farmer	Percentage Of Total Cash Income	Cumulative Percentage Total Cash Income
CASH CROPS				
(i) Cocoa	3.16	86,666.67	4.72	4.72
(ii) Colanut	2.11	37,500.00	1.36	6.08
(iii) Oil Palm	4.21	51,500.00	3.74	9.82
(iv) Tobacco	5.26	4,200.00	3.65	13.47
FOOD CROPS				
(i) Cassava	38.95	57,857.06	21.09	34.56
(ii) Yam	24.21	16,391.30	6.85	41.41
(iii) Cocoayam	8.95	16,588.24	5.13	46.54
(iv) Sweet Potatoes	8.94	16,588.23	5.11	51.65
(v) Maize	31.58	27,612.90	15.05	66.70
(vi) Beans	10.53	25,600.00	4.65	71.35
(vii) Groundnut	5.26	23,520.00	2.14	73.49
FRUITS				
(i) Plantain/Banana	3.16	26,000.00	1.42	71.91
(ii) Pineapple	8.42	29,812.50	4.33	79.24
(iii) citrus	8.42	36,125.00	5.25	84.49
(iv) Bread fruit	6.32	37,833.33	3.03	87.52
(v) Guava	3.16	8,000.00	0.44	87.96
VEGETABLES				
(i) Green V. Leaves	17.89	13,835.29	4.27	92.23
(ii) Pepper/Toma/Okro	8.42	9,662.50	1.40	93.63
LIVESTOCK/POULTRY/FISHERY				
- Poultry	3.16	80,333.33	4.38	98.01
- Piggery	1.10	80,000.00	1.45	99.46
- Fishery	1.10	30,000.00	0.54	100.00
TOTAL			100	

Source: Field Survey, 2006.

From the table, the cash crops grown were cocoa, kolanut, oil palm and tobacco. Cocoa contributed 4.72% of the total cash farm income or ₦86,666.67 which represented 3.16% of the respondents. Followed by oil palm which contributed 3.74% of the total cash farm income or ₦51,500.00 and this represented 4.21% of the respondents. Kolanut and tobacco contributed 1.36 and 3.65% of the total cash farm income which represented ₦37,500.00 and ₦4,200.00 respectively.

Cassava which contributed 21.09% of the total cash farm income or ₦57,857.06 per farmer were grown by 38.95% of the respondents. This was followed by maize another food crop which contributed 15.05% of the total cash farm income or ₦27,612.90 per farmer, this represented 31.58% of the respondents. The percentage of the total cash farm income contributed by the respondents that grew yam, cocoayam, sweet potatoes, beans and groundnuts were represented by 6.85%, 5.13%, 5.11%, 4.65% and 2.14% respectively or ₦16,391.30, ₦16,588.24, ₦16,588.23, ₦25,600.00 and ₦23,520.00 respectively.

Among the fruits grown in the survey area were plantain/banana, pineapple, citrus, bread fruit and guava. 6.32% represented the number of farmers that grew bread fruit which contributed ₦37,833.33 or 3.03% of the total cash farm income. Followed by citrus which contributed ₦36,125.00 or 5.25% of the total cash farm income and grown by 8.42% of the respondents. Pineapple, plantain and guava contributed ₦29,812.50, ₦26,000.00 and ₦8,000.00 respectively to the total cash farm income which represented 8.42%, 3.16% and 3.16% of the respondents respectively.

17.89% represented farmers that grew green vegetable¹ leaves which contributed ₦13,835.29 or 4.27% of the total cash farm income. And 8.42% represented respondents that grew pepper, tomatoes, okro which contributed ₦9,662.50 or 1.4% of the total cash farm income .

Poultry contributed ₦80,333.33 or 4.38% of the total cash farm income which represented 3.16% of the respondents followed by piggery which contributed ₦80,000.00 or 1.45% of the total cash income which represented 1.10% of the respondents while fishery contributed ₦30, 000.00 or 0.54% of the total cash income which represented 1.10% of the respondents. It appears that food crops were most widely grown in the surveyed area due to conducive environmental and weather conditions which enhanced profitable production of food crops. The general view of the farmers for the prevalence of food crop cultivation was that they obtained higher prices for the crops within short period and were able to meet their various household needs which include food security .

