IMPACT OF COMMERCIAL AGRICULTURAL DEVELOPMENT PROJECT ON PRODUCTIVITY AND FOOD SECURITY STATUS OF MAIZE FARMERS IN KADUNA STATE, NIGERIA

BY

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN AGRICULTURAL EXTENSION AND RURAL SOCIOLOGY

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DECLARATION

I hereby declare that this dissertation titled "**Impact of Commercial Agricultural Development Project on Productivity and Food Security Status of Maize Farmers in Kaduna State, Nigeria"** has been written by me and it is a record of my research work. No part of this work has been presented in any previous application for another degree or diploma in this or any other institution. All borrowed information has been duly acknowledged in the text and a list of references provided.

. _____ _____

Rajab SALISU **Date**
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CERTIFICATION

This dissertation titled '**Impact of Commercial Agricultural Development Project on Productivity and Food Security Status of Maize Farmers in Kaduna State, Nigeria',** by Rajab SALISU meets the regulations governing the award of the Degree of Master of Science in Agricultural Extension and Rural Sociology of the Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to Almighty Allah (SWT) who created the universe and the creator of all creatures.

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TABLE OF CONTENTS

Content **Page**

TITLE PAGE……..... i

DECLARATION……... ii

CERTIFICATION…….iii

DEDICATION……...iv

ACKNOWLEDGEMENTS…… v

TABLE OF CONTENT…….....vi

LIST OF TABLES……x

LIST OF FIGURES…….. xi

LIST OF APPENDICES……...xii

ABSTRACT.....xiii

CHAPTER ONE…… 1

1.0 INTRODUCTION……..1

1.1 Background to the Study……1

1.2 Problem Statement……4

1.3 Objectives of the Study……..6

1.4 Justification of the Study…….. 7

1.5 Hypotheses of the Study…….. 8

CHAPTER TWO…….. 9

2.0 LITERATURE REVIEW…….....9

2.1. Agricultural Intervention Programmes in Nigeria……9

2.1.1 Overview of Commercial Agricultural Development Project……...10

2.1.2 Component I: Agricultural Production and Commercialization……....12

2.1.3 Component II: Rural infrastructure……...16

2.1.4 Component III: Project management, monitoring and evaluation and studies…….....17

2.1.5 Component IV: Project coordination……....18

2.1.6 Project Development Objectives (PDO)……...19

2.1.7 Sponsorship of Commercial Agricultural Development Project……..20

2.2 Concept of Productivity……....21

2.3 Concept of Food Security…….23

2.4 Empirical Assessment of Farmers Socio-Economic Characteristics……..27

2.5 Empirical Studies on the Impact of Development Programmes…….29

2.6 Determinants of Food Security among Farming Households……..30

2.7 Constraints to Adoption of Technologies in Nigeria……...31

2.8 Theoretical Framework……....31

2.8.1 Impact Assessment theory……....31

2.9 Conceptual Framework……32

2.9.1 Concept of participation……..32

2.10 Conceptual Model……33

CHAPTER THREE.....35

3.0 METHODOLOGY…….....35

3.1. Description of the Study Area……...35

3.2. Sample Techniques and Sampling Size ……...36

3.3. Data Collection…….37

3.4. Analytical Techniques.....38

3.4.1 Descriptive statistics……..38

3.4.2. Logit regression model……..38

3.4.3. Z –statistic…….....40

3.4.4. Food security line……..41

3.5 Definition and Measurement of Variables…….....42

3.5.1 Independent variables……42

3.5.2 Dependent variable……44

3.5.3 Expected Outcome…….....44

CHAPTER FOUR……46

RESULTS AND DISCUSSION…….....46

4.1 Socio-Economic Characteristics of Respondents……46

4.1.1 Age distribution……..46

4.1.2 Sex distribution……46

4.1.3 Marital Status distribution……47

4.1.4 Household size distribution……..47

4.1.5 Educational level distribution……...48

4.1.6 Farming experience distribution……...48

4.1.7 Farm size distribution……49

4.2 Participants Sources of Information on the Commercial Agricultural Development Project……51

4.3 Factors Influencing Farmers' Participation in the Commercial Agricultural Development Project……52

4.4 Impact of the Commercial Agricultural Development Project on Productivity of farmers…….....56

4.5 Impact of the Commercial Agricultural Development Project on Food Security Status of Farmers…….....58

4.6 Constraints to Farmers Participation in the Commercial Agricultural Development Project……60

CHAPTER FIVE……62

SUMMARY, CONCLUSION AND RECOMMENDATIONS……....62

5.1. Summary……..62

5.2. Conclusions……..64

5.3. Recommendations……64

5.4. Contribution to knowledge……...65

REFERENCES……67

LIST OF TABLES

Table **Page**

Table 3.1: Summary of sampling procedure and sample size……37

Table 4.1: Socioeconomic Characteristics of Respondents in the study area…….....50

Table 4.2: Distribution of participant according to sources of information on the commercial agricultural project……....51

Table 4.3: Factors influencing farmers' participation in the Commercial Agricultural Development Project…….....55

Table 4.4: Impact of the commercial agricultural development project on productivity of farmers…….....57

Table 4.5: Impact of the commercial agricultural development project on food security status of farmers.....59

Table 4.5.1: Test of hypothesis iii……...60

Table 4.6: Constraints to farmers participation in the commercial agricultural development project……...61

LIST OF FIGURES

Figure **Page**

Figure 2.1: A model showing factors influencing farmers' participation in the commercial agricultural development project and its impact on productivity and food security status of farmers**…….....** 34

LIST OF APPENDICES

Appendices **Page**

Appendix 1**:** M.Sc. research questionnaire**……...**75

Appendix 2: Calorie content of some commonly eaten foods in Nigeria**.....**84

Appendix 3: Adult equivalent scale for adjusting household size**……**85

ABSTRACT

The focus of this study was to analyze the Impact of the Commercial Agricultural Development Project on Productivity and Food Security Status of Maize Farmers in Kaduna State, Nigeria. A multistage-sampling technique was used for this study. First stage, two (2) villages were purposively selected from each of the four (4) zones in the state, in the second stage 25% of the respondents from the participants and 25% of the non-participants of the commercial agricultural project from the list of maize farmers were randomly selected to give a total of 230 respondents. The data collected was based on 2013 cropping season and were collected through the use of a structured questionnaires and were analyzed using descriptive statistics such as frequency distribution, percentage and mean, logit regression analysis and Z-test statistical tools. Results of data analysis revealed that the mean ages of maize farmers' participants and non- participants were 40 and 41 years respectively. About (46%) and approximately 52% of the participants and non- participants had between 10-17 years of farming experience respectively, while majority (78%) and approximately (66%) of maize farmers' participants and non- participants did have some formal educational qualification especially primary, secondary and tertiary. It was found that the major avenue through which maize farmer get to know about commercial agricultural project was through extension agents, this constitutes 69 of participants. The results from the logit regression analysis revealed that sex, marital status, farm size, membership of association, level of awareness and access to inputs were the factors influencing the farmers' participation (74.5%) in the commercial agricultural development project in the study area at 1% level of significance. The results from analysis revealed that the productivity of participants in commercial agriculture development project is significantly difference from that of the non-participant counterparts at 1% level of significance and also, the commercial agriculture development project had a positive impact on the productivity of the participants of (385.86kg/ha). From the food security profile, it was found that the participants had a lower food insecurity level than the non-participants. Finally, lack of starting capital was ranked by maize farmers' participants as foremost constraints faced in their participation in the commercial agricultural development project in the study area. Since cooperative societies and banks cannot provide the entire needed fund for the production of maize, it was therefore, recommended that farmers should be encouraged to diversify their livelihood activities by engaging in non-farming activities in order to augment farm family income and thereby increase productivity.

CHAPTER ONE

INTRODUCTION

1.1. Background to the Study

Agriculture constitutes one of the important sectors of the Nigerian economy. However, the importance of agriculture in-terms of employment opportunities, adequate and nutritious food supply is so vital for human development and raw materials for industries (Okolo, 2004). Agricultural sector is the most important non-oil economic activity. It is also the single largest employer of labour force constituting about 70 percent of labour and contributed 40-70 of Gross Domestic Product (GDP) in 2010 National Bureau of Statistics (NBS, 2011). The GDP contributed by sub-sectors were as follows: crops (36.40%), livestock (2.61%), fishery (1.34%) and forestry (0.52%) in 2010 (NBS, 2011). However, the difficulties in agricultural sector have been attributed to the discovery of oil in commercial quantities leading to the decline in agricultural contribution to the National economic growth for over three decades (Ekpo and Umoh, 2012). The decline in the agricultural sector was largely due to rise in crude oil revenue. In the early 1970s, less than 50% of the Nigerian cultivable agricultural land is under cultivation (Ekpo and Umoh, 2012).

Oil-boom era had led to the importation of food items in massive scale. Huge foreign exchange was utilized in importing food product. Nonetheless, price of food stuff remain high, because rural farmers do not have the technical resources to compete in international market, so they could not produce much (Ekpo and Umoh, 2012).

National efforts to boost production and reduce food importation have elicited the initiation of various programmes and policies by successive governments of Nigeria, in

order to revamp agricultural sector (Okereke, 2000). National Programme to boost Agricultural Sector includes the National Programme for Food Security, National Fadama Programme, Agricultural Transformation Agenda and Commercial Agricultural Development Project.

The introduction of commercial agriculture in Nigeria is a strategy of achieving one of the Millennium Development Goals (MDGs) of food security, which was complimented with the current National Food Security Programme that emphasizes on the same objectives (food security and sufficiency) ie. Providing food for the inhabitants of the nation and export excess to other countries and provide rural dwellers and farmers with extension services, agricultural support and rural development services. The introduction of commercial agriculture to supplement subsistence agriculture has become necessary to guarantee food availability for the teeming population of Nigeria. Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). Household food security is the application of this concept to the family level, with individuals within households as the focus of concern (FAO, 1996).

Commercial Agriculture can be defined as the production of both crops and livestock on relatively large scale for market. Commercial Agriculture can be defined as a progression from diversified farming, where the farmers' intention is to produce goods for sale primarily for widespread consumption by others (FAO, 2010). The farmers may acquire a sufficient large amount of agricultural land and sufficient advance technology such as

hybrid seeds and fertilizer, and focus on one or few particular crops due to economies of scale. This may further be augmented by higher level of technology that might significantly reduce the risk of harvest. Another importance of commercial agricultural farming is the new emphasis on capital formation, scientific progress and technological development as opposed to a reliance mainly on natural resources utilization that is common to subsistence farming (Simalenga, 2000). Commercial Agriculture Development Project (CADP) is aimed to improve Agricultural production in Nigeria by supporting the commercialization of agricultural production, processing and marketing outputs among small and media-scale commercial farmers and agro-processors (CADP, 2012).

The project is being financed by the World Bank, African Development Bank, Federal Government, State Government and beneficiary communities in five (5) States of Nigeria, including Cross Rivers, Enugu, Kaduna, Kano and Lagos. The approach used by Commercial Agricultural Development Project. Were demand-driven approach where all the Commodity Interest Group (CIGs) identify their priority needs and the needs will be addressed based on socially inclusive approach, while capacity building training conducted for the successful implementation of Commercial Agricultural Development Project(World Bank, 2009). Kaduna State was one of the five (5) States of the federation that participated in Commercial Agricultural Development Project.

