SOCIO-ECONOMIC ASSESSMENT OF FARMERS' RESPONSE TO AGRICULTURAL EXTENSION SERVICE DELIVERY ON GINGER PRODUCTION IN KADUNA STATE, NIGERIA

BY

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DECLARATION

I hereby declare that this dissertation titled **"Socio-Economic Assessment of Farmers' response to Agricultural Extension Service Delivery on Ginger Production in Kaduna State, Nigeria"** has been written by me and it is a record of my research work. No part of this dissertation has been presented in any previous application for another degree or diploma in Agricultural Economics and Rural Sociology of the Ahmadu Bello University or any other institution. All borrowed information have been duly acknowledged in the text and a list of references provided.

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CERTIFICATION

This dissertation titled **"Socio-Economic Assessment of Farmers' Response to Agricultural Extension Service Delivery on Ginger Production in Kaduna State, Nigeria**" by Joshua MALLAM meets the regulation governing the award of the Degree of Master of Science in Agricultural Economics 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 God and my parents; Late Chief Mallam Ryock and Mrs Mani Mallam.

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TABLE OF CONTENT

CONTENT **PAGE**

TITLE PAGE.....i

DECLARATION.....ii

CERTIFICATION.....iii

DEDICATION.....iv

ACKNOWLEDGEMENTS.....v

TABLE OF CONTENTS.....vi

LIST OF TABLES.....x

LIST OF FIGURES.....xi

LIST OF ABBREVIATION.....xii

ABSTRACT.....xiii

CHAPTER ONE.....1

INTRODUCTION.....1

1.1 Background to the Study.....1

1.2 Problem Statement.....3

1.3 Objectives.....5

1.4 Justification.....5

1.5 Research Hypothesis.....6

CHAPTER TWO.....7

LITERATURE REVIEW.....7

2.1 Historical Background of Ginger in the World.....7

2.2. Uses of Ginger.....7
2.3 Development of Agricultural Extension in Nigeria.....8
2.4 Agricultural Development Programmes (ADPs) in Nigeria.....11
2.5 Socio-economic Characteristics of Farmers.....13
2.6 Factors Influencing Effectiveness of Agricultural Extension Service Delivery.....14
2.6.1 Farmers' Training.....15
2.6.2 Extension Agents' requirement and needs.....16
2.7 Constraints to extension service delivery.....17
2.8 Theoretical Framework.....19
2.8.1 Modernization Theory.....19
2.8.2 Theory of Social Change.....21
2.8.3 Adoption Theory.....23
2.9 Conceptual Framework.....25
2.9.1 Concept of Response to Agricultural Extension Service Delivery.....26

CHAPTER THREE.....29
METHODOLOGY.....29
3.1 Study Area.....29
3.2 Sampling Procedure and Sampling Size.....31
3.3. Data Collection.....32
3.4 Analytical Techniques.....32
3.4.1 Descriptive Statistics.....32
3.4.2 Multiple Regression analysis.....32
3.4.3 T-Statistics.....34
3.5 Operationalization and Measurement of Variables.....34
3.5.1 Dependent Variable.....34
3.5.2 Independent Variables.....34

CHAPTER FOUR.....37

RESULTS AND DISCUSSION.....37

4.1 Socioeconomic Characteristics of Respondents.....37

4.1.1 Gender.....37

4.1.2 Age.....38

4.1.3 Marital status.....38

4.1.4 Educational qualification.....38

4.1.5 Membership of cooperative.....39

4.1.6 Household size.....39

4.1.7 Years of Experience in ginger production.....40

4.1.8 Number of extension visits (contact).....40

4.1.9 Access to Credit.....41

4.1.10 Amount received.....41

4.1.11 Amount of income from other sources.....42

4.2 Farmers' response to Agricultural Extension Service Delivery.....43

4.2.1 Linkage with credit institution.....43

4.2.2 Distribution of inputs.....44

4.2.3 Access to extension information.....45

4.3 Factors Affecting Ginger Farmers' response to extension service delivery.....46

4.4 Effect of Farmers' Response to Agricultural Extension Service Delivery on output.....48

4.4.1 Respondents based on output derived.....48

4.4.2 Effects of extension service delivery on output of ginger farmers.....48

4.5 Constraints faced by Farmers.....49

CHAPTER FIVE.....51

SUMMARY, CONCLUSION AND RECOMMENDATIONS.....51

5.1 Summary.....52

5.2 Conclusion.....52
5.3 Recommendations.....53
5.4 Contributions to Knowledge.....53
REFERENCES.....55
Farmers' Questionnaires.....59

List of Tables

Table		Page
3.1	Distribution of Respondent in the study area	31
4.1	Distribution of Respondent based on Gender	37
4.2	Distribution of Respondent based on age	38
4.3	Distribution of Respondent based on marital status	38
4.4	Distribution of Respondent based on Educational qualification	39
4.5	Distribution of Respondent based on Membership of Cooperative	39
4.6	Distribution of Respondent based on Household size	40
4.7	Distribution of Respondent based on years of experience in ginger production	40
4.8	Distribution of farmers based on extension contact	41
4.9	Distribution of farmers based on access to credit and amount	41
4.10	Distribution of farmers based on Farm and non-farm income	42
4.11	Distribution of farmers based on amount of income from other sources	42
4.12	Distribution of farmers based on farmers' response to training	43
4.13	Distribution of farmers based on linkage to credit institutions	44
4.14	Distribution of farmers based on farmers' inputs	45
4.15	Distribution of farmers based on access to information	45
4.16	Socio-economic Characteristics affecting ginger farmers' response to services	47
4.17	Distribution of farmers based on outputs derived	48
4.18	Effect of extension services on farmers' output	49
4.19	Distribution of ginger farmers based on constraints faced on extension services	50

LIST OF FIGURES

Figure **Page**

Figure 2.1 Conceptual model.....28

Figure 3-1 Map of Kaduna State showing the study area.....30

LIST OF ABBREVIATIONS

ABBREVIATIONS	DEFINITION
ADP -	Agricultural Development Project
E A	Extension Agent
FAO -	Food and Agricultural Organization
FCT -	Federal Capital Territory
FF-	Farming Family
FFS-	Farmer Field School
FG -	Farmers Group
GDP -	Gross Domestic Product
ICT -	Information communication Technology
KADP-	Kaduna Agricultural Development Project
NATP-	National Agricultural Technology Project
NCA -	National Council of Agriculture
NPC -	National Population Commission
QTRM-	Quarterly Technology Review Meeting
SMS -	Subject Mater Specialist
T & V -	Training and Visit
TNA -	Training Need Assessment
UK -	United Kingdom
USA -	United States of America
VEA -	Village Extension Agent
VEW -	Village Extension Worker

ABSTRACT

The study assessed the response of ginger farmers to extension service delivery in Kaduna State. One hundred and fifty five respondents were randomly selected from Kachia and Jaba Local Governments (LGAs) for the study. Descriptive statistics, t-test and multiple regression were used to analyse the data. Majority (97%) of the respondents were literate. The study revealed that the socioeconomic characteristics of the respondents have positive effects on their response to extension service delivery with the exception of age which showed a negative (t-value=-2.35**) effect on their response at 5% level of probability, The variables; gender, age, marital status, educational qualification, membership of cooperative, household size, years of experience in ginger production, and number of extension contacts collectively accounted for 47% (R^2-value) variability in the degree of response to extension service delivery. It was also discovered that extension service delivery had significant effect on ginger outputs (t-value=2.79**) at 5% level of probability. Farmers with extension contacts had an average output of (2010.53kg) while the farmers without extension services had (1113.68kg). Trainings on spacing (4.07*), fertilizer application (4.05*), Mulching (3.34*) and weed control (3.14*) were satisfactory. However, training on harvesting (2.73) was not satisfactory. Linkage to credit institutions was satisfactory only to Bank of agriculture (3.4*). Distribution of planting material (3.238*) and Fertilizers (3.90*) were timely and satisfactory. Access to information (3.62*) was satisfactory for all media involved. The major constraints were price fluctuation (2.012*), inadequate extension agents (1.985) and poor transportation (1.830). Hence, ginger value chain should be improved to leverage and better the farmers' income. Government should recruit more extension agents to bridge the gap of inadequate extension agents in the study area. Rural roads that farmers use to convey their produce should be maintained by the farmers and be assisted by the government to encourage timely supply of inputs and reduce the cost of production, thereby stabilise the price and increase the farmers' income.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Agriculture is important to the Nigerian economy as it engages about 70% of the labour force and contributes 32% of Gross Domestic Product (GDP); small farms produce 80% of the total crops (Nigeria forum, 2014). However the sector is faced with a lot of problems which makes it difficult to optimise its potentials. Some of the problems include poor marketing and distribution infrastructure, inadequate access to credit, and weak extension services. In an attempt to ameliorate the constraints, the Government established Agricultural Development Projects (ADPs). In 1975 Kaduna Agricultural Development Project was established to perform extension function under the Ministry of Agriculture.