The environmental and weather conditions also encourage the production of cash crops, fruits and vegetables in the study area, there were high degree of diversification as nearly all the farmers combined at least two other crops with cassava to avoid total crop failure. Other relevant factors which favoured diversification among the respondents could be the net income potential of different crops, the need to reduce risks and uncertainties, to ensure regular and sustained flow of income and for food security. The practice of livestock production was not predominant in the surveyed area. This might had been due to the fact that the farmers in the study area did not have interest in livestock production or not enough knowledge and skill about the raising of livestock. Despite the huge amount of income contributed¹ to the total cash income.

TABLE 4.3.2

ESTIMATED GROSS MARGIN AND NET FARM INCOME
FOR EACH OF THE ENTERPRISES.

ENTERPRISES					
	Cash Crops	Food Crops	Fruits	Vegetables	Poultry/ Livestock
TOTAL RECEIPTS SALES	179,866.67 (13.47)	184,157.73 (60.02)	137,770.83 (14.47)	23,497.79 (5.67)	190,333.33 (6.37)
TOTAL VARIABLE COST				₹	
(a) Cost of hired labour	23,925.50	21,900.13	21,339.21	1,797.58	36,850.44
(b) Imputed cost of family labour	7,177.65	7,665.05	7,895.51	8,000.26	15,424.70
(c) Cost of inputs	15,187.08	11,797.58	11,522.79	1,806.98	64,455.25
(d) Interest on loan.	N.A	N.A	N.A	N.A	N.A
Sub-Total	46,290.23	41,362.76	40,757.51	4,404.82	116,730.39
Gross Margin GM	133,576.44	142,794.97	97,013.32	19,092.97	73,602.94
Imputed fixed* Cost	17,890.49	14,433.18	14,768.99	3,156.89	14,725.43
Net farm income (NFI)	115,685.95	128,361.79	82,244.33	15,936.08	58,877.51

Source: Analysed data

- * Imputed cost of family labour was computed by the mandays/hour multiplied by the total number of family members involved in farming.
- * Imputed fixed cost was computed from the amount land purchase and purchase of fixed assets.

The table above gives the summary of the analysis of Gross Margin and Net Farm Income of each of the enterprise. Food crops enterprise enjoy the highest simple rate of returns (60.02) which the Gross margin was ₦142,794.97 and contributed Net Farm Income of ₦128,361.79. This is followed by fruits with rate of returns (14.47) Gross margin of ₦97,013.32, which contributed ₦82,244.33 Net farm income. Cash crops enterprise also contributed ₦115,685.95 Net farm income, Gross Margin which amounted to be ₦133,576.44 with rate of returns of (13.47).

Livestock/poultry contributed ₦58,877.51 Net farm income, Gross margin of ₦73,602.94, and rate of returns was (6.37). Vegetables contributed least to the Net farm income ₦15,936.08, Gross margin ₦19,092.97 and rate of returns was 5.67. Though, poultry/livestock enterprise had the highest total receipts sales its contribution to Net farm income was very low. This might have been due to the facts that the enterprise is capital intensive. It was further observed from the table that the respondents in the study area were mainly food crops and cash crops farmers. The reason for this might have been due to the facts that both food crops and cash crops contributed most to the Net farm income and this will enable the farmer to improve their standard of living hence, food security.

1.

4.4 LINEAR PROGRAMMING RESULT

$$\text{Maximize (z) TGM} = \sum_{j=1}^n c_j x_j$$

$$\text{Subject to:-} \quad \sum_{j=1}^n a_{ij} x_j \leq b_i \\ (i = 1, 2, 3, 4, 5)$$

Quantity of the item produced.

x_1 = Cash crops

x_2 = Food crops

x_3 = Fruits

x_4 = Vegetable

x_5 = Poultry/Livestock

Constraints:

Farm land constraint

Equipment constraint

Labour constraint

$$\text{Max } Z = 133576x_1 + 142794x_2 + 97013x_3 + 19092x_4 + 73602x_5$$

Subject to:

$$x_1 + x_2 + x_3 + x_4 + x_5 \leq 9500$$

$$34x_1 + 70x_2 + 28x_3 + 17x_4 + 24x_5 \leq 1080$$

$$170x_1 + 350x_2 + 140x_3 + 85x_4 + 120x_5 \leq 3200$$

$$\text{and } x_1, x_2, x_3, x_4, x_5 \geq 0$$

4.4.1. LAND CONSTRAINT

Land constraint: Assuming that all the land available (9500 ha) is used up in the production of cash crops (x_1), then the land constraint becomes:

$$x_1 + 0x_2 + 0x_3 + 0x_4 + 0x_5 = 9500$$

$$\text{Therefore } x_1 = 9500$$

Assuming that all land available (9500 ha) is used up in the production of food crops (x_2), then the land constraint becomes:

$$0x_1 + 0x_2 + 0x_3 + 0x_4 + 0x_5 = 9500$$

$$0x_1 = 9500$$

$$x_2 = 9500 \quad \therefore x_2 = 9500$$

4.4.2 CAPITAL/EQUIPMENT CONSTRAINT

Assuming that all the capital available (N1080) is used up in the production of cash crops (x_1), then the capital constraint becomes:

$$34x_1 + 0x_2 + 0x_3 + 0x_4 + 0x_5 = 1080$$

$$\text{Therefore } 34x_1 = 1080$$

$$x_1 = 1080/34 \quad \therefore x_1 = 32.$$

Assuming that all the capital available (N1080) is used up in the production of food crops (x_2) then the capital constraint becomes:

$$0x_1 + 70x_2 + 0x_3 + 0x_4 + 0x_5 = 1080$$

$$x_2 = 1080$$

$$x_2 = 15.43$$

$$\therefore x_2 = 15$$

4.4.3 LABOUR CONSTRAINT

Assuming that all the labour available (3200) is used up in the production of cash crops (x_1), then the labour constraint becomes:

$$170x_1 + 0x_2 + 0x_3 + 0x_4 + 0x_5 = 3200$$

$$\text{Therefore: } x_1 = 3200/170 \quad \therefore x_1 = 19.$$

Assuming that all the labour available (3200) is used up in the production of food crops (x_2) then the labour constraints becomes:

$$0x_1 + 350x_2 + 0x_3 + 0x_4 + 0x_5 = 3200$$

$$350x_2 = 3200$$

$$x_2 = 3200/350 \quad \therefore x_2 = 9.1 \quad x_2 = 9.$$

Land constraint: (9500, 9500)

Capital constraint (32, 15)

Labour constraint (19, 9)

4.4.4 OPTIMAL FEASIBLE SOLUTION

Maximize $Z = 133576x_1 + 142794x_2 + 97013x_3 + 19092x_4 + 73602x_5$

.... Equation (4.4.1).

Let us suppose that $Z = 570,000$ and considering cash crops and food crops the equation above becomes.

$$133,576x_1 + 142,794x_2 = 570,000 \dots \text{equation (4.4.2).}$$

If we assume that only x_1 is produced, then the equation becomes:

$$133,576x_1 = 570,000$$

$$\therefore x_1 = \frac{570,000}{133,576}$$

$$x_1 = 4.3$$

If we further assume that only x_2 is produced, the equation becomes:

$$142,794x_2 = 570,000$$

$$\therefore x_2 = \frac{570,000}{142,974}$$

$$x_2 = 3.9$$

$$x_2 = 4$$

$$x_2 = 4$$

(4.3, 3.9) is the profit line.

4.5 REGRESSION ANALYSIS

The production function is the mathematical representation of the relationship between the qualities of inputs employed in the production process and the amount of output produced. It shows how inputs are transformed into output. The function makes possible the prediction of the quality of output desired from particular or specific input combination or the addition to output that could be obtained when one of the factors is changed by a unit keeping others constant.

This section however, tries to determine the influence of some selected socio-economic characteristics of the respondents on food security, hence, income stability. The socio economic factors examined were: age, sex, education, years of farming, farm size, number of children and number of children involved in farming. The result of the estimated regression equations are given as follows:

TABLE 4.5.1 ESTIMATED REGRESSION EQUATIONS OF THE PRODUCTION FUNCTION FOR OPTIMUM FARM PLAN FOR FOOD SECURITY IN ONDO STATE.