1.2. Problem Statement

Nigeria is generally endowed with abundant Agricultural resources and yet the population is facing problems of low productivity and food security. The farmers are facing the problem of food production due to poor access to modern input and subsistence nature of the farming system in the rural area (Ogbonna, 2011). However, several programmes and policies have been implemented by the Nigerian Government to boost production in the agricultural sector includes:- Farm Settlement Scheme (FSS), Marketing and Commodity Board, National Accelerated Food product Programme (NAFFP), Agricultural Development Project (ADPs), National Seed Service (NSS), Agricultural Credit and Guarantee scheme Fund (ACGSF), National Agricultural Cooperative and Rural Development Bank (NACRDB), Operation Feed the Nation (OFN), River Basin Development Authority (RBDA), Green Revolution (GR), Directorate for Food, Road and Rural Infrastructure (DFRRI), Nigerian Agricultural Insurance Company (NAIC), National Agricultural Land development Authority (NALDA), the National Economic Empowerment and Development Strategies (NEEDS I and NEEDS II) and the implementation of Comprehensive African Agricultural Development Programme (CAADP) National Food Security Programme (NFSP), the National Fadama Project (Phase I, II and III), the current Agricultural Transformation Agenda (ATA), (Asiabaka, 2002).

All these programmes and policies failed to meet the objectives of self-sufficiency in food production and the reason for failure were due to policy approach that excluded beneficiaries from project design plan and implementation, recruitment of extension staff were not based on expertise and professionalism but on political consideration and the

three financiers – World Bank, Federal Government and State Government of Nigeria, do not make their contributions as and when due (Asiabaka, 2002). Frequent changes in leadership, lack of proper monitoring and evaluation of success of the programme have affected the operations and programme goals (Olatunji, 2005).

In an attempt to increase productivity among Nigerian farmers by increasing the production and income as a strategy to meet up with the goal of achieving food security, the Federal Government in collaboration with the World Bank came up with another strategy called Commercial Agricultural Development Project, with the aim of improving the business environment for agriculture to become more successful by gradually shifting from subsistence to commercial agriculture through improvement of small and medium scale farmers to access improved technology, infrastructure, finance and out-put-market. However, since the introduction of Commercial Agricultural Development Project in 2009, there is little or no improvement in the productivity of maize farmers and living standard of maize farmers. This has constituted a gap that needs to be filled, thereby making this study very imperative. It is against this backdrop that this study seeks to assess the Impact of Commercial Agricultural Development Project on the productivity and food security of maize farmers in Kaduna State. In order to achieve this, the following research questions are put forward.

i. What are the socio-economic characteristics of farmers in the study area?

ii. What are the participant sources of information on the Commercial Agricultural Development Project?

iii. What are the factors influencing farmers participation in the Commercial Agricultural Development Project?

iv. What is the impact of the Commercial Agricultural Development Project on Productivity and Food Security of farmers?

v. What are the constraints affecting farmers participation in the Commercial Agricultural Development Project in the study area?

1.3. Objectives of the Study

The broad objective of the study was to access the impact of commercial agricultural development project on Productivity and Food Security of maize farmers in Kaduna State, Nigeria.

The specific objectives were to:

i. describe the socio-economic characteristics of the project participants and non-participants in the study area.

ii. identify the participant sources of information on the Commercial Agricultural Development Project's activities.

iii. determine the factors influencing farmers participation in the Commercial Agricultural Development Project.

iv. determine the impact of the Commercial Agricultural Development Project on Productivity and Food Security of farmers.

v. identify the constraints to farmers participation in the Commercial Agricultural Development Project in the study area.

1.4. Justification

The need to increase productivity and food security among Nigeria gain development the project in the Federation. Therefore, this research work will assess how the intervention project has impacted on the beneficiaries' productivity and food security in the state. It is hoped that the study provide information that will be of benefit to both small and medium scale commercial farmer to technology infrastructure, finance and output market thereby improving the standard of living of rural farmer through employment and income generation. Therefore, the finding of this study will help in identifying and addressing those activities that enhance small scale and medium commercial agricultural farmers increase their production income and better living standard. The study shall offer another great potentials contribution to raising agricultural productivity and also expected to be useful to agriculture project/programme planners and implementers, Non-Government Organization (NGOs), donor agencies and other development Planners, Federals Ministry of Agriculture and Rural Development (FMARD) Community based and civil society organization. Policy makers will also find the result useful in their efforts to revamp the agricultural sector by providing information necessary on those variables which can be manipulated to ensure food security at large.

1.5. Hypotheses

i. There is no significant relationship between socio-economic characteristics of the farmers and participation in the commercial agricultural project in the study area.

ii. There is no significant difference in the productivity and food security status of participants and non-participants of the commercial agricultural development project.

CHAPTER TWO

LITERATURE REVIEW

2.1. Agricultural Intervention Programmes in Nigeria

An Intervention is a deliberate process by which change is introduced into people's thought feeling and behavior (Olatunji, 2005). The overall objective of an intervention is to control a person in a non-threatening way and allow them to see their self-destructive behavior, and how it affects themselves, family and friends. It usually involve several people who have prepared themselves to talk to a person who has been engaging in some sort of self-destructive behavior, in a clear and respectful way, they inform the person of factual information regarding his or her behavior and how it may have affected them. The immediate objective of an intervention is for the self-destructive person to listen and to accept help (Oluwasemi, 2000). Agricultural development intervention is an integral part of national development. It is that aspect of development that is related to agrarian reforms, considering the contribution of agriculture to the socio-economic development of many countries; several scholars have postulated themselves linking agriculture development intervention with national development within the context of development paradigms postulated in the field of agriculture (Olatunji, 2005).

Some of the Agricultural intervention project as follows:

Agricultural credit and guarantee scheme fund (ACGSF), Agricultural credit support scheme (ACSS), Commercial Agricultural credit Scheme (CACS), National Economic Empowerment and Development Strategies (NEEDS I and NEEDII), Comprehensive African Agricultural Development Project (CAADP), National Food Security programme

(NFSP) and Agricultural Transformation Agenda (ATA) as well as Commercial Agricultural Development Project CADP)

2.1.1. Overview of Commercial Agricultural Development Project

Generally, development is seen as a process by which man increase or maximizes his control and use of material resources with which nature has endowed him and his environment (Ogen, 2007) affirmed that development consist of five main ingredient increasing material wealth for the use of individuals and the modern collecting known as the nation; eliminating unemployment; poverty and want; eliminating inequality and increasing the general availability of labour-saving devices. Development; from its inception is a kind of totalistic movement and rural development is not an exception. Therefore, rural development is a multi-dimensional concept by which productivity, income and welfare, in terms of health, nutrition, education and other features of satisfactory life of rural people can be improved upon or transformed. According to Igbokune and Ajala (1995) the earliest attempt at rural development during colonial era took the form of community development and later agricultural extension. The community development approach emphasized self-help to improve health, nutrition and community welfare whereas the agricultural extension approach was concerned with improving the agricultural productivity.

Commercial Agricultural Development Project is a World Bank assisted project, being implemented in five States of the Federation, namely: (cross Rivers, Enugu, Kaduna, Kano and Lagos, over a period of five years, starting from 2009 - 2013. Micro, small and

medium commercial farms benefited directly while many houses holds benefited indirectly through access to farm roads energy markets opportunities (CADP, 2009).

The beneficiaries are already aggregated into informal Commodity Interest Group (CIGs). The project supported three value chains per State. The values were distributed thus: Cross River (oil palm, cocoa and Rice) Enugu (fruit trees, poultry and maize), Kaduna (fruits trees, Dairy, and maize) and Lagos (poultry, Agriculture and Rice) (CADP, 2009). The value chains chosen by each of the participating States were based on the respective comparative advantage and their contribution to agricultural growth. Based on an evaluation of market equivalents during appraisal, the value chains selected are expected to have high demand for Agricultural commodities and markets have the capacities to absorb the additional production (CADP, 2009). The micro, small and medium scale farmers are heterogeneous with respect to households assets human capital, income generating potentials, and livelihood strategies requiring differentiated strategies for their value-chain Nigeria's commercial Agricultural Development project (CADP) aims at improving agricultural production system and supporting the dissemination and adoption of new technologies (CADP, 2009). The project has four components namely: Agricultural Production and Commercialization; Rural Infrastructure, Project Management, monitoring and evaluation studies and Project preparation facilities (CADP, 2009).

2.1.2. Component I: Agricultural Production and Commercialization

The objective of this component is to improve the adoption of existing and new agricultural technologies by commercial farmers and processors along the selected value chains. The component has four sub-components:

a. Technology Demonstration and Adoption: This sub-component will finance:

(i) **Demonstration and dissemination of technologies:** A mixture of existing potential service providers from the public (i.e. research institutes and Agricultural Development Projects (ADPs)) and private sectors will provide demonstration and dissemination of technologies in the selected value chains. A value chain approach and Matching Grants will be used for the implementation of this sub-component using the structure of the CIGs/CADAs (CADP, 2009).

(ii) **Matching grant:** The project will provide matching grants to finance activities on sub-components. For adoption of new technologies, the formula for the matching grant will be 50% to 20% contribution from IDA on a sliding scale basis at the association level. In the case of the staples it will be a ratio of 50% IDA and 50% contribution by the beneficiaries (CIGs/CADAs) on activities that do not have public goods element (CADP, 2009).

The matching grant is open to all qualified/eligible members of Commodity Interest Groups (CIGs) and/or Commercial Agriculture Development Associations (CADAs). The entities should be financially sustainable with capacity to initiate and implement acceptable/viable proposals. Commodity Interest Groups (CIGs) must belong to Commercial Agriculture Development Associations (CADAs) and must show evidence

of funds (including own funds or other sources) to match the grant (CADP, 2009). The eligible beneficiaries should have the following attributes:

i. The farmer/beneficiary should be engaged in commercial agriculture production,

ii. Should be member of a Commodity Interest Groups (CIG) for at least 6 months, and

iii. The CIGs should be members of the Commercial Agriculture Development Associations (CADAs) (World Bank, 2013).

b. Support to staple crop production systems:

The sub-component will finance:

(i) Land development:- This sub-component will support small-scale commercial farmers to increase the area under cultivation on existing land holdings. The CIGs/CADAs have tenure on their land. It is estimated that additional 10,000ha (i.e. 2,000ha per state, which translate to 400h/year/state) will be brought under cultivation under existing holdings. This estimate is modest and could be exceeded by the project. The project will provide Matching Grants to the CIGs/CADAs on a 50:50 contribution by IDA and beneficiaries under this sub-component. In addition, special attention will be given to women farmers to expand the area under-cultivation on their holdings; and this support will be closely monitored during project implementation (World Bank, 2014).

(ii) Input support system:- One of the constraints to staple crop production is the issue of non-availability of high quality foundation seeds. This sub-component will finance on a contractual basis, the production of quality foundation seeds of maize (hybrid and open pollinated) and rice by some Research institutes in Nigeria (i.e. International Institute of

Tropical Agriculture (IITA), National Cereals Research Institute (NCRI), Institute for Agricultural Research (IAR), and Institute for Agricultural Research and Training (IAR&T)). These foundation seeds will be made available to seed companies to multiply. The National Agricultural Seed Council (NASC) will certify the seeds produced by the seed companies before they are sold to farmers at market prices. There will be a three-party Memorandum of Understanding between the project, research institutes and the seed companies that the seeds produced will be sold to participating commercial farmers. The need of the CIGs/CADAs will first be met before surplus seeds are sold to others. It is estimated that about 108,000 kilograms of maize and 300,000 kilograms of rice seeds are expected to be produced at the end of the project life (World Bank, 2014).