Effective extension involves adequate and timely access by farmers to relevant information, with appropriate incentives, to adopt a new technology if it suits their socio-economic and agro-ecological circumstances. Public extension is one of the sources of information, but not necessarily the most efficient (Anderson *et al*., 2003). It is widely accepted that extension services are important elements in farming but poor and marginalized farmers in remote villages remain beyond the reach of appropriate extension services.

Extension service in agriculture is indispensable and it offers more than just expert assistance in improvement of production and processing, but also enables flow of information and transfer of knowledge and scientific findings into practice. These activities are performed according to rules which regulate the establishment of

organization, functioning, goals and fields of operation, their obligations and rights. The response of farmers to extension service delivery has not received adequate attention; the focus has been more on research and extension. The public sector programmes are constrained by many factors including lack of transportation, communication and poor skills of service providers. This situation could lead to poor extension service delivery to the farmers that in turn affect their perception on the services they receive. It is an established fact that agricultural production, as currently practiced under traditional methods, has not been able to sustain Nigeria.

The effort of government in information dissemination to ginger farmers is appreciable, but farmers' adoption of innovations remains low and their perception and feedbacks to the extension services have not received adequate attention. Farmers' acceptance, rejection, compatibility, relevance of the services that are provided by the extension organization (ADP) require a thorough assessment to find out the level of their reactions with regards to farmers' satisfaction with the extension services that are been delivered to them in the study area.

Ginger (*Zingiberofficinale*) is a rhizome, which consist of numerous short finger-like structures or branches born horizontally near the surface of the soil. Two commercial varieties are commonly cultivated in Nigeria. The yellow ginger variety locally called "TafinGiwa" is stout with short internodes. The black ginger variety locally called "YatsunBiri" has a dull-grey colour rhizome. The yellow variety is more popular than the black variety apparently due to its high yielding capacity and pungency.

Ginger is produced in several parts of Nigeria particularly in the Guinea Savanna Zone (southern part of Kaduna State) and to a little extent in Keffi and Akwanga Local Government Areas of Nasarawa State (Dauda and Waziri, 2006). Ginger offers a substantial protection from stroke and heart attack because of its ability to prevent blood clotting and a multifaceted herb, crucial in the battle against cardiovascular diseases such as bowels and kidney diseases, respiratory system, colds and flu, headache, pains, stomach upsets and as well helps to clear sore throats.

1.2 Problem Statement

The level of adoption of technologies by farmers should not always be used in measuring the success or failure of extension delivery because the effectiveness and efficiency of extension delivery mechanism is to a large extent responsible for success or failure of extension programmes. Agbarevo, (2013). Farmers are often blamed for not responding to extension delivery programmes without considering the effectiveness and efficiency which the services are delivered.

Although studies have been carried out on extension service delivery for agricultural production and marketing of ginger (Asumgha, 2002), farmers' feedbacks have not received appropriate attention, with respect to quality of services delivered, in terms of content, timeliness of input supply and farmers' demand for the services and their level of involvement in extension activities.

It has been observed that farmers are resistant to adoption of innovation in the area, this could be attributed to high cost and late supply of inputs such as fertilizer. Moreover, the low extension activities in the area, inadequate and irregular extension visits as well

as low market prices, remain threats to ginger production, Adegboye, (2010). The low yield of 25-30tonne/ha as against a potential of 70-80tonne/ha in the area is not encouraging. This may be an indication that farmers are not fully benefiting from the production innovations that are passed through the KADP. (Shehu *et al*., 2013). The yield can be improved if the farmers' response to agricultural extension service delivery is adequately assessed and incorporated into the adoption and diffusion process of the ADPs and the identified constraints ameliorated. This necessitated the conduct of this study to assess the response of farmers to the extension service delivery in the area. In doing this, the following research questions were raised:

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

ii. What are the farmers' responses to agricultural extension service delivery on ginger production?

iii. What are the socio-economic characteristics affecting ginger farmers' response to extension services?

iv. What are the effects of farmers' response to extension service delivery on ginger production

v. What are the constraints faced by ginger farmers in accessing the extension services that are provided by KADP?

1.3 Objectives of the Study

The broad objective of the study was to examine the farmers' response to agricultural extension service delivery on ginger production in Kaduna state.

The specific objectives were to;

i. describe the socio-economic characteristics of ginger farmers in the study area

ii. assess farmers' responses to agricultural extension service delivery,

iii. examine the socio-economic characteristics affecting ginger farmers' response to extension services,

iv. determine the effects of extension service delivery on the output of ginger farmers and

v. identify the constraints faced by ginger farmers on extension services delivered by the KADP.

1.4 Justification of the study

The result of the study will provide the KADP an in-depth understanding of extension service needs of ginger farmers. It is also envisaged that the results of the study will contribute in the design of appropriate extension policies and programmes for ginger farmers to enhance their productive capacity hence their standard of living. The result of the study will also add to the body of knowledge through paper presentation and publications. In addition, it will help the extension organization (KADP) to apply the appropriate strategy for effective extension service delivery.

1.5 Research Hypotheses

(i) Ho: There is no significant effect of socio-economic characteristics of ginger farmers on their response to extension service delivery.

(ii) Ho: Farmers' response to extension service delivery have no significant effect on the output of the farmers.

CHAPTER TWO

LITERATURE REVIEW

In this chapter, the works of relevant literature to this study were reviewed. This is essential because the study of related literature provides a theoretical framework for the researcher to build upon. It also provides the researcher with the sense of direction.

2.1 Historical Background of Ginger in world

Ginger (Z*ingiberofficinaleRosc.*) belongs to the family of *Zingiberaceae*. It is a slender perennial plant with thick and branched underground stem (rhizome). It is a spice and root crop grown as cash crop in Nigeria, mostly grown in the southern part of Kaduna State (Northern Nigeria) for export. In the world market, the current major five exporting countries have been China, Nigeria, India, Jamaica, and Brazil (Asumugha, 2002). Nigerian ginger is known to produce the highest quality essential oils mainly oleoresin and gingerol. These are valued for their aroma and pungency. Ginger cultivation in Nigeria dates back to 1927 when it was believed to have been introduced from Southeast Asia. Among the spices (pepper, ginger, onions, and chillies), it is the only one that is grown on a commercial scale for export. Ginger is mainly exported in split-dried form, while exports of fresh ginger are negligible.

2.2 Uses ofGinger crop

Ginger is not only an income earner for individual farmers, it is as well a foreign exchange earner for the country, and the dried products are the major forms of which ginger is traded internationally. It also has various uses, which ranges from been used as spices in soups, confectonaries, zingiberone (anti-helmintic) from *Zingiberofficinale, oloresine* are among the extracts used for medicinal purposes (Mallam, 2011). Fresh

ginger is consumed as vegetable. Ginger powder is used in making ginger beer, wine, and baked foods. The essential oil obtained from ginger is used in the food and perfume industries.

Oleoresin is the total extract, which contains both volatile oil and pungent extractions. It is used in many types of baked foods, sauces, and alcohol beverages. Ginger is widely used for flavouring a great variety of foods. In western countries, ginger is used for culinary purposes. In Saudi Arabia, ginger is used mainly in the preparation of ginger coffee. In United States of America (USA), United Kingdom (UK) and Canada, ginger is widely used in meat processing industries. Ginger is extensively used in winter for curing minor ailments like cough and cold. It is also prescribed as an adjunct of many tonic and stimulating remedies.

Other uses include; culinary uses such as stews, pepper soups, etc; and Medicinal/Therapeutic uses such as ginger/lime/honey anti-malarial and anti-typhoid fever portion, ginger/garlic anti-hypertension tea (Mefoh, 2006). Ginger is used in the control of atherosclerosis in rabbits and nausea and vomiting and has confectionary and beverages uses as well used as ginger ale, ginger beer, meat flavouring and tendering, diary product and livestock feeds.

2.3 Development of Agricultural Extension Service in Nigeria

There are many models and types of extension activities around the World. Over the years, Nigeria has experimented a number of extension approaches and agricultural programmes with strong extension components. Notable among these extension approaches are: the conventional ministry operated extension system, project based

extension, sectoral/commodity extension, university-based extension, integrated rural development approach and farmers-focused extension. Swanson. (1998)

One of the approaches in Nigerian agricultural extension is the Training and Visit (T and V) system. It was introduced to Nigeria in 1986 by the World Bank and was subsequently adopted in most developing countries. The purpose of the introduction of this pattern of extension system (T and V) was to remedy the weakness inherent in the previous approaches. Olatunji *et al*,.(2011). It was also to strengthen research extension linkages by making research more relevant to the needs of the small-scale farmers. The design was to deliver selected, timely and feasible technologies to farmers on a strict fortnightly knowledge generation, or periodicity. The system encourages strong linkages of agricultural research institutions, places great emphasis on a professional approach to extension and requires an exclusive devotion to extension work. The main feature of the T&V extension system includes a single line of command and a well-defined geographical boundary of operation for each extension worker Ilevbaoje, 2004 in Olatunji *et al*., (2011).