Variables	Parameter	Linear	Semi-log	Double-log.
Constant	B ₀	88226.3238 (53130.7256)	1116.2 (2.95)	796.20 (1.26)
Age (x ₁)	B ₁	12194.6820 (2675.2662)	*0.529 (10.18)	*0.749 (11.20)
Sex(x ₂)	B ₂	5508.8615 (2317.3651)	0.115 (1.06)	+0.029 (+0.524)
Education(x ₃)	B ₃	-1.0933 (0.4663)	-20.346 (-0.96)	-0.45 (1.14)
Years of farming (x ₄)	B ₄	-351.8559 (1448.5696)	-26.51 (-1.75)	-7.986 (1.53)
Farm Size (x ₅)	B ₅	0.1923 (0.4663)	-0.00015 (0.83)	0.832 (0.811)
No of children (x ₆)	B ₆	-10467.0 (4384.88)	-2663.520 (4384.88)	-200.90 (-1.67)
No of children involved in farming (x ₇)	B ₇	17883.0433 (22813.0263)	2129.86 (6603.65)	*2524.9 (10.24)
SE		57515.6056	36422.557	0.35
R ²		0.661	0.438	0.752
Value		39.57	37.94	189.65

Source: Field Survey, 2006.

Figures in parenthesis are the standard error of regression coefficients.

4.5.2 RESULT AND FINDINGS OF REGRESSION ANALYSIS

The regression results of the effects of some variables on optimum farm plan for food security by the respondents is as shown in Table 4.5.1. From the three functional forms fitted to the data, the double log production function was considered to give the best fit, hence the lead equation. This was based on economic and statistical criteria, such as the value of R^2 , t and f ratio and the number of statistically significant variables contained in the model.

Thus,

- It has the highest R^2 value of 0.752
- It has the least standard error of estimated value of 0.35 and
- The estimated regression coefficient that are statistically significant at 5% level.

Hence, the regression equation is given as:

$$Y = 796.20 + 0.749X_1 + 0.029X_2 - 0.45X_3 - 7.986X_4 + 0.832X_5 \\ (11.20) \quad (0.524) \quad (1.14) \quad (1.53) \quad (0.81) \\ - 200.90X_6 + 2524.9X_7 + e \\ (-1.67) \quad (10.24)$$

$$\text{Thus, } R^2 = 0.752$$

$$SE = 0.35$$

$$F \text{ Value} = 189.65$$

* Statistically significant at 5% level.

The independent variable such as Age(x_1), sex (x_2) farm size (x_3) and number of children involved in farming (x_7) had a positive relationship on the optimum farm plan for food security of the respondents in the study area. This implies that, when there is any increase in the value of the variables, this would

lead to an increase in the respondents farm income hence, food stability and food security. However, variables such as level of education (x_3), years of farming (x_4) and the number of children (x_6) of the respondents had a negative relationship on the optimum farm plan for food security in the study area. It implies that, any increase in the value of the variables, would lead to a decrease in the respondents farm income, hence, food instability and food insecurity. Education (x_3), was found to be a significant variable, which affect the gross income of the farmers in a negative way. It was found that, as the level of education of the respondent increases, the value of the income of the farmers will decrease by 45%. This might have been due to the fact that as the level of the education of the respondent increase, they are less likely to depend solely on farming for their living. Hence, they might be engaged in other jobs in the nearby cities for higher income, hence food security.

Farm size (x_5) is another statistically significant factor that affect the farm income of the respondents. It was observed that for every additional cultivation of 1ha by the farmers, there would be an increase of 83.2% in the gross income of the farmers hence, food security and income stability. This might had been to the fact that, the farmer spend less on the acquisition of additional ha. of farm land. Despite the fact that the respondents house hold size i.e. number of children (x_6) had a negative relationship with the gross income of the farmers. The total number of children that were involved in farming (x_7) had a positive relationship with the gross income of the farmers. It was observed that for every additional numbers of members of the household

that are involved in farming, there is an increase of 25.25% in the gross income of the farmers. This implies that the respondents might have been augmenting the family labour with hired labour to enhance food productivity hence, income stability and food security.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS.

5.1 SUMMARY OF MAJOR FINDINGS

This study was undertaken to determine optimum farm plan for food security in Ondo – state. Some selected socio – economic characteristics of the respondents were examined, the gross income of the farmers were determined optimum enterprise combination was also determined. Relevant literatures were reviewed on the optimum farm plan for food security in order to accomplish the objectives of the study. Data were collected from a randomly selected 100 farmers using a well structured questionnaire and interview schedule.