(iii) Production systems:- In order to substantially intensify production of staples, support will be provided for animal traction and power tillers. This sub-component will finance mainly power tillers and animal traction using locally manufactured implements and simple cultivators. The support under this sub-component will be provided through the structure of the CIGs/CADAs. This model is similar to International Fund for Agricultural Development (IFAD)-Community Based Agricultural and Rural Development Project in Nigeria. The project will provide Matching Grants to the CIGs/CADAs on a 50:50 contribution by IDA and beneficiaries for this sub-component (World Bank, 2011).

(iv) On-farm primary processing:- The project will finance on-farm primary processing and storage to minimize post-harvest losses by providing threshing/milling machines and storage bins of various capacities to CIGs/CADAs on Matching Grant basis. The

Matching Grants to the CIGs/CADAs will be on a 50:50 contribution by IDA and beneficiaries for this sub-component. The CADAs will manage the investment and charge fees for the provision of threshing, milling and storage services (CADP, 2009).

(v) Post-harvest handling centres:- The CADA Post-harvest losses account for about 30 percent of production costs because of poor post-harvest handling of produce. The project will support the establishment of post-harvest handling centers that will be equipped with appropriate facilities and machineries to promote value addition to various products in the targeted value chains and managed by the CADAs. The centers will also provide services to farmers and clients at a fee to support the operations and management of the centers by the state CADAs (CADP, 2009).

c. Market facilitation

This sub-component aims at the creation of domestic and export markets, which will support market development, awareness and knowledge sharing for commercial farmers. It will finance market information system, including market price surveys, website and information kiosks, market/financial linkages (such as promotion of products for supply chain financing and use of crops as collateral), quality control measures and standards; food safety, exchange programs, agricultural trade fairs and shows, local and international study tours (World Bank, 2013).

d. Capacity building

This sub-component will focus on the training of commercial farmers, organized producer/commodity associations/apex organization of Commercial Agriculture Development Associations (CADAs) that will play a coordinating role in the project. The

sub-component will assist to develop the capacities of the CADAs to plan and execute their projects. The training will also include gender and social impacts. This sub-component will finance the following activities: interactive sessions, discussions with experts, group dynamics, investment plans, food safety, grading and quality control and standards, exhibitions, production techniques and marketing strategies for the selected value chains in the states and maintenance of machines and equipment (World Bank, 2014).

2.1.3. Component II: Rural infrastructure

The project will assist to close the infrastructure gaps to enhance agricultural commercialization by providing resources for the construction, rehabilitation and maintenance of network of selected farm access roads.

i. Network of farm access roads: Substantial evidence exists that investments in roads and road connectivity have positive effects on agricultural productivity and output. Better road connectivity increases crop production, reduces transport costs of goods and services, and raises producer prices of crops. This sub-component will link feeder roads to State and Federal roads. Investments will address construction, rehabilitation and maintenance of farm access roads concentrated in areas where a critical mass of project participants will benefit. This sub-component will be closely coordinated with the Rural Access and Mobility Project. The guiding principles for the design of farm access roads for CADP are technical feasibility, financial viability, complementarily with Rural Access and Mobility Project (RAMP), and should support the needs of the target group. The objectives are to enhance the profitability of agricultural activities in recipient rural

communities by increasing productivity, ensuring better processing and marketing for small and medium- scale farmers and agro-processors (CADP, 2009).

ii. Rural energy: Provision of transformers and extension of lines from the main transmission lines to commercial farmers and agro-processing facilities in collaboration with the Power Sector Reform Project. The key issues for rural energy will be, identification of investment needs in rural energy in the participating states, the specific item/activities to be financed by the states and the locations, who should be responsible for decision (private or government), responsibility for maintenance, the flow of funds and disbursement mechanisms, linkage and synergy to be developed between the project and the Energy Reform Project, and cost estimates of the interventions. Access to IDA resources under the three sub-components will be through the preparation of Commercial Agriculture Development Plans by the beneficiaries (World Bank, 2010).

2.1.4. Component III: Project management, monitoring and evaluation and studies

a. Project management*:* This component will finance Project Management and Monitoring and Evaluation, including the Management Information System, impact evaluation and beneficiary assessment, Mid-Term Review, and final evaluation (World Bank, 2009).

b. Monitoring and evaluation:- This sub-component will support Management Information System, Impact Evaluation and Beneficiary Assessment and Monitoring of Environmental Management Plans.

c. Support to relevant Federal and State Institutions:- The project will support some Federal Institutions (Federal Ministry of Agriculture and Water Resources, National Food Reserve Agency and Federal Ministry of Finance and other relevant institutions) in respect of capacity building, project monitoring and other activities. At the state level, the project will support the States Ministries of Agriculture, Agricultural Development Projects (ADPs), the Project Financial Management Unit (PFMU) and other relevant institutions such as Veterinary and Animal Health, Cooperatives and Agriculture Insurance, Produce Inspection and Standards Organization of Nigeria in the areas of capacity building and project monitoring (World Bank, 2013).

2.1.5. Component IV: Project coordination

a. National-level project coordination

At the federal level, there will be a National Steering Committee (NSC) with 10 members as proposed by government. These are, Permanent Secretary, FMAWR(Chairman); Director of Agriculture; Representatives of the Ministry of Finance; Ministry of Commerce and Industry, Ministry of Women Affairs; National Planning Commission; CADA – Apex CADA; National Association of Chambers of Commerce, Industry, Mines and Agriculture (NACCIMA), and the Executive Director, NFRA. The NSC will meet twice a year. The NCO will serve as the secretariat (CADP, 2009).

b. State-level project coordination

Project coordination will be carried out by the State Commercial Agriculture Development Office (SCADO) of the participating states while the oversight, policy and strategic orientation functions will be performed by the State Steering Committee (SSC).

The State Steering Committee will comprise of 12 members as proposed by government, which are, Permanent Secretary Ministry of Agriculture (Chairman); Directors of relevant value chains in the Ministries of Agriculture (2), Representatives of Ministries of Finance, Planning/Budget, Trade and Commerce, Women Affairs, Rural Development/Energy Commission, Works, Chamber of Commerce and Industry, Commercial Agriculture Development Associations; Project Manager (PM) of ADPs. The Vice Chairman will come from the CADA and SCADO will be the Secretariat (CADP, 2009).

c. Beneficiary-level project coordination and sub-project approval

Critical decisions will take place within the CADAs and the various Commodity Interest Groups (CIGs) which should be legally registered. The Commercial Agriculture Development Associations (CADAs) are apex organizations of Commodity Interest Groups, which have a common interest in agricultural commercialization. The CADAs are already in existence. They will be responsible for the coordination of the activities of the CIGs, including the management of the post-harvest handling centres under the Public-Private Partnership (PPP) arrangements. The CADAs may facilitate co-financing of the sub-projects through commercial banks (CADP, 2009).

2.1.6. Project development objectives (PDO)

The Project Development Objectives (PDOs) of commercial Agricultural Development Project (CADP) was to strengthen agricultural production system and facilitate access to market for targeted value-chains among small and medium scale commercial farmers in five participating State. The value chains are oil palm, cocoa, fruit trees, poultry,

aquaculture and dairy with maize as staple crops. Typical chains include, input sales, producers, assemblers/traders, processor, retailers and finally consumers. The strategies thrust of the project is to support access to productivity-enhancing technologies, to improve market access, to build and improve capacity in areas of needs and to improve access to rural infrastructure (ie network of roads and electricity). The project facilitators will help to organize the Commodity Interest Groups (CIGs) and commercial Agricultural Development Association (CADAs) and guide them through an intensive process of group formation and decision making using a range of participating techniques, resulting in development of commercial agricultural development plans (CAD Plans). The commercial Agricultural Development Project was designed to reduce rural poverty by increasing productivity and enhanced food security as one of the Millennium Development Goal (MDGs) (CADP Hand Book 2009).

2.1.7. Sponsorship of commercial agricultural development project

Commercial Agricultural Project is a comprehensive five years project developed by the Federal Ministry of Agriculture and Water Resources (FMAWR) in collaboration with the World Bank and other state Government ministries, local government and other stakeholders (donors, private Organizations, NGOs as well beneficiary communities) to raise productivity and enhance food security among farmers. The project is being sponsored by World Bank, African Development Bank, Federal Government State Government and beneficiaries' communities.

The approach used by the commercial Agricultural Development project (CADA) were demand driven approach where all the commercial farmers including oil palm producers,

maize farmers, fruit-trees farmers, rice farmers, cocoa farmers, poultry farmer, agriculturist and on-and off farm entrepreneur operating through respective commodity interest group (CIGs) and their apex Organisation, Commercial Agricultural Development Association (CADAs) would reach consensus on how to pursue their common goals of productivity and food security. Through this process, the communities would decide on the kind of advisory services, infrastructure, capacity building training as well as environmental mitigation measures needed for successful implementation of the project. All sub-projects must meet technical standard to ensure structural stability and environmental compliance (CADP, 2009).

2.2. Concept of Productivity

For many years productivity has been a key issue for agricultural development strategies because of its impact on economic and social development. It is generally believed that the surest means through which mankind can raise itself out of poverty to a condition of relative material affluence is by increasing productivity (Ibrahim, 2008).

Productivity improvement creates the wealth that can be used to meet present need of the future. Productivity in its broad sense is a measure of how efficient and effective resources are used as input to produce products and services needed by the society in the long run. It is the rate of flow of output when compared with rates of flow of resources used in producing output of goods and services (FAO, 2010). In financial terms, productivity is the value of output divided by the cost of inputs used in a given period. The basic resource inputs consist of labour, capital and natural resources. Since resource

inputs seldom grow much faster than population, obviously the main source of increase of output per capital is through the growth in productivity.

There is a direct relationship therefore between individual resource productivity and nation building, because improvement in productivity of each worker or farmer leads to improvement in earning of investors as well as more financial capital for management and more revenue for government. Improvement in productivity is the most important factor in attaining growth in the economy and this is more so for agriculture which provide means of livelihood for over 65.0 percent of the population through subsistence production which is a predominant feature of agricultural production in Nigeria (Ibrahim, 2008).

Productivity is defined as average measures of the efficiency of production. Agricultural productivity is measured as the ratio of agricultural output to agriculture input. While individual products are usually measured by weight; their varying densities make measuring overall agricultural output difficult. Therefore output is usually measured as the market value of final output which excludes intermediate products such as corn feed used in the feed meal industry (FAO, 2010).

This output value may be compared to many different types of inputs such as labour and land (yield). These are called partial measurement of productivity (FAO, 2010).Agric productivity may also be measured by what is termed total factor productivity (TFP). This method of calculating agricultural productivity compares an index of agricultural inputs to an index of agricultural output. This measures of agricultural productivity was established to remedy the shortcoming of the partial measures of productivity, notably

that it is often hard to identify the factors cause them to change. Changes in TFP are usually attributed to technological improvement.

2.3. Concept of Food Security

Food security exists when all people, at all-time have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2006). Household Food Security exists when all members at all times, have access to enough food for an active healthy life. The main goal of food security therefore, is for individuals to be able to obtain adequate food needed at all times and to be able to utilize the food to meet the body's needs. Individual who are food secure do not live in hunger or fear of starvation (FAO, 2006). Food insecurity on the other hand, is a situation of "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways (FAO, 2006).

Maxwell (1996) stated that a country and its people are food secured when their food system operate in such a way as to remove the fear that there will not be shortage of food to eat. He further stressed that food security requires that poor and vulnerable have secure access to the food they want. Food insecurity on the other hand occurs when:-

i. People experience a large reduction in their sources of food and are unable to make-up the difference through new strategies.

ii. The prevalence of malnutrition is abnormally high for most time of the year and this cannot be accounted for by either health or care factor.

iii. A large proportion of the population or group is using marginal or unsuitable strategies and

iv. People using coping strategies that are damaging to their livelihood in the longer term or incur some other unacceptable cost such as acting illegally and immorally.