In Nigeria, T and V has encouraged participatory approaches and improved linkages with research. In Asia, where there is more homogeneity within farming systems and higher capacity among agents and farmers, T & V had recorded more success.

However, T & V extension systems came under attack due to the cost of financing coupled with criticisms of irrelevancy, inefficiency, ineffectiveness and lack of equity (Rivera *et al.*, 2001).

The extension agent's role has evolved from that of a primary knowledge source to that of a facilitator of knowledge creation. The extension agent no longer has to have all the answers and the messages of extension are not centrally contrived but, instead, they are locally relevant problems emerging from the field. Another extension approach is the Farmer Field School (FFS) methods, which have transformed farmers from recipients of information to generators and manipulators of local data. (Madukwe, 2006).

In India, the public sector programmes are constrained by many factors including lack of transportation and communication and poor skills of service providers. Nevertheless, public sector reform has been continuing, for example, the "Support to State Extension Programmes for Extension Reforms" which was aimed at helping the states to revitalize their extension systems for the agriculture sector. However, given the limited capacity of public extension services, it is not possible to reach the smallholder in remote areas without speedy technology that can easily reach the remote areas.(Anderson2007)

Private sector initiatives in the area of agricultural extension services delivery are extremely limited. Widely discussed initiative is e-Choupal, an ICT enhanced initiative of the Indian Tobacco Company. The technologies depend on computers, internet and landline connections. The problems also include slow and disruptive internet connectivity, poorly maintained landlines, and the unreliability of electricity supply and power backup systems and operational constraints from the inadequate maintenance and support of the equipment (Annamalai and Rao, 2003). There are also some initiatives involved the establishment of information kiosks and information shops. Farmers are provided with information on crop technology and farmers' rights, loans, and the

availability of grants (Singh, 2006 in Xiolan *et al.*, 2012). However, the disadvantaged section of the population was still out of reach.

One way of solving the problem of food shortage among farmers is to increase their agricultural productivity and efficiency of their agricultural production systems, especially given their limited access to arable lands. To attain this objective, provision of soil-related information services to the farmers such as application of inorganic fertilizers, organic manure, soil and water management and the use of improved commercial seeds, with the overall aim of addressing the rampant problems of soil and land degradation is imperative. (Ojiem, 2006 in Nambiro*et al.*, 2010).

2.4 Agricultural Development Programmes (ADPs) in Nigeria

The priority of agricultural development in Nigeria is to be self sufficient in food supply. In the past, the traditional system allowed for subsistence farming, where individuals were able to feed and there was self-sufficiency in basic food needs. Millions of small farmers produced enough food for themselves. Everyone was responsible for the food requirement of the family members and self and the surplus was marketed. Substantial quantities of export crops such as cocoa, groundnut, oil palm and coffee were also produced. These earned foreign exchange for the country. (Ogunsumi, 2008)

The goal of the Government in establishing the ADPs is to achieve self-sufficiency in food and fibre production for both human and industrial consumption. Consequently, issues relating to this must reflect the changes in such institutions through sustained use of agricultural technologies. Hence, proper technology development and transfer

coupled with the adoption of the technologies are a must for agricultural development and sustainability of agriculture in the country. However the usual failure or collapse resulted especially as the funding agents withdrew their supports. The government could not sustain their existence. There were diversions and conflicts in their initial objectives. Hence the objectives were refocused where they were commercialised, yet they could not perform in most of the states.

The extension approach used by KADP is Training and Visit, this involves training of farmers during the extension agents' visit to the farmer. Trainings are also organised on a monthly basis for the extension agents by the subject matter specialists (SMSs) who are expected to train the farmers. However, the monthly training meetings have been reduced to quarterly meeting (QTRM) to reduce cost. KADP use training and visit and the unified agricultural extension system, the main purpose of T&V extension system is to build a professional extension service for raising agricultural production and income.

The unified agricultural extension system came to being as a result of dwindling resources to support the ADP, it was introduced in 1993. In this arrangement one Village Extension Agent (VEA) is expected to teach farmers improved farm practices in all areas including crops, agro-forestry, animal production, fishery and food processing using the T & V system. The VEAs are backed up by Subject Matter Specialists (SMSs) in the various areas.

Information from the research gets to the farmers through the extension agents who visit the farmers through Village meetings, Demonstrations, Field days, Farm Radios, Extension Campaigns, and Agricultural Shows. The frequency and coverage of

extension contacts depend on the availability and adequacy of extension workers. The shortage of extension workers is one of the problems of agricultural extension in developing Countries; a staff farmer ratio of 1:2500 was recorded in Malawi as against a recommended ratio of 1:750 (Kimaro, 2010). In Nigeria the Extension Agent (EA) Farming family (FF) Ratio has an average of 1 EA to 1,722 FF in 2003 as recorded by Agbamu (2005) in Koyenikon, (2008)

Frequent and regular extension contacts with the farmers has a positive effect on the adoption of technologies by farmers, a study carried out in Delta state on the farmers' perception on the effectiveness of extension agents revealed that a monthly extension contacts instead of fortnightly contacts of the T & V extension system, recorded an impressive result. (Aphunu*et al*.,2008).

2.5 Socio-economic Characteristics of Farmers

The socioeconomic characteristics of farmers have a lot of influence on their crops' yield. The level of education attained by a farmer eases the ability to adopt innovation thereby increasing their output. A study carried out by Adegboye, (2010), showed that the majority of ginger farmers in the study area are married males who are between the ages of 30 – 39 years, with at least secondary education and they cultivate less than one hectare, their major source of finance/credit is through personal savings. In a related study, Shehu *et al*., (2013) identified credit/capital as major constraint to ginger production in KADP zone. The primary occupation of the people in the study area is crop production that accounts for an average of 96.5%, Livestock production is at an average of 1.6%, trading accounts for 1.4%, civil servants make up 0.3% and others is 0.2%. Despite the government's effort to increase the number of extension staff, the

study area still has a low extension contacts, which accounts to an average of 27% (KADP, 2007).

2.6 Factors influencing effectiveness of Agricultural Extension Service Delivery

The appropriateness of the advisory methods, the capacity and number of extensionists, and the management and governance structures of the organisations delivering the services are some of the reasons for effective extension service delivery, as noted by Waddington *et al.,* (2012). Also effectiveness may be influenced by the degree of feedbacks and the mechanisms of delivery of information from farmers to the research and extension system, and thus the role of farmers in formulating demand and their ability to exercise voice. This may depend in turn on the ratio of extensionists to farmers, a responsive management approach. The policy environment determines the overall orientation of the advisory service, the degree of resources devoted to it and the types of farmers targeted. Characteristics of local communities, such as heterogeneity in terms of land and asset-holdings, ethnicity, education, gender roles and the degree of social exclusion, will determine the ability of the extension services to penetrate communities and reach the disadvantaged, and the degree of farmer-to-farmer diffusion. Consequently these factors together with market access and weather conditions will determine the degree of adoption of techniques and final outcomes such as yields, income and empowerment.

Extension messages are often not accompanied by the availability of physical inputs. This frustrates the farmers' eagerness to adopt innovations as well as demotivates extensionists in their job performance and the reliability of services is questioned. Agricultural innovations do not spread by just word of mouth. The government

extension system has been criticized since long for not delivering the production inputs on time, to the places where they are needed, and in the right quantities and qualities (FAO, 2010)

2.6.1 Farmers' training

Farmers' training is education that often takes place outside formal learning institution. It is different from formal education as obtainable in conventional schools, because it focuses on adult learning. Matured adults are self-directed and sufficient in most aspects of their lives.

Non-formal training is defined as any form of training for which the content and learning aims have been defined. This usually means training is based on well-defined curricula, either within or without an institution, with or without guidance from a teacher or trainer. Formal training on the other hand is any form of training which the content and the learning aims are defined.

Participatory training is an educational process that is based on the assumption of adult learning, deciding on what they want to learn and the best way to learn. Participatory training encourages participants to see themselves as source of information and knowledge about the real world. It refuses to accept that people do not know anything, recognizes the value of popular knowledge and encourages people to participate in their own learning process.