The data collected were analyzed using frequencies, percentage, mean, inferential statistical analysis was done using multiple regression to determine the production function, cost and return analysis were used to analyze the gross margin and net farm income of the farmers, the optimum enterprise combination was determined by using linear programming. The major findings from the respondents during the course of the study were highlighted as follows: 55% were between 31 to 60 years of age which is the active group and is the modal age. 95% of the respondents were male. More than half of the respondents (54.17%) had no formal education. 96.88% of the respondents were married. Most of the respondents (93.45%) took farming as their primary occupation. 79.09% of the respondents keep large family of between 0 to 10 household members. 96.88% of the respondents involved members of their

household in farming while 69% relied on hired labour. 80.21% of the respondents acquired their farmland through purchase. 78.12% of the respondents had been in farming for between 10 to 49years i.e farming experience of between 10 to 49years.

Most of the respondents (85.42%) were into farming for income stability and food security. 69.79% of the respondents possesses farmland sizes of between 1.0 to 5.0 hectares of land. 93.75% of the respondents acquired their farm inputs directly from the market. More than half of the respondents (51.04%) transport their farm produce from the farm by head. Nearly all the respondents (90.68%) had no access to credit facilities. 69.79% of the respondents want to continue in farming by reasons of income stability and food security. 78.12 % of the respondents' encountered one problem or the other (viz: transportation, glut, credit, spoilage). 35.42% of the respondents were faced with the problems of glut and credit purchase. 78.12 % of the respondents showed their desired for government intervention and assistance.

Judging from the multiple regression analysis it was observed that all the independent variable played an important role in explaining the variability of each of the variables in optimum farm plan for food security The enterprise that contributed immensely to the farmers net income were the food crops and cash crop enterprise with a total net farm income per annum of 128,361.79naira and 115,685.95 naira respectively. The gross margins[†] of each of the enterprises were 142,794.97 naira and 133,976.44 naira respectively. Linear programming was used to determine the total gross margin and to determine

the profit line of the two enterprises (food crops and cash crops). The equation was subjected to three constraint land, capital and labour constraints. The profit line is (4.3 and 3.9) respectively. This is the optimal feasible solution.

5.2 POLICY IMPLICATIONS OF FINDINGS

It is a well known fact that modern agriculture requires a substantial amount of capital either in cash or in kind if the motive is to make profit. From this study, it was observed that shortage of capital fund was identified as being responsible for the small holder-farmers inability to expand their production. Unless government comes to their aid by providing assistance for them in the form of adequate credit and technical assistance through the extension agents and relevant bodies to enable farmers to adopt improved technology and innovations, the nation goals for food self-sufficiency and food security will be futile or remain a mirage.

The main aim of the Land Use Decree of 1978 which stipulates a fair distribution of land among citizens of Nigerian and also directs a one man one land policy in an egalitarian society is mainly a paper work which does not apply in the present situation in Nigeria. As a result of ineffectiveness of the scheme, many farmers do complain about lack of land to go into enough large-scale farming and the high cost of purchasing the available farmland from the community. Therefore there is a need to reform the Land Use Decree and make it more meaningful and more practical oriented such that farmers in Nigeria would be encouraged to be owners of land and the land can serve as collateral security to obtain loan under the scheme for self-employment in agriculture.

5.3 CONCLUSION

Nigeria's food security effort needs considerable support from institution which are responsible for the sustainable development of the human resource base. It is the systematic development of the human capital and integration into the inter- sectoral dimension of food security that can help to achieve sustainability in food security. The alternative to this development will be massive importation of human capital to sustain food supply or a continuation of the phenomenal increases in our food import bills. In the course of this research work, it was observed that most of the farmers in the study were illiterate. They were faced with problems of reading and writing hence it will be very difficult for them to be able to apply new innovations and technology since education positively affects the rate of adopting new innovations and technology. Most of these farmers lack the basic principles of farm management. This invariably affects their farm productivity, including planning, and organization.

Other problems faced by the farmers in the surveyed area are the problem of transportation and storage. These problems had rendered most of the farmers poor by depriving them of appreciable farm income due to losses incurred from produce waste or poor prices. The farmers in the study areas lack access to credit facilities, hence they were clamoring for government assistance. In spite of all these problems farmers in the surveyed area were still interested in farming for income stability and food security.

5.4 RECOMMENDATIONS

Based on the major findings of this study it is now being recommended that any programme that will be designed for the farmers should be the one that would address the local farmers' problems and also allow the local farmers to be involved in the administration of such programme.