Food insecurity and hunger are forerunners to nutritional health, human and economic development problem. They cones deprivation of basic necessities of life. As such food security has been considered as a universal indicator of households and individual personal wellbeing. The consequences of hunger and malnutrition are adversely affecting the livelihood and wellbeing of a massive number of people and inhibiting the development of many countries (Gebrenedhin, 2000).

Four essential component of a measure of food security at the individual and household level must be incorporate in the definition of food security which includes:

i. Availability of having sufficient quality of food.

ii. Quality of available food concerning the food types and the diversity of the diet.

iii. Physiological acceptability relating to feeling of food deprivation restricted food choice and anxiety about the quantity and quality of food on hand in the household store and

iv. Special acceptability of consumption pattern, determine by social norms in respect of meal frequency, composition and way of food acquisition such as being

able to purchase foods instead of having to beg, scrounge or steal food (Campbell, 1991).

The world food summit in 1996 defined food security as a situation "when all people at all times have physical, social and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996). At the world summit of food security in 2009. This definition was reconfirmed and the concept was extended and specified by adding that the "four pillars of food security are availability, access, utilization and stability" and stated that the nutritional dimension is integral to the concept (FAO, 2009). The strength of this dimension is its comprehensiveness and imperative for "concerted actions at all level "(that are individual, household, national, regional, and global)" and "coordinated efforts and shared responsibilities" across institutions, societies, and economics to tackle food insecurity effectively (FAO, 1996) furthermore, poverty is regarded as the major obstacle to achieve food security at the household level so that "poverty eradication is essential to improve access to food" (FAO, 1996). The use of the term "food security" at the national (and global) level has been often focused on issues on supply side of the food equation and particularly a country's ability to provide enough food to meet the needs or demands to the population either through domestic production or food imports (Anderson, 2009).

Hence, for major food importers such as Middle East and Northern African countries, external balance and currency resources need to be recognized as crucial factors of national food security (Diaz – Bonilla *et al.*, 2002; Breisinger, Ecker, Al-Riffai and Yu, 2012). The use of the term "food Security" at the national (and global) level has been

often focused on issues on supply side or the food equation and particularly a country's ability to provide enough food to meet the needs or demands of the population either through domestic production or food imports (Anderson, 2009). Hence, for major importers such as Middle East and Northern African countries, external balance and currency resources need to be recognized as crucial factors of national food security (Diaz – Bonilla *et al*. 2002, Breisinger *et al.* 2012).

The micro dimension relates to issues of food security at the household levels. Household food security refers to the ability of a household to produce and/or purchase food needed by all household member to meet their dietary requirement and food preference as well as the assets and services necessary to achieve and maintain an optimal nutritional status. This complies with the second pillar of the world summit definition that is access, yet, even household access to enough and nutrition's food may not assure adequate food intake of all household member for two seasons (Anderson, 2009). First the ability to acquire sufficient food may not convert into actual food acquisition, because the preferences of household or its decision maker may not prioritize food acquisition over the acquisition of other goods and services. Second, the intrahousehold allocation of the available food may not comply with the physiological requirement of each individual household members, the extent to which sufficient food intake translates into good nutrition depends on several health-related factor.

The condition of intake of sufficient and safe food which is adequate according to the individual physiological requirements forms the third pillars-that is utilization. Finally, food security can be distributed into transitory and permanent food security. Where the

farmer describes a situation of food shortage during certain periods such as times of food crises or season of agricultural production, whereas latter identified a situation of a long term persistent lack of adequate food. The condition to time refers to both macro and micro level food security and summarized under the fourth pillar that is stability (Gebrendhin, 2000).

2.4. Empirical Assessment of Farmers Socio-economic Characteristics

Socio-economic characteristics play a vital role in the farmers' lives in the sense that they influence willingness to accept changes which contributed significantly in raising farm productivity and ultimately their standard of living. Some of the most commonly used socio-economic variables include age, sex, marital status, gender differences, educational level, household size, farm size, membership to social organization and urban contact and level of income were all found to be related to adoption of an innovation Oladeji, *et al* (2000) reported that it is generally believed that males are often more energetic and could readily be available for energy demanding jobs like maize farming. Ekenta (2004) stated that adoption of improved technologies is influenced by certain factors and is a function of farmers characteristics, extension agency and the new technologies themselves as material components. Overall farmers responses to agricultural innovation is attributed to a number of institutional, national, economic and environmental factors like credit, extension agent, input delivery and information sources have been reported as important stimulus to individual in the adoption process. Kassie (2009) reported that some socio-cultural characteristics such as literacy, age etc. that could lead to adoption of recommended farm practice. He also emphasize that age affects the amount of physical efforts put into any economic activity that is why most of the farmers are conservatives,

sticking to the old system of farming. He also stated that those aware of risk taking, they will therefore refuse to adopt new innovation that could lead to increase in productivity. He further stated that those farmers that are literate will be able read the technical information and they keep record in their farm business, unlike those that are literate.

Chinedu (2000) also stated that low number of extension agents in the community contributed to the factors affecting the farmers' participant in the adoption of an improved practice. In a related development (Ogen, 2007) agreed with socio-cultural factors that affect adoption of new innovation, none of these views differ materially with the finding of Chinedu (2000) with regard to his study he concluded that extension services might increase its effectiveness by identifying certain farmer in the village to serve as early adopters.

Some of these characteristics he suggested are:-

i. Farmer who can read and comprehend certain extension material.

ii. Farmers who can think transpose themselves into the feeling and action of other that is leading them to the utilization of the role taking in structuring and interpreting social and later relationship.

iii. Farmers who have frequent contact with various sources of extension and advise.

iv. Leadership role.

2.5. Empirical Studies on the Impact of Development Programmes

There are quite a number of studies on programmes development. These studies have been carried out in different parts of Nigeria. For example, Bajoga and Adebayo (2006) examined the impact of the project specifically on the living standard of dry season farmers who benefited from the Fadama loans in Gombe state. The study revealed that the project did not make any impact on the beneficiaries of the Fadama loan by increasing their income, improving the living standard of an access to more personal belongings.

Correspondingly, Adegbite, Oloruntoba, Adubi, Oyekunle and Sobanke (2008) carried out an assessment of the impact of Fadama II on small-scale farmer's income in Ogun state with emphasis on the implication for agricultural financing in Nigeria. Evidence from their study also revealed no significant increase in the income of the Fadama beneficiaries compared to non-beneficiaries of the Fadama project in the study area. In another study, Kudi, Usman, Akpoko and Banta (2008) examined the impact of the Fadama II on poverty alleviation among farmers in Giwa local government area of Kaduna State, especially how the project has affected the socioeconomic status of the farmers and production efficiency. They found that there was a little improvement in the income of farmers. The implication is that better income give better purchasing power and hence the improvement of living standard.

2.6. Determinants of Food Security among Farming Households

Socio-Economic Characteristics and Resources of individual households have been identified as basic factors influencing the food security status of households (Sanusi,Badejo and Yusuf, 2006). Kidane, Alemu and Kundhlande (2005) identified household size, education and farmland size and land quality as determinants of food security status of a household. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs; engage them in diversification of household incomes which, in turn, would enhance households' food supply. Amaza *et al.* (2006) noted that the major determinants of food insecurity are: household size, gender, educational level, farm size and types of household farm enterprise. They concluded that policy measures towards the provision of better family planning should be given adequate attention and priority by the government in addition to improving access to education, credit facilities and agricultural extension services for rural households. Sanusi *et al.* (2006) further reported in his study conducted in some selected Local Government Areas of Oyo and Lagos States that income status and the educational status of the household head influence food security status of the household. Babatunde *et al.* (2007) noted that household income, household size, education status of the household head and quantity of food obtained from own production determined the food security status of farming households in North Central Nigeria. They concluded that socio-economic variables of the households are important determinants of their food security or insecurity status.

2.7. Constraints to Adoption of Technologies in Nigeria

Research finding on the constraints to the effective performance of Agricultural intervention programme revealed that major reasons for poor performance farm level technology were farmers lack of awareness of the improved technologies or a lack of information regarding potential benefits accruing from them, the unavailability of improved technologies unprofitable given the farmers agro-ecological conditions and the complex set of constraints faced by farmers in allocating land and labour resources across farm and off-farm activities, Doss (2003).Other constraints that militate against project implementation include lack of understanding of the socio-economic and socio-cultural element of the community or participant by the programme implementer (Orokogo, 1995). Several factors have been identified to enhance or retard growth in the agricultural sector. These factors include education, infrastructure and inflation (Johnson, 2002). Other common constraints limiting the effective agricultural intervention programme in Nigeria are lack of commitment to agricultural development, policy associated problems, lack of community participation in the planning and implementation of programme (Top – Down approach), funding and where funding is available there is always problem of misappropriation and diversion of fund and corruption (Amalu, 1998).

2.8. Theoretical Framework

This study was guided by social change and modernization theories.

2.8.1. Impact Assessment Theory

Impact refers to the broad, long-term economic, social and environmental effects resulting from project intervention. Impact of a programme can be manifested in relation

to whether the services actually resulted positively on the people who receive them. Manyong *et a*l. (2001) opined that impact assessment is the process of identifying the future consequences of a current or proposed action. It is used to ensure that projects programme and policies are economically viable, socially equitable and environmentally sustainable (Manyong *et al.*, 2001). Impact assessment of Agricultural development projects is a continuous process and therefore being a process. It is better conceptualized to use the "participant" and "non -participant" impact assuagement approach (Alene *et al.*, 2006).

2.9. Conceptual framework

Farmers' participation is the main factor which can bring about impact on productivity and food security of maize farmers in the study area. Without farmers' participation, commercial Agricultural Project could not be achieved. It is important to note that since this study focuses on farmers' participation in commercial Agricultural project on the productivity and food security of maize farmers. Therefore, it is important to generate or improve the meaning and definition of participation and impact deduced from the study:

2.9.1. Concept of participation

According to Oladele (2013) participation can simply be defined as a process of equal and active voluntary involvement of all stakeholders in the formulation and of the developing of policies and strategies and in the analysis of problems and solutions identification, planning, implementation, monitoring and evaluation of agric extension activities. Kumba (2003) stated that Participation is a total commitment of both the initiators and the beneficiaries in carrying a mutually planned project to its completion

through the involvement of participating agencies and receivers using the multi-sectoral approach in which farmers take active part in the decision making process. Farid *et al.* (2009) defined participation as playing a role or taking part in an activity usually with other farmers participation also refers to involvement of individuals and groups in agricultural development process with the aim of ensuring self-reliance and better standard of living (Oladele, 2013).

The important relationship between farmers' participation in agricultural projects on one hand, and economic development and poverty alleviation on the other hand, cannot be over emphasized (Oladele, 2013). According to Nxumalo and Oladele (2013) without participation there would be no programme and no development. Farmers' participation in agricultural projects can either be nominal, consultative action oriented or collegial. Development efforts that employ the top-down approach with minimal inputs and involvement of target beneficiaries have long been recognized as an unsustainable and poor pathway to beneficiary empowerment and development (Kumba, 2003) Bottom-up approach that views beneficiaries as partners, utilize local experience and endeavour to empower target beneficiary (Kumba, 2003).

2.10. Conceptual Model

Conceptual model was used in explaining the relationship between the independent and the dependent variables. Model has been used in research primarily as tools for organizing knowledge gained in experimentation (Adebayo and Okunaye, 2004). In the context of this study, the independent variables in the model include: age, educational level, household size, farming experiences, contact with extension against, membership

to social organization, access to improve inputs, access to credit facilities. It is expected that these, variables would influence the participation in commercial Agricultural Development Project and if affected positively there would be increase in productivity and food security and consequently improvement in the level of living.