When adult are encouraged to work with the knowledge they have experience, they can develop strategies together to change their immediate situation. The role of trainer in

this learning process is that of a facilitator. Therefore, this process gives participants a sense of empowerment and they start recognizing their existing knowledge and its value. In doing this, they become more open to and actively share responsibility for seeking new knowledge. This enhances the learning process and feeling of ownership of the knowledge. Thus, participatory training becomes a tool and a strategy for social change when people start valuing the process of collective analysis. Participatory training creates an understanding that change is possible, that it is possible to change ones situation. It also enables individuals and communities to identify what type of change they wish to achieve and how to go about attaining that. Rivera *et al*., (2001)

Participation of people in extension programme is voluntary. The people have complete freedom whether or not to join an extension programme. The behaviour of the people has to be changed not by ordering or coercing, but by educating and motivating them. Unless the people are convinced, get good results, are satisfied, they should turn their faces away from extension (Swanson, 1998). Training is more effective in changing behaviour, if it is related to ones actual work situation. Effective training is the one that is responsive to farmers' needs. Therefore, a need for Training Need Assessment (TNA) before training is carried out. The success of training depends on its content. The objective and content of a training programme is the most important part when the need is identified. The objective and content specifies what will be taught and how it will be.

2.6.2 Extension agent's requirement and needs

The required entry level of an extension worker is graduate in agriculture related sciences; extension workers with lower educational level cannot meet the needs, priorities and demands of farmers for improved farming. Poor remuneration packages

and limited opportunities for higher level studies for career development are among the problems facing the extension staff. In addition, extension staff does not have a clear job descriptions and career development paths. (FAO, 2010)

In India, extension workers are trained in some of the tools and techniques useful in extension work which include, participatory rural appraisal, problem census/problem solving, projectization, project concept, note preparation, log framing, proposal writing, bottom-up planning, participatory monitoring and evaluation, etc. Needs assessment is normally carried out at the farmers' group (FG) level one year in advance for use in planning during the following year. (Nambiro *et al.*, 2010)

Extension staff requires mobility for field work, teaching aids, and extension materials. Extension messages are not often accompanied by critical support services of inputs, credit and marketing. There are neither means nor capacities of the extension workers to put up a trial to solve local problems at the farmers' field. (FAO,2010)

2.7 Constraint to Extension Service Delivery

The problem of agricultural extension and indeed technology delivery became prominent with the expiration of the World Bank component of the agricultural extension funding arrangement. Withdrawal of funding and fierce competition for resources from the national budget among different economic sectors has substantially reduced the funding available for agricultural technology delivery in Nigeria.

Other problems of extension service delivery include poor logistic support for field staff, use of poorly trained personnel at the local level, insufficient and inappropriate

agricultural technologies to farmers, disproportionate extension agent as observed by Koyenikon, (2008), he also identified peculiar problems faced by ADPs to include, inadequate logistics, poor feedbacks from farmers to research and failure of Unified Agricultural extension Service to make impact in other sub-sectors.

Anderson and Feder, (2003) observed that "despite the fact that public financing for extension is often justifiable, the general trend towards fiscal restraint and a reduced role for the public sector has led to financial crises in many extension services. Since the late 1990s, inadequate funding has led to the virtual collapse of research and extension institutions that provided services to small farmers and rural communities in Nigeria (Omotayo, 2004). For example, average available funds for Ogun State ADP fell by about 20% as the State and Federal Government exhibited reduced commitments to the funding of the ADP. The private sector needs to play a more active role in both funding and the physical transfer of the available improved technologies. In pursuance of more private involvement in agricultural technology delivery, some innovative mechanisms, derived from the Nigerian government stance on privatization policy, are being considered. Few or no contacts by extension agents could have been caused by inadequate extension- farmer ratio in addition to difficult access to credit as opined by Adegboye, (2010).

There is no doubt that agricultural extension is a difficult and demanding profession, both physically and intellectually. Extension workers in most developing countries, Nigeria inclusive, suffer from low salaries, meagre benefits, and negligible opportunities for development of their professional career. The researchers or other agricultural specialists often grab sponsored overseas training opportunities, leaving

very few, if any, for the extension staff, No wonder few young graduates are keen to make extension their career profession. Suitable candidates may not be attracted to the profession.

The unsolved field problems of the farmers which include untimely supply of inputs, irregular extension visits and irrelevant market information have not been adequately addressed. More so, high extension agent to farmer's ratio is grossly inadequate; 1:3000. Moreover, the farmers in the study area depend on the use of crude implements, old varieties of crops and personal saving as the only source of finance (Adegboye, 2010). Agricultural Development Project (ADP) is currently operating at less than 10% of their capacities as opined by Ogunsunmi, (2008). These could be responsible for the low yields and low profitability of the crop.

The social infrastructures include, educational facilities, (such as schools), Electricity supply, communication facilities (Telephones, radio, television and internet), and transportation facilities (Roads network, rail tracks, and water ways). These entire infrastructures can affect extension service delivery. The transportation problems can hinder access to vital inputs such fertilizers and agro chemicals.

2. 8 Theoretical Framework

2.8.1 Modernization theory

Modernization theory is a description and explanation of the process of transformation from traditional or underdeveloped societies to modern societies. Modernization is the process of change towards the types of social, economic and political systems that have developed in the Western Europe and the North America from the seventeenth century

to the nineteenth and have then spread to other European countries and later to the South American, Asian, and African continents. Modernization theorists are concerned with economic growth within societies. Modernization theorists define development in term of economic output per capita. Other theorists may be more concerned about development of autonomous productive capacity, equitable distribution of wealth, or meeting basic human needs.

Although there are many versions of modernization theory, major implicit or explicit tenets are that; Societies develop through a series of evolutionary stages; these stages are based on different degrees and patterns of social differentiation and integration of structural and cultural components that are functionally compatible for the maintenance of society. Institution and individual activities become more highly specialised, differentiated and integrated into social, political, and economic forms characteristic of advanced western societies.

Modernization is characterised by high level of urbanization, literacy, research, health care, secularization, bureaucracy, mass media, and transportation facilities. Kinship ties are weak and nuclear conjugal family system prevails. Birth rates and death rate are lower and the life expectancy is relatively longer. Politically, the society becomes more participatory in decision making process. Michael and John, (2001)

Modernization theory's definition of development in term of economic growth within the society is applied to the study, where the farmers' response to extension services depends on the economic gains associated to such services. The adoption and

continuous use of use of chemical fertilizers technology is determined by the increase in the level of output that is expected by its adoption.

The use of machine as energy savers move the production of ginger from traditional to modern way of production. The change from family labour to use of machine and the increase in area of production from small scale to large scale is brought about by modernization.

2.8.2 Theory of social change

Factors in societal change may be summarised under three main headings: economic, political and cultural. Marx is perhaps the most famous proponent of the notion that societies/forms of social organisation are largely determined by economic factors and in particular the impact of industrial capitalism. Among political influences, the state – government – now plays a very large role in social life and change in industrial societies. Cultural influences clearly play an important part in social change. For example, secularization and the development of science have had major effects on the way in which we think, attitudes to legitimacy and authority, and have thus influenced social structures, systems and values (Giddens and Duneier, 2000).

Social change can be planned or unplanned; a planned change entails the direct human intervention in the shaping and direction of change towards some predefined goals. Ekong,(2003) Extension service is a planned change which goal is to increase production levels of the farmers. Training and Visit is the means of effecting this change. Change at this level need to focus on changing economic, political or cultural structures and processes. Some international foundations aiming to change economic

and political conditions adopt this macro approach to social change. Social change is an ever present phenomenon in any society. Rogers (1983) posits that social change is the process through which significant alteration occurs in structure and function of the society. The process of change involves interaction and so individuals must be understood in terms of the group in which they belong or participate.

Saltman,(1972), defined social change as a term used to describe change in social and economic lifestyle and values of people, technological innovation and social institutions. The specific meaning of social change varies depending on the social entity considered. Thus, for this study, the social change theory will help to analyze the changes in income and output of ginger farmers in the study area. The economic change involves the production of crops in commercial quantities for sale by this the income level of farmers is increased. The technological change involves the application of scientific knowledge to practical task. In ginger production technology is applied in production, processing and marketing. The use of electronic devices to communicate with farmers on the available and improved methods of production, machine for processing of the crop and the mode of transportation from the farm to the market.

Behavioural change is referred to as the changes from the influence of education on the attitude and the reaction of people. The perception of ginger farmers on the extension service delivery and their expectations from the change agent.

2.8.3 Adoption theory

The Adoption-Diffusion Concept

Adoption, according to Arokoyo, (2005), is the decision to make full use of a technology as the best course of action available. The farmers may decide to use a technology continuously over a time. The time taken for adoption varies with the nature of the technology, the communication channels used and the characteristics of the social system. Adoption studies have been seen as important tools for measuring and assessing the impact of agricultural technologies (Agbamu and Orhorhoro, 2007). Agbamu (2006) defined diffusion as the process by which an innovation is communicated through certain channels over time among members of the social system. According to him, a number of factors interact to influence the diffusion of innovations. These factors include: the innovation itself; the communication channels; the time; and the nature of the social system into which the innovation is being introduced.