Hence, the following recommendations were made:-

- Considering the high percentage of the respondents that had no formal education they should be encouraged and educated by the government through sending extension workers to train them by organizing adult literacy classes.
- The farmers should be encouraged to expand their farm land through the initiation of the release of land by the community and eradication of land tenure problems.
- Establishment of financial institutions that will give out loans at a reduced rate and at an appropriate time to the farmers to finance their productive farming activities.
- The farmers should be encouraged to be engaged in the enterprise combination that would be more beneficial to them and the country as a whole so as to increase productivity hence, their income will increase and food productivity and security would be enhanced.

- The use of modern agricultural implements and tools should be provided for the farmers to supplement crude implements that yield low-returns. This will reduce the problem of labour constraints which is one of the major constraints faced by the rural farmers.
- Necessary infrastructure should be provided by the government in the rural areas so as to avoid rural-urban migration; hence, the youth would be encouraged to participate fully in farming.

REFERENCES

- Adegeye, A. J. and Dittoh, J.S. (1985): Essentials of Agricultural Economics. Impact publishers Nigeria Limited. Ibadan.
- Adesimi A.A. (1988): Farm Management Analysis. With Perspectives Through the Development process. Ile-Ife.
- Aderinola E.A. (1982): Food Import Demand Model For the Nigeria Economy 1951-79. An Unpublished M.Sc. Thesis Department of Agricultural Economics, OAU – Ife.
- Aderinola, E.A. (1989): Socio-economic and Institutional Factors Affecting Farm Management Decision Among Nigerian Farmers. Paper Presented at the Workshop on Farm Management in Nigeria. The problems and prospects, Owena Motels, Akure, 28-30 November, pp. 18.
- Aderinola E.A., Ibe C., and Ajibefun I.A. (1997) "Farm plans for maximum income and food security among small scale food crop farming families in Ogun State, Nigeria". An A.M.S.E. Publication Tassin France Vol. 15. No. 2.
- Akintunde O.A. (1995): Analysis of Household Consumption Pattern of Animal Protein Production in Warri Delta State of Nigeria. An Unpublished B. Agriculture. Thesis Department of Agriculture, University of Abeokuta.

- Central Bank of Nigeria (1994):** Annual Report and Statement of Accounts. For the year ended 31 December 1994.
- Central Bank of Nigeria (1996):** Statistical Bulletin Vol. 7, No.2 December 1996. pg. 39.
- Charry A., Daramola A.G. and Dillon J.L. (2004):** Application of Mathematical Programming in farming systems Research and Extension. A Methodological Outline.
- Ewuola, S. O. (1985):** "An Analysis of the Effectiveness of Small Holder Farmers Credit Programme in Ondo State". A Thesis Ph. D. University of Ibadan. Feb. 1985.
- Ewuola S.O. (2000):** (Poverty Alleviation through Credit) An International Journal. ISSN: 1118-6712 Vol. 05 December 2000 No.2. The Journal for School of Agriculture and Agricultural Technology. The Federal University of Technology, Akure. Nigeria.
- Famoriyo, S.** "Land Tenure Systems and Small Farms in Nigeria". Nigerian Small Farmers. Ed. By S.O. Olayide, et al, CARD, 1980.
- FAO, 1992:** Food and Agricultural Organization of United Nation, Production Year Book, FAO. Rome Italy.
- FAO publications 1998:** "Supplying (citic dwellers) with safe and affordable food"

F.O.S. (1999): Publications on Food Requirements Base line data from
F.M.A. and R.D.

Food and Agricultural Organization (1998): Feeding the cities. An
FAO publications of the United Nation.

Gurkan, Ali A. (1995): The Mathematics of Hunger.
CERES 27(2): 31-33

Hay, R.W. and Rukuni, H (1988): SADCC Food Security Strategies:
Evolution and role World Development 16(9): 103-1014.

Heady, E.O and Dillon, J.L. (2001): Agricultural Production Function.
The IOWA University Press, pp 36-71. International Food Policy
Research Institute, Food for Education: Feeding Minds Reduces
Poverty, Facts on Hunger, Poverty and Education (citing World
Bank: World development indicators 2001 report).
<http://www.ifpri.org/pubs/issuebrief/ib4/ib4/facts.asp>.oct.16,2001.