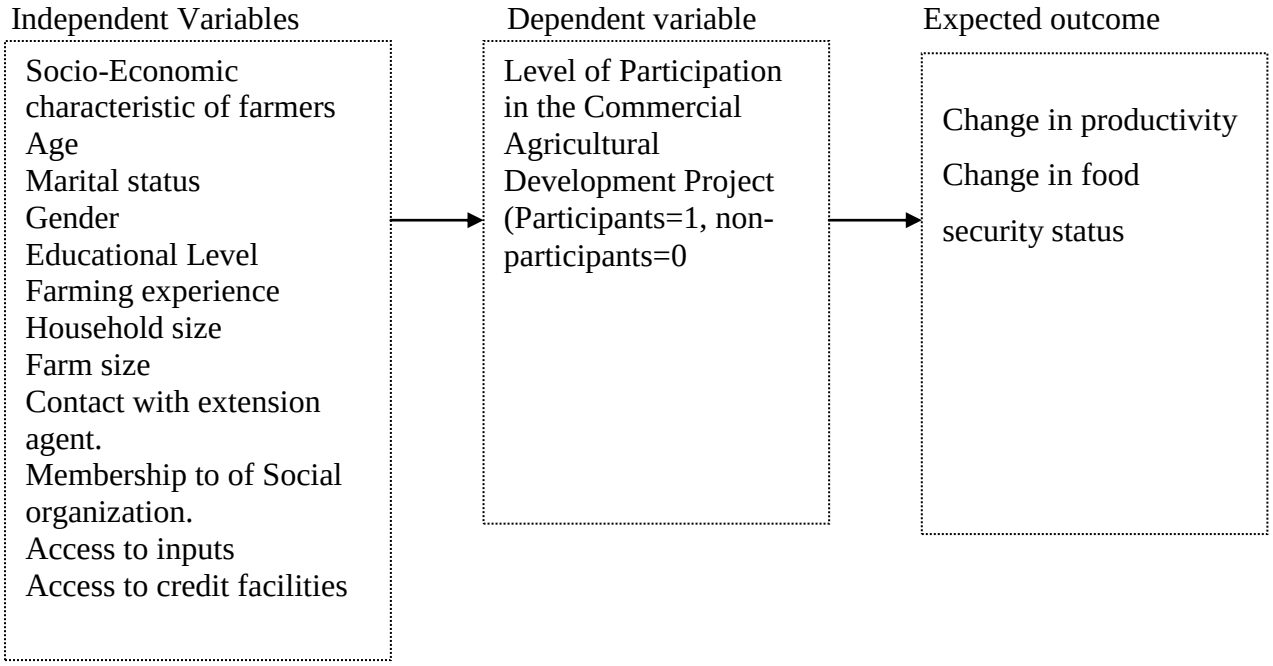


Figure 2.1: A model showing factors influencing farmers' participation in commercial agricultural development project and its impact on productivity and food security status of farmers.

CHAPTER THREE

METHODOLOGY

3.1. Study Area

Kaduna State is one of the 36 states of the Federation. Kaduna State is located between latitude 09^0N and 11^0N and between longitude 06^0E and 08^0E of the Greenwich meridian. The State has a population of 6,066562 people according to NPC 2006 and a projected population of about 6,667,357 in 2010 and it is the largest in the federation after Lagos and Kano.

It has several ethnic groups which include Fulani, Hausa, Baju, Atyap, Jaba, Adara, Gbagyi, Kurama Ninzo, Ham, Koro, Kagoro, Gwong, Numana among many other ethnic groups. It has an estimated cultivable land area of about 46053km^2 with only about 30,000km^2 under cultivation by traditional law-income group the area is marked with two distinct seasons of wet and dry season, the wet season which commenced in the month of April in the Southern part of the State and between May and June in the northern part of the State. The dry season extends from October to march and is marked by the hot dry north easterly hammattan winds.

The mean annual rainfall shows a marked decrease from south to north of 1524-635mm (Sani and Lawal, 2003). The vegetation in the southern part of the State is southern guinea savannah type, while the northern part has the northern guinea savannah vegetation, Kaduna state shares common borders with Abuja in the north east and six other states namely Katsina, Kano, Zamfara, in the north-north Nasarawa, Plateau in the north – east and Niger in the north – west.

Agricultural activities is the main occupation of people in the State and characterized predominantly mixed cropping, of such crops as maize, sorghum, millet, cowpea, rice, cassava, cocoyam, sugar cane, tomatoes, pepper, acha, potato, etc. Rain-fed agriculture is mostly practiced in the state with little Fadama agriculture (Yakubu, 2005). People engaged in other business ventures like blacksmith, hunting, butching, trading, craft men (Yakubu, 2005). Infrastructure such as water, electricity, health, transportation, communication, education centers etc. are all found in the study area (Yakubu, 2005). Hausa language is the predominant language spoken in the state, Hausa women are hardly involved prominently in agricultural and outdoor economic pursuits in the northern part of the state while they highly involved in southern part of the state. Traditionally, marriage within tribes are most preferred but occasionally done between tribes (Gbovega, 2000). Muslim and Christians are the two major religion practiced in the state (Gbovega, 2000).

3.2. Sample Techniques and Sample Size

All the four Agricultural zones in Kaduna State were used for this study (Maigana, Samaru, Birni – Gwari and Lere). Using multi-stage sampling procedure, the first step involves the purposive selection of two villages in each zone given a total of eight villages. They include: Giwa and Shika from Maigana – zone, Kachia and Gumen from Samaru Kataf zone, Birnin-Gwari and Kujama from Birnin – Gwari zone, Saminaka and Lere from Lere zone. The criterion for selection of the villages was based on intensity of participation of farmers in the Commercial Agricultural Project obtained from the Kaduna State Agricultural Development Project (KADP). Ebojei *et al.* (2010) in their studies selected 80% and 40% of the population of participants and non-participants of

bee farming, respectively for enumeration. Thus, 42 participating household head and 58 non-participating household head were randomly selected. The variation in percentage was due to the fact that the population of the non-participants was more than that of the participants (Ebojei *et al.*, 2010). This method was adopted for the second stage, a random selection of 25% of the participant and 25% of the non-participant from the list of maize farmers provided by the Desk Officer from Agricultural Development project making a total of two hundred and thirty respondents for the study area. The variation in percentage was due to the fact that the population of the non-participants was more than that of the participants

Table 3.1: Summary of sampling procedure and sample size

		Participants		**Non-Participants**	
Agricultural Zone	**Villages**	**Sampling Frame***	**Sample Size (25%)**	**Sampling Frame***	**Sample Size (25%)**
Maigana Zone	Giwa	46	12	77	19
	Shika	36	9	55	14
Samaru Zone	Kachia Urban	54	14	67	17
	Gumen	58	15	56	14
Birnin-Gwari Zone	B/Gwari	62	16	61	15
	Kujama	50	13	45	11
Lere Zone	Saminaka	46	12	75	19
	Lere	50	13	67	17
Total: 4	**8**	**402**	**104**	**503**	**126**

3.3. Data Collection

Data for this study was obtained from primary source. Structured questionnaire was designed to obtain first-hand information from the respondents in the study area which serve as the primary data source. Information collected include: socio-economic characteristics of participant and non-participant of commercial agricultural development project such as age, sex, marital status, household size, education level, farming

experience, farms size, , membership of associations, access to input such as fertilizers, seeds, agrochemicals and extension contact. Production information such as Output of maize (Grain Equivalent) and input (such as fertilizers and labour), yield (Kg/ha) of maize, Farmers' calorie intake.

3.4. Analytical Techniques

The data was analyzed using both descriptive and inferential statistic. The descriptive statistics involved the use of mean, median, mode, frequency distribution table, percentage, standard deviation and variance where necessary while inferential statistics involved the use of logit regression model, Z-test statistical tools.

3.4.1. Descriptive statistics

Descriptive statistics such as frequency distribution, mean and percentage was used to achieve objectives i, ii and vi.

3.4.2. Logit regression model

Logit regression model was used to achieve objective iii. The probability of a farmer participating in commercial agricultural development project was determined by an underlying response variable that captures the true economic status of a farmer. The underlying response variable y* in the case of binary choice is defined by the multivariate logit regression relation:

$$y^* = \Sigma x_i \beta_j + \mu \quad \ldots\ldots 1$$

The relevant logistic expressions are given as:

$$\text{Prob } (y^* = 1) = 1 - F^*(\Sigma x_i \beta_j) = \frac{e^{\Sigma x_i \beta_j}}{1 + e^{\Sigma x_i \beta_j}} \quad \ldots\ldots 2$$

$$\text{Prob } (y^* = 0) = F^*(\Sigma x_i \beta_j) = \frac{e^{-\Sigma x_i \beta_j}}{1 + e^{\Sigma x_i \beta_j}} = \frac{1}{1 + e^{\Sigma x_i \beta_j}} \quad \ldots\ldots 3$$

Where:

F = the cumulative distribution function for μ_i

$\text{Prob } (Y_i = 0/\beta_j X_i) = F(-\Sigma x_i \beta_j)$

$\text{Prob } (Y_i = 1/\beta_j X_i) = 1 - F(-\Sigma x_i \beta_j)$

The likelihood function is given by;

$$L = \Pi_{y_i=0} \{F(-\Sigma x_i \beta_j)\} \Pi_{y_i=1} \{1 - F(-\Sigma x_i \beta_j)\} \quad \ldots\ldots 4$$

while the log likelihood function for the expression is:

$H(\beta) = \log L(\beta) = \sum_{i=0}^{n} y_i \log$

$1 - F[(-\sum X_i \text{ '} \beta_i) + (1-y) \log F(-\sum X_i \text{ '} \beta_i)]$

Where

Y = Farmer Participating in Commercial Agricultural Development Project
(Participation=1, otherwise, 0.)

μ_i = a logistic cumulative distribution in F

X_1 = Age in years

X_2 = Marital Status (Married/Single)

X_3 = Sex (male/female)

X_4 = Education Level (years of formal education)

X_5 = Membership of Cooperative association (years)

X_6 = Farming experience (years)

X_7 = Household size (number)

X_8 = Farm size (ha)

X_9 = level of awareness (aware=1, not aware=0)

X_{10} = access to input (access=1, no access=0)

X_{11} = extension contact (number of contact)

β_i = The coefficients for the respective variables in the logit function

The probability of a household being poor and the corresponding change in probability due to unit change in a variable X_1 are given as:

prob ($y_i = 1/\beta X_i = \frac{e^{\Phi}}{1+e^{\Phi}}$)

e = error term

3.4.3. Z – statistic

Z-test was used to achieve objectives iv that to determine the impact of the commercial agricultural project on livelihoods of maize farmers with particular focus on productivity and food security status and to test hypothesis (ii). It was used for larger sample greater than thirty (30). Z-test model was used in the study to compare the differences in productivity and food security status between participants and non-participants of the CADP in the study area. The average calorie intake was used as proxy for food security status. The Z-statistic is expressed as follows:

$$Z = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_1^2}{n_2}}} \quad \text{.....5}$$

Where Z = calculated Z value

$\overline{X_1}$ = Mean productivity and average calorie intake of participant.

$\overline{X_2}$ = Mean productivity and average calorie intake of non-participant.

S_1= Standard deviation of participant.

S_2 = Standard deviation of non- participant.

n_1= Sample size of participant.

n_2 = Sample size of non-participant.