The classical diffusion- adoption theory is made up of two components:

(a) The diffusion process and

(b) The adoption or innovative decision process.

Adoption is a concept which refers to the acceptance and continuous use of an idea or practice by single unit of a potential audience; Adoption is the decision to continue full use of an innovation after an individual has passed through certain mental processes. Adoption is the acceptance of continued use of an innovation after individuals or groups had gone through certain mental processes (Agbamu, 2006). One of the models that is accepted by the United States of America North Central Rural Sociology Committee of Iowa in 1995, recognized the following sequence for explaining the process of adopting innovation;

i. Awareness,

ii. Interest,

iii. Evaluation,

iv. Trial,

v. Adoption

(Ogunbameru, 2001 as cited in Dahunsi, 2015).

After the first four stages, the fifth stage is the adoption in which a decision is taken on whether to accept agricultural technology or not. Awareness stage is the first stage; here the farmer merely knows about the existence of an innovation but lacks details about it. This is somewhat like seeing something without attaching meaning or importance to it. Before a farmer can adopt a new idea or practice, the individual must first known about it. It is therefore the major task of the extension staff to bring the new idea, practice or technology to the knowledge of the farmer (Ogunbameru, 2001 as cited in Dahunsi, 2015). Interest is the stage that farmers seek more factual information about the idea, practice or technology due to the interest the farmer develops in the technology.

Farmers evaluate how the information or new practice affects their social, economic and cultural variables (values and conditions). If positive, they go ahead to the next phase. If negative, they stop there. They ask such question as: Can I do it? How can I do it? Is the new practice or technology better than what I am doing or using now? Will it work in my case? What will I get out of it? All these and other questions flood their minds. They then make mental application of the idea.

Trial stage is the stage where the farmers have weighed the advantages and the risks involved and if the idea is divisible in small segments, they actually apply the

innovation on a small scale under his own circumstances and managerial competence. If the farmer is satisfied with the trial, he may decide to continue the use of that innovation. If the trial provides poor result, he may reject the innovation (Ogunbameru, 2001 as cited in Dahunsi, 2015).

The adoption stage is the stage when a farmer approves an innovation and decides to continue using it. Adoption involves acceptance and repeated use of an innovation since the new practice brought an improvement on farm productivity or is expected to do so or will help to ease a difficult farm operation (Adegbenga and Babaleye (2009) argued that even when people have accepted an innovation, they remain curious until it has worked for some time and proved reliable. Having established trust in an innovation, there is no likelihood of discontinuance of its use.

The continuous usage of a technologyis a function of Farmers' satisfaction to the innovation. The content of agricultural extension as well as the timeliness and channel of delivery determines the effectiveness of the services.

2.9 Conceptual framework

Conceptual framework can be defined as a visual or written product that explains either graphically the main things to be studied, it is used to help identify the problem by using a broad set of ideas and theories. Conceptual framework is a theoretical structure of assumptions, principles and rules that holds together the ideas comprising a broad concept.

2.9.1 Concept of response to agricultural extension service delivery

Response can be defined as a reaction to a question, experience or some other type of stimulus. The stimulus is the extension services; the innovation is an alteration to social system. The output, level of living and level of income form the response indicators, for the purpose of this study, the indicators will be condensed to satisfaction, which will be used to measure response while output, level of living and income of farmers form the outcomes.

Service delivery involves getting services as effectively and quickly as possible to the intended recipient. However, the feedbacks from the farmers are often ignored. Investment in extension service has the potential to improve productivity and increase farmer's income. Yet the impact of extension on farm performance is varied, reflecting differences in how extension services are delivered and in the circumstances of services recipients and their reactions. Critical to adoption are the availability of improved technology, access to modern inputs and resources and profitability at an acceptable level of risk, more so, the recipients' needs and reaction deserve adequate attention.

Response was measured by ranking the farmers' responses in a likert scale using a five-point scale;

This was used to achieve objective (iii);

A five-point likert-type scale was utilized. The response options ranged from "strongly satisfied"= 5; "satisfied"= 4, "indifferent"= 3, "not satisfied"= 2, "strongly not satisfied"= 1. The values were added to obtain 15, which was divided by 5 to get a mean score of 3.00. Mean scores of 3.00 or above was classified as satisfaction of extension service delivery, while scores less than 3.00was regarded otherwise.

The model for this study explained the response of farmers to the extension services delivered by KADP, trainings, inputs and extension visits (service delivery). The farmers' satisfaction to the services formed the index of their response to the services. It is expected that their socioeconomic characteristics would influence their satisfaction to the extension services hence their output, income and level of living

The farmers' socioeconomic characteristics; age, gender, marital status, education level, farming experience, household size, membership of association, extension contact, forms the independent variables (X). Which are linked to the dependent variable by an arrow ($\rightarrow$). While the farmers' response forms the dependent variable (Y). The farmers' response to the extension services are linked to the expected outcomes by an arrow ($\rightarrow$). The outcomes of the relationship between the independent variables and dependent variables; output, income and level of living as shown in the model (figure 2.1).

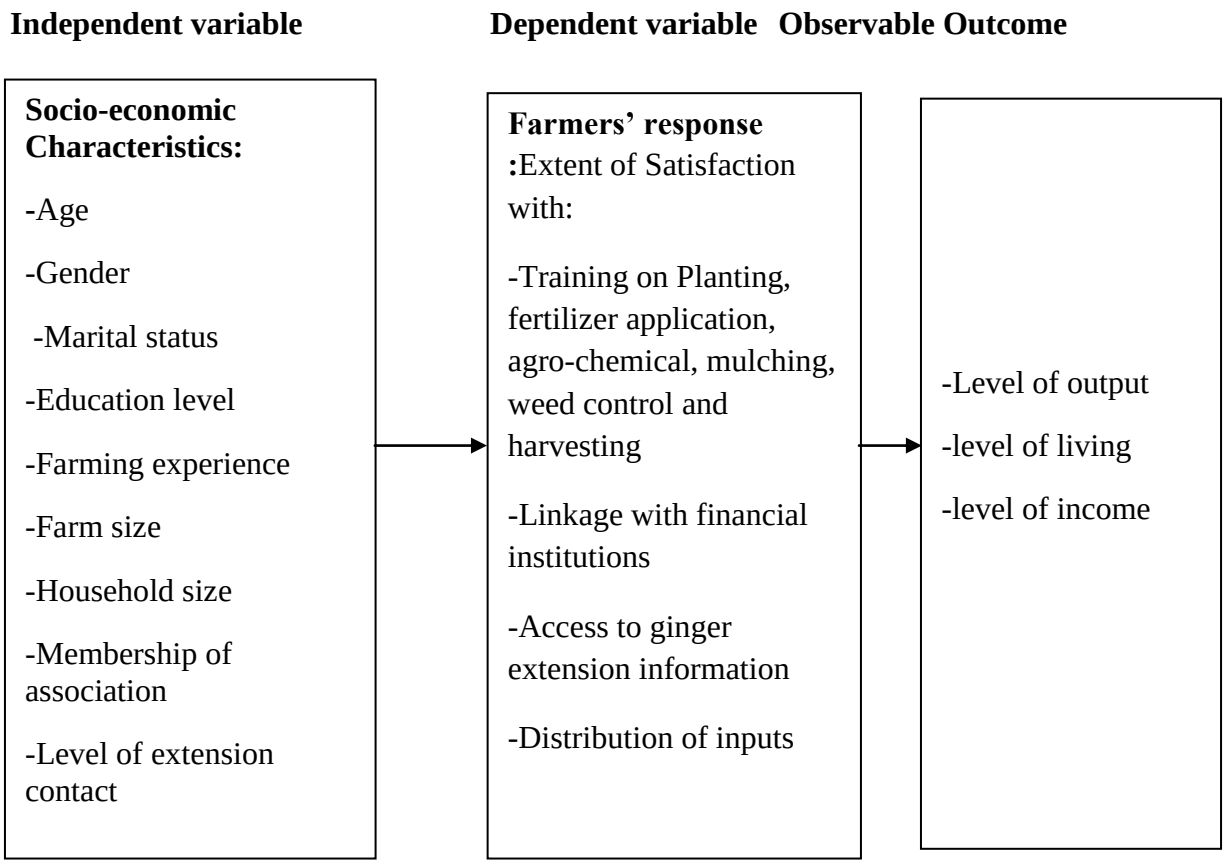


Figure 2.1: A model of the response to extension service delivery by ginger farmers in the study area