Jacques Diouf, (2001) The Right to Food, Message from the Director
General

FAO, <http://www.fao.org/inside/dg/message.htm>.(oct.23,2001)

Maxwell S. and Frankenberge T. (1992): "Household Food Security,
Concepts, Indicators, Measurements" A technical review, UNICEF
and IFAD, New York and Rome pp. 73-129.

- Maxwell, D.G. 1996:** "Measuring Food Insecurity: The frequency and severity of coping strategies" Food policy, 21(3): 291-303.
- NISER Research: Report (1995):** Estimates Computed from 1995 food Production and import data.
- Ogunfowora (1970):** Educating Rural Communities for Progress, University Press Publishing House. University of Ibadan.
- Ojo M.O., Balogun, E.O. and Grace E.O. (1993):** "Sustaining Agricultural Production in Deregulated Economy". Journal of Economic and Financial Review CBN 31(2): 25-39, June 1993.
- Ojo. S.O. (1999):** Investing in Human Capital: A veritable tool for the development of Rural Economy. A paper presented at the second Annual Conference of Children in Agriculture Programme (CIAP) pp. 99 Ile-Ife NNPC/Chevron Joint Venture.
- Olayemi J.K. (1980):** Key Issues in Agricultural Planning in Nigeria, Keynote Address presented at the opening of the First National Training Workshop for Agricultural Planners, University of Ibadan.
- Olayemi, J.K. (1996):** Structural Adjustment and Food Security in Nigeria: An Overview, A paper presented at a Staff Seminar, Development Policy Centre, Ibadan.

- Olayemi, J.K. (1998):** Food Security in Nigeria. A Research Report, Volume 2.
- Olayemi, J.K, Titilola S.O. and Igben M.S. (1986):** Nigerian Food Balance Sheet. (Statistics)
- Olayide, S.O. and Olowude, S.O (1972):** "Organizing and Administering Small Farmers in Nigeria". Nigerian Small Farmers. Ed. by S. O. Olayide et al CARD, 1980..
- Olayide, S.O. and S.O. Olowude (1972)** "Application of Linear Programming to Farm Planning in Developing Countries". Journal of Association of Advancement of Agricultural Science in Africa, 1(1):
- Olayide, S.O. (1980):** "Agricultural Policy for Nigerian Small Farmer". Nigerian Small Farmers. Ed. by S.O. Olayide et al. CARD, 1980.
- Olufokunbi, Banwo (1982):** "Marketing Margin Analysis as a tool for a Decision Making: The case of Marketing Guinea Corn and Yam in Kaduna and Kano States of Nigeria" Oxford Agrarian Studies xi: 48-64.
- Osuji, O. and Olayemi J.K (1978):** Food Marketing and Distribution in Nigeria: Problems and prospects. NISER, Ibadan. 1978.
- Shama, R.P. (1992):** "Monitoring Access to Food and Household Security" Food Nutrition and Agriculture 2(4):15-24.

- Siamwalla, A and Valdes A (1984):** Food Security in Developing Countries: International Issues". In Eicher and Staaz (eds) op.cit.
- Talabi S. O. (2001):** The Human Resource Base on food security in Nigeria. A paper delivered on the occasion of the University of Agriculture/RESDEC Lecture November, 2001.
- Teriba O. (1972):** "Rural credit Development in Nigeria". Proceedings of the 1992 annual conference of Nigeria Economics Society (NES). Rural Development in Nigeria.
- The World Bank (1996):** Nigeria: Poverty Assessment. Draft Report No. 14733-UNI.
- World Bank 1986:** Poverty and Hunger: Issues and Options for food security in Developing countries. A World Bank Policy Study. The World Bank, Washington D.C., USA.
- World Bank 1992:** World Development Report, 1992. Oxford University Press New York.
- World Bank 1996 – Nigeria:** Poverty in the Midst of Plenty.