3.4.4. Food Security Line

Food security line was used to achieve part of objective v. It was used to classify farmers into either food secure or food insecure depending on which side of the line they fall. The food security line was the recommended daily per capita calorie intake of 2260 kilo calorie (Babatunde, 2007).In this study, a one month (30 days) recall method was used. The food security line of daily 2260 kcal by FAO (1996) was adopted in this study. The household's calorie intake was obtained through the household's consumption and expenditure data. From the data, the quantity of every food item consumed by the households in the 30 days period was estimated. The quantities were converted to gram and the calorie content estimated using the nutrient composition table of commonly eaten foods in Nigeria (Oguntona and Akinyele, 1995). Per capita calorie intake was calculated by dividing estimated total household calorie intake by the family size after adjusting for adult equivalent using the consumption factors for age-sex categories.

To get the household's daily per capita calorie intake, the household's per capita calorie intake was divided by 30. A household whose daily per capita calorie intake is up to 2260 kcal was regarded as food secure and those below 2260 kcal were regarded as food insecure households.

The food insecurity line is given as:

$$Z = Yi / R$$

Where:

Zi = food security status of ith farmers.

Yi = daily per capita calorie intake of ith farmers

R = recommended per capita daily calorie intake (2260Kilo calorie)

3.5. Definition and measurement of variable

3.5.1. Independent variables

Age (X_1): This is the actual years of respondent from birth to date. Age of the respondent was measured in years.

Sex (X_2): This is the categorization of respondent according to their biological sex which is either male or female. Sex was measured as a dummy variable, male = 1, female = 0.

Education(X_3): This is the number of years a respondent has spent schooling. Level of education was measured in terms of the number of years of formal schooling.

Marital Status(X_4): This is a condition or state of being married or unmarried as indicated by the respondent. This variable was measured thus: single = 1 married = 2.

Farming Experience(X_5): This refers to the number of years that a respondent has actively been involved in farming operation. This was measured in years.

Household Size(X_6): Ojuekaiye (2006) defined household size as the number of people eating from one pot. This variable was measured by the number of wives, children, husband, and other dependent of the respondent living the same house at the time of this study.

Farm Size (X_7): This variable refers to the area of land put into agricultural production and was measured in (ha).

Membership to organization (X_8): This is a decision of the respondent to belong to a cooperative group. This was measured by estimating the number of years the respondent has spent from registration.

Extension contact(X_9): This is the meeting of respondent with the extension agent. It was measured by estimating the number of contact from the extension agent to the farmer and number of contact from the farmer to extension agent.

Level of awareness (X_{11}): The variable awareness is the first stage in the adoption process that involves the farmers learning about the existence of an innovation. It was measured as a dummy variable (aware=1, otherwise, 0)

3.5.2. Dependent Variable

The dependent variable (Y) in the context of this study is the participation. Participation is an active involvement in Commercial Agricultural Development Project by the beneficiaries (participants=1, non-participants=0)

3.5.3. Expected outcome

Output: This is the total quantity of maize harvested by the farmers in a season and was measured in (100Kg bags).

Productivity: Productivity for the purpose of this study was measured as the ratio of agricultural output (grain equivalent) to agricultural input (farm size, seed, fertilizer and labour). Yield (i.e. Output/ farm size measured in kg/ha) was used as proxy for productivity while, other inputs such as seed, fertilizer and labour were held constant.

Food Security: Food security exists when all people, at all-time have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2006). Per capita calorie intake was calculated by dividing estimated total household calorie intake by the family size after adjusting for adult equivalent using the consumption factors for age-sex categories. To get the household's daily per capita calorie intake, the household's per capita calorie intake was divided by 30. A household whose daily per capita calorie intake is up to 2260

kcal was regarded as food secure and those below 2260 kcal were regarded as food insecure households. The daily per calorie intake was used as proxy for food security.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Socioeconomic Characteristics of Respondents

In this section the selected socio-economic characteristics of the respondents is provided. These include age, sex, household size, educational level, farming experience and farm size as shown in Table 4.1.

4.1.1 Age distribution

The result in Table 4.1 reveals that majority (74% and 79%) of the participants and non-participants were between the ages of 34-53 years. The mean ages for participants and non-participants were 40 and 41 years, respectively. This implies that majority of the respondents were still within a productive and active working age range, hence their ability to produce to earn some income from farming and non-farming activities is assured. This finding concurred with the findings of Windapo and Olowu (2001) and Bzugu *et al.* (2005) who reveal that productive and active persons participates more in agricultural and community development activities such as cooperative societies.

4.1.2 Sex distribution

The result in Table 4.1 reveals that (89% and 91%) of the participants and non-participants were male, while about 11% and 9% were female. According to Adewale *et al*. (2003) gender is no barrier to active involvement in crop production activities. However, Oladeji *et al*. (2003) observed that it is generally believed that males are often more energetic and could readily be available for energy demanding jobs like farming. The low percentage of the female participating in commercial agricultural development

project could be attributed to the fact that females in the study area usually involved in several other activities outside farming like food vendors, hair dressing, tailoring and petty trading.

4.1.3 Marital status distribution

The result in Table 4.1 reveals that (83% and about 85%) of the participants and non-participants were married while, about 17% and 15% were still single. Wives and children can serve as cheap source of labour which may lead to increase in their farm size, adoption of innovations and the overall level of farm productivity.

4.1.4 Household size distribution

The result in Table 4.1 reveals that majority 98% of participants and approximately 89% of non-participants had between 1-14 household sizes. The mean household size for farmer's participants and non-participants were 8 and 9 household sizes, respectively. The implication is that the relatively large household size may likely enhance the family labour supply on the farms, hence supporting favorably, productive capacities of the farmers already enhanced by their age. This corroborate with the findings of Adegbite and Oluwalana 2004; Adegbite *et al.*, 2007 that the larger the household size, the higher the likelihood of sustainable labour efficiency on farmers' farm, given the constant labour supply.

4.1.5 Educational level distribution

Considering the educational level of the sampled respondents in the study area, it was observed that majority (78% and 66%) of the participants and non-participants were educated. This means that the respondents were predominately highly educated people. The farmers can therefore be said to be literate since only small proportion of about 22% and 34% of the participants and non-participants had no formal education. The result compares favourably with Lawal and Idega (2004) who observed that the level of education attained by the fish farmers to a large extent determine the strategies which he/she may use to relate with the extension officers.

4.1.6 Farming experience distribution

It was found that (46% and about 52%) of the participants and non-participants had between 10-17 years of farming experience. The mean farming experience for participants and non-participants were 14 and 15 years respectively. Farming experience is used as a measure of managerial ability, the more experience the farmer is, the more his ability to make farm decision. This result showed that most of the respondents had long years of farming experience, implying that such farmers are likely to make decisions that would increase their output and income. This finding is in tandem with the findings of kebbeh *et al*. (2003) which found an average of 21 years of farmers' experience in rice farming in Kaduna and Niger States of Nigeria.

4.1.7 Farm size distribution

The size of the farm cultivated is a function of population pressure, family size and financial background of the farmers. The results in Table 4.1 shows that about 61% and about 77% of the participants and non-participants farmed on 7.0-9.9 hectare , while, about 28% and about 31% farmed on between 5.0-6.9 hectares respectively. The mean Farm size of participants and non-participants were 7 hectares and 8 hectares respectively. It then implies that majority of the respondents were medium and large scale farmers going by Ojuekaiye (2001), classification of farm size of 0.1 hectare to 5.9 hectares as small farms. This will allow for meaningful investment and returns to scale on food security and productivity.

Table 4.1: Socioeconomic Characteristics of Respondents in the study area

	Participants (n=104)		Non-Participants (n= 126)	
Characteristics	**Frequency**	**Percentage (%)**	**Frequency**	**Percentage (%)**
Age				
24-33	24	23	19	15
34-43	46	44	68	54
44-53	31	30	32	25
54-63	2	2	6	5
64-73	1	1	1	1
Mean		40		41
Sex				
Male	93	89	115	91
Female	11	11	11	9
Marital Status				
Married	86	83	107	85
Single	18	17	19	15
Household Size				
1-7	45	43	50	40
8-14	57	55	62	49
15-21	1	1	11	9
22-28	1	1	1	1
29-35	0	0	2	2
Mean		8		9
Educational Level				
No Formal	25	24	43	34
Primary	6	6	10	8
Secondary	26	25	36	29
Tertiary	46	44	36	29
Others	1	1	1	1
Farming Experience				
2-9	24	23	22	17
10-17	48	46	66	52
18-25	26	25	29	23
26-33	5	5	7	6
34-41	1	1	1	1
42-49	0	0	1	1
Mean		14		15
Farm Size				
5.0-5.9	10	10	5	4
6.0-6.9	19	18	22	17
7.0-7.9	21	20	32	25
8.0-8.9	29	28	40	32
9.0-9.9	22	21	25	20
10.0 And Above	3	3	2	2
Mean		7		8
Total	104	100	126	100

4.2. Participants Sources of Information on Commercial Agricultural Development Project

Table 4.2 shows that 69 of the participants ranked extension agent as their foremost source information on the commercial agricultural development project, this was followed by radio which constitutes 53 of participants, while very few of them 10 sourced information on the commercial agricultural development project through friends and relation. This implies that the extension services in Kaduna State is the one that reached out most effectively to the majority of the participants to fulfill their information needs on the commercial agricultural project activities, which is probably due to the interests of the governments at promoting the enterprise. This is in line with the work of Bolorunduro *et al.*, (2003) that majority of the fish farmers were aware of extension agents.

Table 4.2: Distribution of Participant According to Sources of Information on Commercial Agricultural Project

Sources of Information	Frequency	Ranking
Extension Agent	69	1st
Friends and Relation	10	8th
Radio	53	2nd
Television	36	5th
Newspaper	13	7th
Fliers	41	4th
Mobile Phone	16	6th
Ministry of Agriculture	49	3rd

Multiple Response Allowed*

4.3. Factors Influencing Farmers' Participation in Commercial Agricultural Development Project

Farmers' socioeconomic and institutional factors considered were age, sex, marital status, household size, educational level, farming experience, farm size, membership of association, level of awareness, access to inputs and extension contact. The maximum likelihood estimates for the logit model are presented in Table 4.3. The result of the analysis shows that the Chi square of the regression is 28.79 found to be statistically significant at 1% level. The model has a high negative Log likelihood of -158.370; describing a model displaying a good fit, this shows that the explanatory variables in the estimated logit model significantly explain the likelihood of a respondent participating in commercial agricultural development project. The results show that R^2 is 0.748 and it is significant at 1%. Six (6) of the eleven (11) factors tested had coefficients that were significant, namely sex, marital status, farm size, membership of association, level of awareness and access to inputs.

The coefficient of sex (9.17) was found to be significant at 1% and had positive influence on willingness to participate in the commercial agricultural development project. This implies that sex of the respondents significantly affected participation in the commercial agricultural development project. Being a male farmer tended to increase the probability of participating in the commercial agricultural development project by 89%. This results disagree with Hadebe and Mpofu (2013), who state that women are mainly involved in urban agriculture activities.

Coefficient obtained for marital status (2.26) was found to be significant at 5% and had positive influence on willingness to participate in the commercial agricultural

development project. This implies that individual married farmer had the probability of participating in the commercial agricultural development project by 12%. This may contribute to the labour requirements on the farms as most of the farm operations are labour intensive (Ismailla, 2010).Thus, women and children can serve as cheap source of labour which may lead to increase in their farm size, adoption of innovations and the overall level of farm productivity. This can translate into higher level of incomes to the farmers hence higher loan repayment capacity

Coefficient obtained for farm size (4.74) was found to be significant at 5% and had positive influence on willingness to participate in the commercial agricultural development project. This implies that farm size had the probability of participating in the commercial agricultural development project by 4%. The findings of this study is not consistent with that of (Aniedu, 2006 and Emodi, 2009), who reported that most urban farmers in Nigeria operated on small scale.