CHAPTER THREE

METHODOLOGY

3.1.1 Study Area

The study was conducted in Kaduna State. The State is located at 10.31.23" North of the Equator, $7^0$26, 25"s East of the Greenwich Meridian. It was created in 1976. It shares border with Zamfara, Katsina, Niger, Kano, Bauchi, Federal Capital Teritory (FCT) and Nasarawa states. The State occupies an area of approximately 1189.25 square metres with an estimated population of 7.4million people as projected from 2006 population census, which has an annual growth rate of 3%. The population comprises of Hausa, Gbagyi, Adara, Ham, Atyap, Bajju, Fulani, Yoruba, Igbo and Agworok ethnic communities. The state has 23 LGAs, and 255 political wards (Kaduna, 2012). Agriculture accounts for an estimated 56% of Kaduna State's GDP and it employs approximately four (4) million people. The state has about 606,007 farming families, which constitute about 75% of the total state's population as recorded in Kaduna Agricultural Development Project, (2007)

The land is undulating with many rivers; the major rivers include River Kaduna in Kaduna, River Wonderful in Kafanchan among others. There are two marked seasons in the state, the dry windy season and the Rainy (wet) season. The wet season usually begin from April through October with much variation as you move northward. It has an average rainfall of about 1016mm. The ecological location of the state extends from the tropical grassland (Guinea savannah) in the North to Sudan savannah in the North. The grassland is a vast region covering the Southern part of the state to about 1100"North of the Equator. (Kaduna state, 2007). KADP is a major public agricultural

extension service provider in the state. The state is divided into four zones namely; BirninGwari, Lere, Maigana and Samaru.

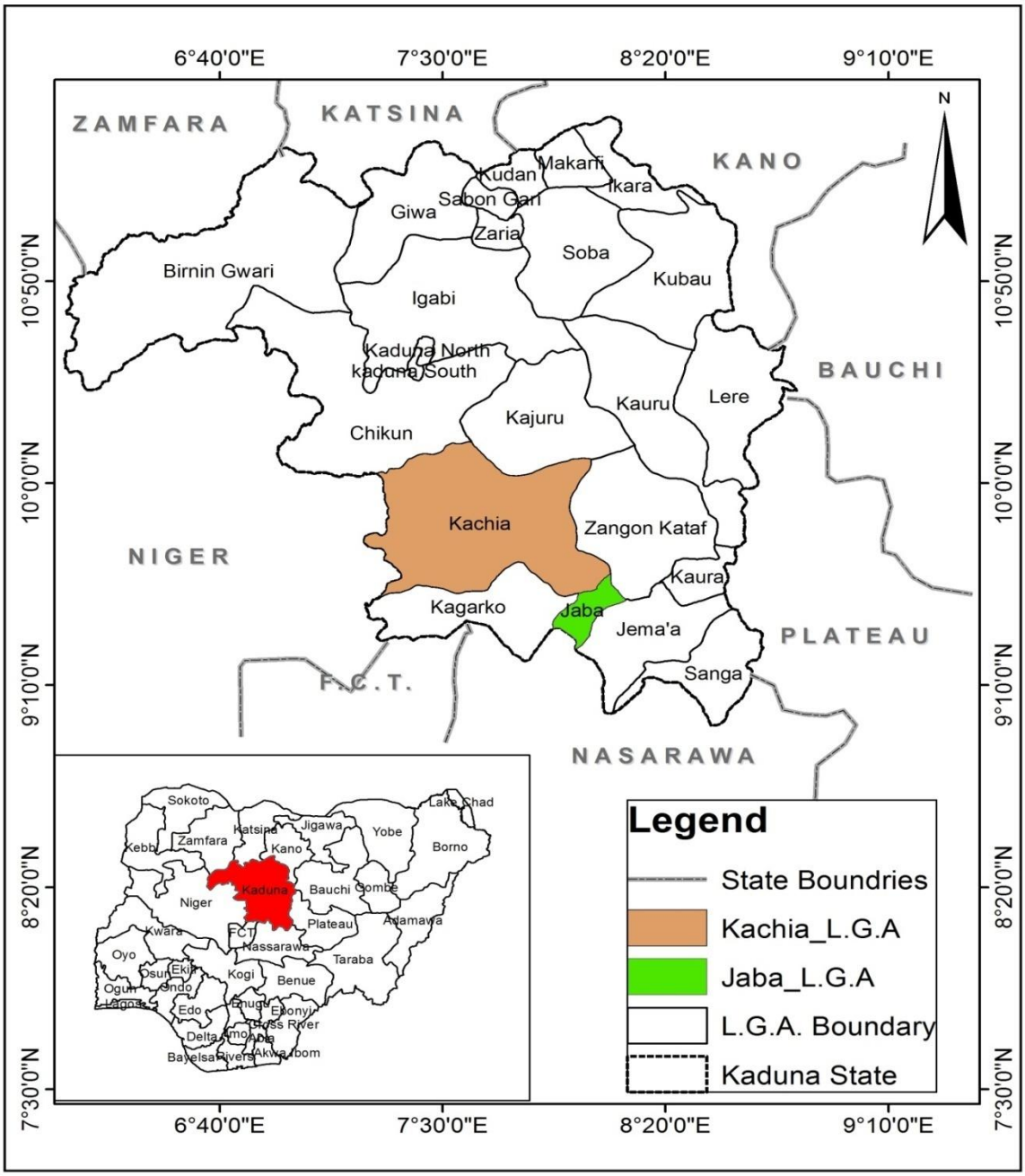


Fig1: Map of Kaduna State Showing the Study Areas
Source: Adopted from administrative Map of Kaduna State

3.2 Sampling Procedure and Sample Size

This study employed a multi-stage sampling technique. In the first stage, Samaru Zone, was purposively selected out of the four (4) zones (BirninGwari, Lere, Maigana and Samaru zones) of the ADP in Kaduna State. This is because of the active production of ginger in the zone.

In the second stage, two Local Government Areas (Kachia and Jaba) were purposively selected because they are the major ginger producing areas. In the third stage, five villages were randomly selected from each of the Local Government Area. The fourth stage, 155 farmers were randomly selected from the sample frame of 1552 farmers based on the data collected from KADP (KADP,2007). This forms the sample size of the study and it represent 10% of the sample frame, as shown in table 3.1

Table 3.1 Distribution of respondents in the study area

S/No	LGA	Village	*Sample Frame	Sample Size
1	Jaba	Sabzuro	265	27
		Fada	171	17
		Kuryas	203	20
		GidanSanni	98	10
		K/Jatau	271	27
2	Kachia	G/ Tagwai	261	26
		Walijo	56	6
		Gumeltsakiya	64	6
		Wawan Rafi	33	3
		K/Sara	130	13
Total	**2 (23)**	**10**	**1552**	**155**

*VLS-Village Listing Survey (KADP 2007)

3.3 Data Collection

Primary and secondary information were sought, structured questionnaire was used to obtain primary information on farmers' socioeconomic characteristics. While secondary information were obtained through the literature review. The socioeconomic data such as age, marital status, educational level, gender, farming experience, farm size, household size and the institutional factors such as access to credit, access to extension information, membership of association, extension contact, constraints faced by the farmers and ginger output were sought from the respondents.

3.4 Analytical Techniques

Descriptive statistics, t-statistic and Multiple Regressions were used to achieve the objectives of the study, which include:

3.4.1 Descriptive statistics

Descriptive statistics such as frequency counts means and percentages were used to achieve objective; (i) that is to describe the socioeconomic characteristics of ginger farmers. (ii) that is to assess farmers' responses to agricultural extension services and (v);that is to identify the constraints faced by ginger farmers on extension services delivered by KADP.

3.4.2 Multiple regression analysis

(i) Regression analysis is a statistical tool for the investigation of relationships between variables. In this study, regressions was used to achieve objective (iii);that is to examine socioeconomic characteristics affecting ginger farmers' response to extension services and to test the first hypothesis;There is no significant effect between socio-

economic characteristics of ginger farmers and their response to extension service delivery. The t-test was used to test the second hypothesis; Farmer's response to extension service delivery has no significant effect on their outputs.

The regression model is specified below:

$Y=bo+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8+u$----------(1)

Where, Y = Response of farmers to extension services delivery and this was measured by level of satisfaction.

Likert scale was used to achieve objective (iii); examine socioeconomic characteristics affecting ginger farmers' response to extension services.

. A five-point likert-type scale was utilized. The response options ranged from "strongly satisfied"= 5; "satisfied"= 4, "indifferent"= 3, "not satisfied"= 2, "strongly not satisfied"= 1. The values was added to obtain 15, which was be divided by 5 to get a mean score of 3.00. Mean scores of 3.00 or above was classified as satisfaction of extension service delivery, while scores less than 3.00 was regarded otherwise.