APPENDIX I

Distribution of Respondents by Land Tenure System

Others	2.08%
Inheritance	6.25%
Rentage	11.46%
Purchase	80.21%

Source: Field Survey, 2006

Distribution of Respondents by Farming Experience

0 - 9	4.17%
10 - 19	12.50%
20 - 29	17.50%
30 - 39	29.17%
40 - 49	18.75%
50 - 59	10.42%
Above	7.28%

Source: Field Survey, 2006

Distribution of Respondents by Reason(s) for Farming

Food Production	11.46%
Income Stability	13.12%
Food Security	85.42%

Source: Field Survey, 2006

Distribution of Respondents by Farm Size

1	3.12%
3	31.25%
5	38.54%
7	18.75%
9	6.25%

Source: Field Survey, 2006

Distribution of Respondents by Source of Farm Inputs

Government Agents	6.25%
Market	93.75%
Cooperatives	0
Others	0

Source: Field Survey, 2006

Distribution of Respondents by Mode of Transporting Farm Produce

Head	51.04%
Farm Gate	6.25%
Motorcycle /Bicycle	33.33%
Van	9.38%

Source: Field Survey, 2006



APPENDIX II

OPTIMUM FARM PLAN FOR FOOD SECURITY IN NIGERIA. A CASE STUDY OF ONDO STATE, NIGERIA.

Household No: Farm No: Time started: Code No:

SECTION A: PERSONAL DATA

1. Name:
2. Name of town/village:
3. L.G.A:
4. Age: [Years]
5. Sex: i. Male [], ii. Female []
6. Religion:
7. Level of Education:
8. Marital Status: i. Single [], ii. Married [], iii. Widowed [], iv.
Divorced []
9. Main occupation:
10. Minor occupation:
11. Number of occupation:
12. Number of people involved in farming:

SECTION B: DATA ON FARM

13. Farm location or site:
14. How far is your residence from your farm?

15. Method of farm acquisition: i. Rent [], ii. Communal [], iii.

Acquired [], Others []

16. Farming experience: [years]

17. Why are you into farming? i. ii. iii.

18. What is your farm size?

19. What is your source of inputs?: i. Market [], ii. Government [], iii.

Co-operatives []

20. How do you transport your farm produce? i. Head [], ii. Van [], iii. []

Others []

SECTION C: DATA ON LABOUR

21. Do you hire labour for your farm operation? i. Yes [], ii. No []

(if yes, specify which of the farm operations)

22. Specification(s): i. ii. iii. iv.

23. Why do you hire labour for such operations?

24. Which of the following types of labour do you normally use?:

i. Family labour [], ii. Exchange labour [], iii. Hired labour [], iv.

Others []

25. How much do you spend on the type of labour used? #

SECTION D: DATA ON CREDIT FACILITIES

26. Do you borrow money for your farm operations?: i. Yes [], ii. No []

(if yes above, which farm operations do you borrow money for?)

27. Specify the farm operations: i. ii. iii.
iv.

28. What sources do you get your loan from?

29. How much do you borrow last? Naira

30. When last did you borrow loan? [years]

31. What is the duration loan? i. Short term [], ii. Medium term [],

iii. Long-term []

32. How do you pay back your loan?^t

33. Do you usually encounter any problems on the loan you obtained?

i. Yes [], ii. No [], (if yes above, what problem(s) do you usually encounter)?

34. Specify the problem(s): i. ii. iii. iv.

SECTION E: OTHERS

36. Do you get assistance from the government? i. Yes [], ii. No []

37. Specify the assistance i. ii. iii. iv.

38. Do you want to continue farming? i. Yes [], ii. No []
^t

39. Give reasons why you want to continue, (if yes) i. ii.

40. Give reasons why you do not want to continue (if No) i. ii.

41. How do you sell farm produce?

42. Do you encounter any problems when want to sell your produce?

i. Yes [], No []

43. What kind of problem do you usually encounter? i. ii.
44. Do you want any intervention on the problem?: i. Yes [], ii. No []
45. If yes suggest the source you want: i. Government [],
- ii. Community [], iii. Individual [] iv. Others

SECTION F: Records on last cropping season.

A

Cropping Pattern (sole or mixture)	Types of crop(s)	Crop Output	Price of Sale Per keg	Cost of Labour man days/cost
	1			
	2			
	3			
	4			
	5			

B

Crop(s)	Quantity Harvested	Quantity Sold	Quantity Stored for Planting	Proportion for household consumption
1				
2				
3				
4				
5				
6				
7				

SECTION G: Livestock Production and Sales Records

Enterprise	Type of animal	Current No of animal	No sold last	Amount sold	Cost of mediation	Cost of feed

SECTION H: Other Business

Name of Business	Size of Business	Cost of Operation	Income Generated	Problem(s) encountered