Coefficient for membership of association (14.67) was found to be positively significant at 5% level of probability. This implies that respondents' membership of association positively affected participation in the commercial agricultural development project. Thus, farmers who perceived belonging to cooperative societies were more likely to participate while those who see little or no benefit in belonging to cooperative were not. Being a member of an association tended to increase the probability of participating in the commercial agricultural development project by 13%. This finding agrees with Agbamu (2006), who reported that the greater the participation of a farmer in social

organization, the more interaction with other farmers and hence the earlier his adoption of innovations.

Coefficient for level of awareness (5.44) was found to be significant at 5% and had positive influence on willingness to participate in the commercial agricultural development project. This implies that respondents' awareness positively affected participation in the commercial agricultural development project. Being aware tended to increase the probability of participating in the commercial agricultural development project by 50%.

Access to inputs with the coefficient of (11.39) was found to be significant at 5% level of probability and had positive influence on willingness to participate in the commercial agricultural development project. This implies that the more respondents' access to inputs the more their motivation for participation in the commercial agricultural development project. Ability to access inputs tended to increase the probability of participating in the commercial agricultural development project by 90%.

Table 4.3: Factors Influencing Farmers' Participation in Commercial Agricultural Development Project

Variable	Coefficient	Standard error	Marginal effect	T-value
Constant	-27.22	4.13	0.51	-6.59
Age	7.34	6.21	0.72	1.18
Sex	9.17***	1.17	0.89	7.84
Marital Status	2.26**	1.09	0.12	2.07
Household Size	1.21	9.44	0.8	0.13
Educational Level	1.64	3.04	0.05	0.54
Farming Experience	7.71	5.71	0.95	1.35
Farm Size	4.74**	2.76	0.04	1.72
Membership of Association	14.67**	8.07	0.13	1.82
Level of Awareness	5.44***	1.79	0.50	3.04
Access to Inputs	11.39**	5.23	0.90	2.18
Extension Contact	2.23	2.66	0.43	0.84

Number of Observation	230.00
LR Chi^2 (11)	28.79
Pseudo R^2	0.74770
P-Value	0.0000
Log likelihood	-158.370

**** P<0.01; **P<0.05; and *P<0.10.*

Hypothesis 1

It was hypothesized that there is no significant relationship between socio-economic and institutional factors of the farmers and participation in the commercial agricultural project in the study area. Based on the findings in Table 4.3, the null hypothesis is rejected because sex, marital status, farm size, membership of association, level of awareness and access to inputs significantly influenced the level of participation (74.8%) of farmers in the commercial agricultural development project at 1% levels of probability.

4.4. Impact of Commercial Agricultural Development Project on Productivity of farmers

The result of the Impact of the commercial agricultural development project on productivity of participants and non-participants is presented in Table 4.4. For the purpose of this study yield (kg/ha) was used as proxy for productivity. The value of productivity of participants and non-participants of the commercial agricultural development project were subjected to Z-test. Result of the analysis shows that the productivity of participants is significantly different from the productivity of the non-participants at 1% level of probability at two-tail. Also, the calculated Z-value of 7.57 was obtained. It was found that calculated Z-value (7.57) was greater than the tabulated Z-value (1.96), meaning that there is significant differences in their respective productivity. Finally, the difference in the mean value of productivity for participants and non-participants is positive (991.84-605.98 = 385.86). It implies that the commercial agricultural development project had a positive impact on productivity of participants. A positive mean difference in productivity value indicates positive impact of project on beneficiaries' productivity (Nkonya *et al*., 2008). This result is consistent with the findings of Ezeh (2004) and Nkonya *et al.,* (2008) who reported that Fadama project beneficiaries were better off than their non-beneficiary counter-part in terms of income and productivity.

Table 4.4: Impact of commercial agricultural development project on productivity of farmers

	Participants	Non-participants
Mean	991.835	605.9768
Variance	204420.2	79635.17
Observations	104	126
Hypothesized Mean Difference	0	
Z-Calculated	7.570791***	
P(Z<=Z) One-Tail	1.85E-14	
Z Critical One-Tail	1.644854	
P(Z<=Z) Two-Tail	3.71E-14	
Z Critical Two-Tail	1.959964	

**** P<0.01; **P<0.05; and *P<0.10*

Hypothesis 11

It was hypothesized that there is no significant difference in the productivity of participants and non-participants of commercial agricultural project in the study of area. Based on the findings in Table 4.4, the null hypothesis is rejected because the calculated Z-value was found to be higher than the tabulated Z-value and significant at 1% level of significance. This implies that there is a significant difference in the productivity of participants and non-participants of the project. Therefore, participation in the commercial agricultural project has contributed to the productivity of farming households who participated in the commercial maize production in the study area.

4.5. Impact of Commercial Agricultural Development Project on Food Security Status of Farmers

The result of the impact of the commercial agricultural development project on food security status of the participants and non- participants is presented in Table 4.5. Based on the recommended daily calorie intake (R) of 2260 kcal, the headcount ratio shows that 63% of the participants with an average daily per capita household calorie consumption of 3612.40 kcal were food secure and 37% of this group with an average daily per capita calorie consumption of 1653.62 were food insecure. The headcount ratio for non-participants indicates that 36% of the households were food secure with an average daily per capita calorie consumption of 3190.64 kcal and 64% were food insecure with an average daily per capita calorie consumption of 1592.71 kcal. This is similar to results obtained by Agbola (2005) in his study on the Analysis of Food Insecurity and Coping Strategies among Farming Households in Osun State. He reported that based on the recommended daily calorie intake of 2260 kcal, 82% of the households were food secure and 18% were food insecure for households that combined crop production with livestock production. Based on the headcount ratio, it is expedient to infer that participants were more food secure ($P<0.10$) than non-participants.

From the food security profile of the participants and non-participants of commercial agricultural project, it can be deduced that participants had a lower food insecurity level than non-participants and this implies that participation in commercial agricultural project has contributed in enhancing food security among participants of the project. Therefore, participation in commercial agricultural projects can be a panacea for food insecurity among maize farming households and hence, the fight against the menace of food

insecurity among rural farming households who are into maize production can be fostered by encouraging participation among the households. This result is consistent with other related studies on the impact of agricultural technologies on food security (Mendola, 2007; Mignouna *et al*., 2011; Omilola, 2009).

Table 4.5: Distribution of the respondents by their food security status

Statistical estimates	**Participants**		**Non-participants**	
	Food secure	**Food insecure**	**Food secure**	**Food insecure**
Frequency	76	28	45	81
Average daily calorie intake (kcal)	3612.40	1653.62	3190.64	1592.71
Maximum daily calorie intake (kcal)	18232.90	2247.63	8243.80	2245.44
Minimum daily calorie intake (kcal)	2267.61	947.14	2273.34	732.54
Head count ratio (H)	0.63	0.37	0.36	0.64
Standard deviation	1540.37	397.06	1320.14	379.53

Hypothesis 111

Table 4.5.1 shows the result of the hypothesis testing comparing the means of the food security status of participants and non-participants. The average calorie intake was used as proxies for food security status. The result showed a significant difference between the food security status of participants and non-participants in commercial agricultural projects. Since the average calorie intake of participants is greater than the average

calorie intake of non-participants with a significant z- value at (P<0.10), the null hypothesis which states that there is no significant difference in the food security status of participants and non-participants of commercial agricultural project is therefore rejected. This implies that there is a significant difference in the food security level of participants and non-participants of the project. Therefore, participation in commercial agricultural project has contributed in enhancing food security status of farming households who participated in commercial maize production in the study area.

Table 4.5.1: Test of hypothesis III

Category	Mean calorie intake	N	Standard Deviation	z-value	z-critical
Participants	2784.030	104	1580.403	1.683*	1.926
Non-participants	2459.403	126	1392.522		

*P<0.10

4.6. Constraints to Farmers Participation in the Commercial Agricultural Development Project

The constraints to farmers' participation in the commercial agricultural development project are presented in Table 4.6. It was found that 132 of the respondents ranked lack of starting capital as the first constraints. About 123 of the respondents ranked lack of landownership as the second constraints. Also, about 115 of the respondent's ranked high cost of inputs such as fertilizer, improved seeds and agrochemicals as third constraints, while low pricing, no proper awareness, high intensive management and rule and regulation was ranked by 54, 34, 9 and 7 of the respondents as fourth, fifth, sixth and seventh constraints respectively. It indicates that lack of starting capital ranks foremost followed by lack of landownership, high cost of inputs, low pricing, no proper awareness,

high intensive management and rule and regulation amongst the respondents respectively. This finding agrees with that of Hyun *et al.,* (2008) and Tekana *et al.,* (2011) who observed that, inadequate capital, high cost of farm inputs, poor access to loan, were among the constraints faced by members of cooperative societies.

Table 4.6: Constraints to farmers participation in the commercial agricultural development project

Constraints	**Frequency**	**Ranking**
Lack of Starting Capital	132	1st
Lack of Landownership	123	2nd
High Cost of Inputs	115	3rd
Low Pricing	54	4th
No Proper Awareness	34	5th
High Intensive Management	9	6th
Rule and Regulation	7	7th

Multiple Response Allowed*

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study analyzed the impact of the Commercial Agricultural Development Project on Productivity and Food Security of Maize Farmers in Kaduna State, Nigeria. All the four Agricultural zones in Kaduna State were purposively selected while the respondents (participant and non-participant) were randomly selected from the list of maize farmers provided by the Desk Officer from Agricultural Development project making a total of two hundred and thirty respondents. The data collected was based on 2013 cropping season and were collected through the use of a structured questionnaires and were analyzed using descriptive statistics such as frequency distribution, percentage, tables and mean, as well as z-test and logit regression analysis.

The socio-economic characteristics of the respondents revealed that the mean ages of participants and non- participants of the commercial agricultural development project were 40 and 41 years respectively. Majority about (89% and 91%) of participants and non- participants of the commercial agricultural development project were male, also, about 83% and 85% of participants and non-participants of the commercial agricultural development project were married. Majority about (78% and 66%) of participants and non-participants of the commercial agricultural development project did have formal education especially primary and secondary education, while, majority (61% and 77%) of participants and non-participants of the commercial agricultural development project were within medium-large holder farmer.

Extension agent in Kaduna State is the most effective medium participant sourced for information on the commercial agricultural development project in the study area; this constitutes about 69 of the participants.

It was found that sex, marital status, farm size, membership of association, level of awareness and access to inputs were the significant factors that influence the level of participation of farmers in the commercial agricultural development project at 1% and 5% levels of significance.

From the result of the Z-test analysis, the difference between participants and non-participants productivity (yield) is 385.86Kg/ha and the calculated Z-value (7.57) was greater than the tabulated Z-value (1.96) and significant at 1% level. Based on the findings that the calculated Z-value was found to be higher than the tabulated Z-value, the null hypothesis which states that there is no significant difference in the productivity of participants and non- participants in the commercial agricultural development project is rejected.

From the food security profile of the participants and non-participants in the commercial agricultural development project, it can be deduced that the participants had a lower food insecurity level than the non-participants at ($P<0.10$).

Lack of starting capital was ranked the foremost constraints faced by participants of the commercial agricultural development project. Other constraints include lack of landownership, high cost of inputs, low pricing, no proper awareness, high intensive management and rule and regulation.