The independent variable (X) is as follows;

X_1=Age (years)

X_2=Gender (male or female)

X_3=Marital status (Single;divorced,widowed)or Married

X_4 = Education (Level of schooling-years)

X_5=Household size (number of persons)

X_6= Farming experience (Years)

X_7=Membership to association(Number of years)

X_8=Extension contact (Number of times)

u = Error term

$b_1 – b_8$= Regression coefficients

b_0 = Constant

3.4.3 T-static

Objective (iv) was achieved using the t-statistic. It was used to compare the means of the output of farmers that had extension services and those without. It is expressed as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \text{----------(2)}$$

W here;

t = calculated t-value, $\bar{x}_{1=}$ mean output of farmers of farmers with extension services, $\bar{x}_{2\ =}$ mean output of farmers without extension services, $s_{1=}$ standard deviation of farmers with extension services, $s_{2\ =}$ standard deviation of farmers without extension services, $n_{1=}$ sample size of farmers with extension services, $n_{2\ =}$ sample size of farmers without extension services.

3.4.2 Operationalization and Measurement of Variables

3.5.1 Dependent variable (Y)

Response to extension service: In this study, farmers' satisfaction to the extension services was considered. Satisfaction or non-satisfaction to the services formed the general indicator of their response to the agricultural extension service delivery. Farmers' response to the services constitutes the dependent variable.

3.5.2 Independent variables

These are also called predictor variables and the following were used in this study; age, marital status, level of education, farm size, family size, farming experience

accessibility to credit and information sources. Others included membership of association, extension contact and accessibility to inputs. These variables exerted influence on the response of farmers to the extension service delivery.

Socio-economic Characteristics

a. **Age**: This is the number of years of the respondent from birth. Age of the respondent was measured by the actual years the individual has lived as given by him/her.

b. **Gender;** This is the classification of the respondents according to their biological sex into male or female. It was measured by allocating 1 to male and 2 to female

c. **Marital status**: This is a condition or a state of being married or unmarried as indicated by the respondent. Score was used to measure. Single (widowed, divorced) = 1, Married = 2.

d. **Level of Education:** This is the number of years a respondent has spent schooling. Level of education was measured in terms of the highest level attained.

e. **Household size**: This is the number of dependants in the respondent's house. This was measured by estimating the number of people in a household eating in the same pot.

f. **Farming experience**: This refers to the number of years that a respondent has actively been involved in ginger farming operation. This was measured in years.

g. **Membership of association**: This is the decision of the respondent to belong to a group. It was measured by the number of years the respondent has been in the association.

h. **Extension contact**: This is the meeting of respondents with the extension agents. It was measured by estimating the number of contacts.

CHAPTER FOUR

RESULTS AND DISCUSSION

The results obtained from the study are classified according to the objectives of the study. First, a description of the socio-economic characteristics of the respondents in the study area (Kaduna State).The second section is the description of the respondents' responses to agricultural extension service delivery in Kaduna state. The third section is the analysis of socio-economic characteristics affecting ginger farmers' response to extension services. The fourth section is the analysis of the extension service delivery on the output of ginger farmers and the fifth section consist of the constraints faced by respondents on extension service delivery by KADP.

4.1 Socio-economic Characteristics of the Respondents

The main socio-economic characteristics of respondents that are covered in the study are presented in Table 4.1. The characteristics include: gender, age, marital status, educational qualification, membership to groups, household size and years of experience in ginger production.

4.1.1 Gender

The distribution of respondents based on gender, indicated higher percentage (73%) of males than females (27%) as shown in Table 4.1 This may be attributed to the land ownership system that prevails in the area, which allows only males members of the society inherit and own land.

Table 4.1: Distribution of respondents based on gender

Gender	**Frequency**	**Percentage**
Male	113	72.9
Female	42	27.1
Total	**155**	**100**

4.1.2 Age

The distribution of respondents based on their ages, revealed that the mean age is 51 years. This shows that ginger production is produced by old people. The implication of this finding is that production will remain low if not decline as result of aging of the producers who are weak. It also indicates the increased need for energy saving devices like tractors and water pump machines would be necessary. More so, older people could be reluctant or resistant to innovations. This agrees with Adegboye, (2010) who in her study discovered that farmers in the study area are resistant to adoption.

Table 4.2: Distribution of respondents based on age

Age	Frequency	Percentage
21 – 30	3	1.9
31 – 40	27	17.4
41 – 50	53	34.2
51 – 60	42	27.1
Greater than 60	30	19.4
Total	**155**	**100**
Average	**50.87**	

4.1.3 Marital status

From the result in Table 4.3, about 81% of the respondents are married while 19% are single. This implies that there is the possibility of the farmers having sufficient labour to send to work on the farm.

Table 4.3: Distribution of respondents based on marital status

Marital status	Frequency	Percentage
Single	30	19.4
Married	125	80.6
Total	**155**	**100**

4.1.4 Educational qualification

The results in Table 4.4 showed that less than half (34%) of the respondents attained secondary education. In general, about 97% of the respondents have some form of education and 3% do not have any form of education. The implication of this is the

greater potential of adoption of available innovations and easy access of information from the print and ICTs (Information and communication technologies) media.

Table 4.4: Distribution of respondents based on educational qualification

Educational Qualification	Frequency	Percentage
Primary	35	22.6
Secondary	53	34.2
Tertiary	33	21.3
Adult education	29	18.7
No formal education	5	3.2
Total	**155**	**100**

4.1.5 Membership of cooperative

The result in Table 4.5 revealed that majority (60%) of the respondents did not belong to any cooperative but 40% belong to cooperative. This implies that most of the activities in ginger production are carried out by individual farmers. This situation could result to ineffective access to farm inputs because cooperative lead to pooling of resources by members.

Table 4.5: Distribution of respondents based on membership of cooperative

Membership	Frequency	Percentage
Yes	62	40.0
No	93	60.0
Total	**155**	**100**

4.1.6 Household size

The study revealed an average household size of 8 persons, as shown in Table 4.6. This implies that there was less pressure on the available resources in the family. The result showed a decline in family size when compared to Shehu *et al.*, (2013) who recorded an average household size of 13 persons, suggesting a decrease in family expenditures.

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Table 4.6: Distribution of respondents based on household size

Household size	Frequency	Percentage
1 – 5	34	21.9
6 – 10	101	65.2
11 – 15	18	11.6
Greater than 15	2	1.3
Total	**155**	**100**
Average	**8**	

4.1.7 Years of experience in ginger production

The results indicated that less than (36%) of the respondents have 21-30 years of experience in ginger production as shown in Table 4.7. The implication is that the respondents would be able to cope with common challenges in ginger production as a result of accumulated years of experience.

Table 4.7: Distribution of respondents based on years of experience in ginger production

Years of experience	Frequency	Percentage
1 – 10	10	6.4
11 – 20	33	21.3
21 – 30	56	36.1
31 – 40	34	21.9
41 – 50	14	9.0
51 – 60	7	4.5
Greater than 60	1	0.6
Total	**155**	**100**
Average	**25.5**	

4.1.8 Number of extension visits (Contact)

The results in Table 4.8 indicated that 88% of the respondents had at least three visits, 12% could not have any visit. The implication of regular extension visits is increase exchange of information between the agents and farmers; it also enables timely response to challenges. This agrees with Aphunu *et al.*, (2008) who discovered a positive effect of extension contacts on adoption of technologies.

Table 4. 8: Distribution of farmers based on Extension contact

Variables	Frequency	Percentage
Extension agent's visit (Contact)		
Nil	19	12.3
1-2	118	76.1
3-4	18	11.6
Total	**155**	**100**
Average	2	

4.1.9 Access to Credit

It was discovered that 91% of the respondents had access to financial institutions as shown in Table 4.9. The linkage to financial institutions has the potential of solving the problem associated to high cost of farm inputs in crop production by increasing the farmers' purchasing power.

Table 4. 9: Distribution of farmers based on farmers' access to credit and amount received

Variables	Frequency	Percentage
Access to credit/ received (₦)		
Nil	141	91.0
1000-10000	5	3.2
10001-20000	2	1.3
20001-30000	3	1.9
Greater than 30000	4	2.6
Total	**155**	**100**
Average (₦)	**5,500**	

4.1.10 Amount of Credit received (₦)

Majority (91%) of farmers could not obtain loan from financial institutions, as shown in Table 4.9. This could be attributed to the farmers' inability to provide collateral. The few (9%) that got the facility got an average of ₦ 5,500.00k only, which could only do little in their farm operation.

Farmers' income

Less than (46%) of the respondents depend on ginger production as the main source of income, as shown in Table 4.10. However, 54% of the respondents have other source of income. The result contradicts the general notion that ginger is the major source of income in the area (Kaduna, 2009).This implies that the respondents have something to fall back to in the event of crop failures and falling prices.