5.2 Conclusion

The Commercial Agricultural Development Project has been able to achieve its stated objectives: socio-economic characteristics of the project participants and non-participants, Identify the participant sources of information on the commercial agricultural development project, determine the factors influencing farmers participation in the commercial development agricultural project, determine the impact of the commercial agricultural project on productivity and food security status and identify the constraints to farmers participation in the commercial agricultural project in the study area. Participation in the commercial agricultural project has contributed positively and significantly on the productivity and food security status of maize farming households in the study area. It can also be concluded that the participants in the commercial agricultural projects had a lower food insecurity status than non-participants, it could be due to their participation in the commercial development agricultural project.

5.3 Recommendations

Based on the findings, the following recommendations are made:

i. Based on result of Z-test analysis the commercial agricultural development project had positive impact on the livelihoods (productivity and food security status) of the participants. It is recommended that farmer's should explore into the commercial agricultural and source for loans so that they could continue to enjoy from the benefits of commercialization.

ii. Most of the respondents complained of high cost of farm input such as fertilizers, improved seeds and agrochemical as part of the constraints in participating in the

commercial agricultural development project. The cooperative societies could link –up the farmers with sources of input production. This will enable the groups to buy inputs at factory cost thereby helping to reduce cost of production.

iii. Most of the respondents mentioned lack of starting capital as the foremost constraints faced in participating in the commercial agricultural project. Since cooperative societies and banks cannot provide the entire needed fund for the respondents, farmers should be encouraged to diversify their livelihood activities by engaging in non-farming activities in order to augment farm family income and thereby increase productivity.

iv. Most of the respondents complained of lack of landownership as part of the constraints in participating in the commercial agricultural development project. To address the land fragmentation problem, government can acquire large expanse of land and lease out to maize farmers at reduced rate. This approach would enhance access to land and reduces the land rental value. The abandoned lands of the defunct River Basin development Authorities lying idle in most States of the federation can serve this purpose. The Land Use Act of 1990 in Nigeria should be reviewed to facilitate access to land by landless peasantry who produce bulk of the agricultural produce.

5.4 Contribution to Knowledge

i. The result of the analysis reveals that the commercial agricultural development project had a positive impact on the productivity of participant of (385.858Kg/ha) and also, that the productivity of participants in the commercial agriculture

development project is significantly difference from that of the non-participants counterpart at 1% level of significance. This implies that the commercial agriculture development project is veritable tools for enhancing farmer's livelihoods.

ii. Participants are more food secured than non-participants. This is buttressed by the fact that 63% were food secured and 37% were food insecure for participants while 36% were food secured and 64% food insecure for non-participants. It established that people will be food secured when they participate in the agricultural development project.

iii. The study further identified the factors that influence the level of participation of farmers in the commercial agricultural development project including sex (1%), marital status (5%), farm size (5%), membership of association (5%), level of awareness (1%) and access to inputs (5%). This can help proper project planning.

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APPENDICE

Appendix 1: QUESTIONNAIRE

DEPARTMENT OF AGRICULTURAL ECONOMIC AND RURAL SOCIOLOGY,
AHMADU BELLO UNIVERSITY, ZARIA

TOPIC: Impact of Commercial Agricultural Project on Productivity and Food Security Status of Maize Farmers in Kaduna State

Dear Respondent,

This questionnaire will be used by an M.Sc student of the Department of Agricultural Economics and Rural sociology, Ahmadu Bello University, Zaria. Please, fill as appropriate. All information will be treated with confidentiality and strictly for the purpose of research. Thanks for your co-operation.

Farmers Questionnaire: Project Beneficiaries ( ) Non- Beneficiaries ( )

Rajab SALISU.

SECTION A: Background Information

1) Name……..

2) Name of Village……..

3) Name of Local Government……..

SECTION B: Socio-Economic Characteristics of farmers

4) Age……. Year

5) Sex: Male ( ) Female ( )

6) Marital Status: Married ( ) Single ( )

7) Educational level of the respondent

a) No education ( )…….. ……Year

b) Primary education **( )** ……. Year

c) Secondary education ( ) ……. Year

d) Tertiary education ( ) ……. Year

8) How long have you been in maize farming …… years

9) Household size (people living together and eating from the same pot):

Age group (in years)	Number of males	Number of female
< 1		
1-4.9		
5-9.9		
10-14.9		
15-59.9		
>59		
Total		

10) Total farm size…… (ha)

SECTION C: Institutional Variable

11) Have you had any visit by extension agent yes ( ) No ( )

12) If yes, how frequent did they visit you in 2014 cropping season

13) Did you visit the extension agent for any information in 2014? Yes ( ) No ( )

14) If yes, what types of information did you visit them for?

a) It is in maize production ( )

b) It is in Agronomic practice ( )

c) It is in on group management ( )

d) Other specify……

15) Do you belong to any cooperative organization? Yes ( ) No ( )

16) If yes, how long have you been in cooperative group……years

SECTION D: Information on Commercial Agricultural Project

17) Did you participate in Commercial Agricultural project? Yes ( ) No ( )

18) If yes, what types of support were you able access under maize production?

a) Production inputs ( )

b) Marketing ( )

c) Capacity building training ( )

d) Other specify……..

19) How did you get to know about Commercial Agricultural Project?

a) Extension agent ( )

b) Friends and relations ( )

c) Radio ( )

d) Television ( )

e) Newspapers ( )

f) Fliers ( )

g) Awareness Campaign ( )

h) ADP ( )

20) If No to question 17, give reason for not participating

a) No proper awareness ( )

b) Not belonging to any group ( )

c) Lack of starting capital ( )

d) Fair of exploitation ( )

e) Poor access to enough Land ( )

f) Other specify…….

……..

21) What influenced you to participate in the project?

a) Expectation of support from government ( )

b) Ready market for produce ( )

c) Expectation of improve output ( )

d) Quest for food security ( )

e) High economic return ( )

f) Other specify……

22) Is commercial Agricultural Development Project beneficial to you?

Yes ( )

No ( )

23) If yes, to the above question, in what way(s)?

i) …….

ii) …….

iii) …….

24) If No to question state reasons for your answer?

i) …….

ii) …….

iii) …….

25) What suggestion will you give to project participant for sustainability in case, the intervention creased?

i) …….
ii) …….
iii) …….

SECTION E: Production Information

26) How many plot(s) of land did you have in 2013…….. ?

27) Did you increase your plots in 2013? Yes ( ) No ( )

28) What is the size(s) of your plots(s) under maize production?

Field/Plot	(2013)		
S/No	Actual size (ha)	Output (Kg)	Yield (Kg/ha)
1.			
2.			
3.			

29) How did you obtain your farm land?

a) Inheritance ( )

b) Purchase ( )

c) Rent ( )

d) Other specify…….

SECTION F: Information on Food Security

30) Main sources of foods by the head of household?

- Own farm production
- Purchase food
- Supplies from relative and friends
- Other specify……

31) Of the ones indicated above, which do you regard as most important?
……..

32) Number of meals normally taken by the household in the last 12 months

- It is thrice daily
- It is trice daily
- It is once daily

33) In the last 12 months, did any of the number of your household ever cut the size of your meals because there wasn't enough food to eat?

- Yes ( )
- No ( )

34) If yes to the above question, how often did this happen?

- Almost every month
- Some months but not every months
- 1 or 2 months only

35) In the last 12 months did any of the members of your household ever not eat for a whole day because there wasn't enough money for food?

- Yes ( )
- No ( )

36) If yes to the above question, how often did this happen?

- Almost every month
- Some months but not every month
- 1 or 2 months only.

37) What do you think is the reason for having more food at store reaches the next cropping season?

i)……

ii)……

iii)……..

38) What problems did you encounter in the process of participating in Commercial Agricultural Development Project?

i)……..

ii)…….

iii)……

iv).....

v).....

vi).....

39) **Respondents' calorie intake**

	Item purchased last season for household		Amount produced last cropping season (Quantity/units)	Amount consumed from food purchased (quantity/units)	Amount consumed from production (quantity/units)	Value of Foods eaten outside the household last one month (~~N~~)
	Quantity or units	Price paid/unit				
Maize						
Grain						
Flour						
Sorghum						
Grain						
Flour						
Rice						
Imported						
Local						
Cassava						
Tubers						
Gari						
Cassava chips						
Yam						
Tubers						
Yam flour						
Cocoyam						
Corms						
Groundnut						
Shelled						
Unshelled						
Soybean						
Grain						
Flour						
Cowpea						
Okra						
Tomato						
Onion						
Pepper						
Egg plant						
Carrot						
Pumpkin						
Green leaves						
Guava						
Citrus						
Mango						
Others specify:						
1						
2						
3						

a) Kindly provide information on the following crops

Units refers to local measures (e.g., Mudu, Tiya, baskets, etc) and Kilogramme (kg)

b) Indicate the amount purchased of the following items for household consumption

Item	**Quantity purchased**	**Purchase value (₦)**	**Quantity consumed**
Salt/Potash/Maggi			
Groundnut oil			
Palm oil			
Other oils, specify:			
1.			
2.			
3.			
Fish (Fresh/dried/smoked)			
Meat (beef/mutton etc.)			
Sugar			
Bread			
Drinks, specify:			
1.			
2.			
3.			

Thanks for Your Cooperation

Appendix 2: Calorie content of some commonly eaten foods in Nigeria

Food items	Kcal/kg	Food items	Kcal/kg
Staple foods		Mango	590
Cassava Tube	1500	Pawpaw	300
Cassava flour	3800	Pineapple	320
Cassava chips	3000	Apple	570
Garri	3840	Coconut	580
Yam Tuber	1100	Guava	730
Yam flour	3810	Sugar cane	360
Yam chips	3000	***Meat and animal products***	
Sweet potato Tuber	1100	Cow meat	2370
Sweet potato chips	900	Goat meat	2370
Irish potato	1200	Sheep meat	2370
Cocoyam Tuber	3830	Pork	2370
Maize green	3100	Bush meat	2370
Maize grain	4120	Chicken	2380
Maize flour	4120	Turkey	2380
Sorghum grain	3500	Fish	2230
Sorghum flour	3500	Snail	2245
millet grain	3500	Shrimps	2230
Millet flour	3500	Crayfish	2200
Rice	1230	Crabs	2200
Wheat grain	3400	Eggs	1400
Wheat flour	3300	***Dairy products***	
Cowpea (beans)	5920	Milk	4900
Groundnut	5950	Cheese	4000
Soybeans	4050	Yoghurt	4100
Soybeans flour	2600	Ice cream	4100
Melon (shelled)	5670	Beverages	
Plantain	770	Cocoa	1200
Banana	960	Tea (leaves)	1200
Vegetables		Tea (liquid)	1200
Okra	4550	Coffee (powder)	1340
Tomato	880	Coffee (liquid)	1340
Pepper	3930	***Drinks***	
Onion	440	Soft drinks	620
Carrot	400	Orange juice	400
Egg plant	440	Apple juice	550
Cucumber	270	Pineapple juice	560
Chochorus/ewedu	500	Local beer	740
Spinach	220	Bottled beer	460
Bitter leaf	220	Wine	330
Water leaf	180	***Condiments and spices***	
Cabbage	230	Magi	220
Pumpkin	440	Salt	180

Source: Oguntona and Akinyele, (1995)

Appendix 3: Adult equivalent scale for adjusting household size

Age category (years)	Male	Female
< 1	0.00	0.00
1-4.9	0.25	0.20
5-9.9	0.60	0.50
10-14.9	0.75	0.75
15-59.9	1.00	0,90
>59.9	0.80	0.65

Source: Stefan and Pramila, (1985)