Table 4.10: Distribution of farmers based on farm and non-farm income

Variable	Frequency	Percentage
Sources of income		
No other source of income	71	45.8
Business/trading	37	23.9
Civil service	24	15.5
Remittance from relations	11	7.0
Pension	10	6.5
Craft work	2	1.3
Total	**155**	**100**

4.1.11 Amount of income from other sources

An average of ₦24,688.00k was sourced from other sources of income aside ginger production as shown in Table 4.11. This implies that majority of the respondents could not meet their basic financial needs for maximum production of ginger.

Table 4.11: Distribution of farmers based on amount received from other sources

Variable	Frequency	Percentage
Amount received from other source of income (₦)		
No other source of income	71	45.8
1000-20000	16	10.3
20001-40000	31	20.0
40001-60000	24	15.5
Greater than 60000	13	8.4
Total	**155**	**100**
Average (₦)	**24,688.312**	

4.2 Farmers' response to agricultural extension service delivery

Response to Trainings

Result in Table 4.12, show that the response to training on spacing, fertilizer application, mulching, weed control and harvesting. The result showed an average score of 4.07* for response to training on spacing, 4.05* for response to fertilizer application, 3.34 for response to mulching, 3.14* for response to weed control and 2.73 for response to training on harvesting respectively. This implies that responses to trainings on spacing, fertilizer application, mulching, and weed control were satisfactory to the respondents, but trainings on harvesting were not satisfactory. This could be due to the unavailability of the alternative harvesting services to improve or replace the existing methods by the KADP. This agrees with the findings by Shehu *et al.*, (2013) that farmers in the area use crude tools in production and harvesting.

Table 4.12: Distribution of farmers based on farmers' response to trainings

Extension services	**Weighted Frequency**						
	Strongly satisfied	**Satisfied**	**Indifferent**	**Not satisfied**	**Strongly not satisfied**	**Raw score**	***Average score**
Training on:							
Spacing	53	75	13	13	1	631	4.07*
Fertilizer application	17	131	5	2	0	628	4.05*
Mulching	18	42	73	18	4	517	3.34*
Weed control	13	68	15	46	13	487	3.14*
Harvesting	11	45	28	33	38	423	2.73

* Average score greater than 3.00 = Satisfied; Average score less than 3.00 = Not satisfied

4.2.1 Linkage with credit institution

The results from the study showed that the respondents were satisfied (3.4*) with the linkage to Agricultural financial institutions as shown in Table 4.13. This indicates that respondents could access funds from the institutions in order to acquire equipments and

expand their production from the related institution. However, linkage with other financial institution was not satisfactory with mean scores less than 3.0.

Table 4.13: Distribution of farmers based on linkage with credit institutions

Extension services	Weighted Frequency						
	Strongly satisfied	Satisfied	Indifferent	Not satisfied	Strongly not satisfied	Raw score	*Average score
Linkage with credit institutions							
Bank of agriculture	48	31	30	27	19	527	3.4*
Commercial bank	2	60	37	36	20	453	2.9
Micro finance bank	9	35	64	28	19	452	2.8
Others(Cooperative society)	15	25	87	11	17	475	1.4

* Average score greater than 3.00 = Satisfied; Average score less than 3.00 = Not satisfied

4.2.2 Distribution of inputs

The distribution of inputs such as planting materials (3.23*) and fertilizers (3.9*) were satisfactorily delivered to the respondents. However, the distribution of agro chemicals (2.73) and implements /machinery (1.97) were not satisfactory as shown in Table 4.14. This implies that the respondents were satisfied with the distribution of other inputs except agro chemicals and Farm machinery.

Table 4.14: Distribution of farmers based on distribution of inputs

Extension services	Weighted Frequency						
	Strongly satisfied	Satisfied	Indifferent	Not satisfied	Strongly not satisfied	Raw score	*Average score
Timely distribution of inputs							
Planting material	49	17	22	55	12	501	3.238*
Fertilizer	14	124	4	13	0	604	3.90*
Chemicals	6	27	60	43	19	423	2.73
Implements	3	11	12	81	48	305	1.97

* Average score greater than 3.00 = Satisfied Average score less than 3.00 = Not satisfied

4.2.3 Access to extension information

Information was delivered to the respondents through the extension agents' visits where information are passed to them. The results in Table 4.15 showed that all the media that were used to deliver information were satisfactory to the respondents, because they were all scored above 3.00. This implies that the farmers have better information they required for their production.

Table 4.15: Distribution of farmers based on access to extension information

Extension services	Weighted Frequency						
	Strongly satisfied	Satisfied	Indifferent	Not satisfied	Strongly not satisfied	Raw score	*Average score
Information services							
Print medium	48	43	21	30	13	548	3.53*
ICT	4	125	3	15	8	567	3.66*
Extension agent (verbal)	19	54	64	14	4	535	3.45*
Fellow farmers (verbal)	40	85	6	14	10	596	3.85*

* Average score greater than 3.00 = Satisfied; Average score less than 3.00 = Not satisfied

4.3 Factors Affecting Ginger Farmers' Response to Extension Service Delivery

The results in Table 4.16 show the socio-economic factors that determine the response of the respondents to agricultural extension service delivery.

The result of the regression analysis showed that the coefficient of age (-0.182) was negative and significant at 5% level of probability, this implies that as age increases, the response to extension services decreases. It suggests that respondents with lower ages respond to extension services more than those with higher ages. Respondents that are older are likely to be reluctant to adopt new technologies because of the risky nature of farming.

The coefficient estimated for gender (4.231) was positive and significant at 1% level of probability, this implies that the response of the respondents to extension service delivery is dependent on gender, this could be attributed to the gender role of males in decision making in the family. The coefficient of marital status (0.091) is positive and not significant at any level of probability; it implies that married people are not likely to respond to extension services than the singles.

The parameter estimated for extension contacts (1.213) was positive and significant at 10% level of probability, implies that the degree of response to extension services increases as the number of extension contact increases. This suggests that as the extension contact increases, there will be increase in access to information on improved technologies which also increases the adoption rates of technologies.

The adjusted R^2 value of 0.47 implies that the socio-economic variable specified in the model collectively contributed 47% to the variability in farmers' response to agricultural extension service delivery among the respondents. Hence, the null hypothesis: "There is no significant effect of socio-economic characteristics of ginger farmers on their response to extension service delivery" was rejected. This implies that the identified variables can be used to strengthen the delivery of extension services thereby increasing the level of output, level of living and level of income of ginger farmers.

Table 4.16: Socio-economic characteristics affecting ginger farmers' response to extension services

Variable	**Coefficient**	**Std. Error**	**t-value**
Constant	52.704	3.128	16.59***
Gender	4.231	1.362	3.11***
Marital status	0.091	1.282	0.94
Age	-0.182	0.077	-2.35**
Education	0.070	0.151	0.46
Membership of cooperative	0.367	0.137	2.68*
Household size	0.046	0.094	0.49
Experience in ginger production	0.132	0.070	1.88*
Number of extension visit	1.213	0.669	1.81*
Amount of support received	0.0013	0.0017	0.80

R-square=0.52 R-square adjusted=0.47 F-value=2.28**

*** = p<0.0 1%, ** = p<0.0 5%, *= p<0.10%

4.4 Effect of Farmers' Response to Agricultural Extension Service Delivery on Output

4.4.1 Respondents based on output derived

The result in Table 4.17 revealed that less than one third (28%) of the respondents have an output of 41 – 60 bags of dry ginger, in general, they had an average of 54 bags. This implies that Production level of ginger is high. That the services delivered by KADP to the farmers in the area were timely, relevant and clear to them (Farmers).

Table 4.17: Distribution of ginger farmers based on output derived

Output of dry ginger (bags)	Frequency	Percentage
1-20	37	23.9
21-40	32	20.6
41-60	44	28.4
61-80	13	8.4
81-100	16	10.3
Greater than 100	13	8.4
Average (bags)	53.87	

4.4.2Effect of extension services delivery on output of ginger farmers

The results in Table 4.18 showed that the coefficient of variation of farmers with extension visit is lower (65%) than the output of farmers without extension visit (90%). This implies that extension service delivery had significant effect on the outputs of the respondents. Hence, the hypothesis that extension service delivery has no significant effect on output is hereby rejected. This implies that the increase in production is positively related to the extension services delivered by the KADP.

Table 4.18: Effect of extension services on farmers' output

Output (kg)	Farmers without extension contact	Farmers with extension contact
Average	1113.68	2010.53
Minimum	280	280
Maximum	4000	8000
Std. Error	230.78	297.94
Std. Deviation	1005.96	1298.67
Coefficient of variation (%)	90.33	64.59

** p<0.0 5 percent level of probability t-value=2.79**

4.5 Constraints faced by ginger farmers on extension delivery

The results in Table 4.19 shows the distribution of respondents based on the constraints faced in extension service delivery. It shows that Price fluctuation (2.012*), ranked first. This implies that the farmers could be losing revenue to middlemen. Inadequate number of extension agents (1.981) ranked second this implies that the respondents were not satisfied with the number of extension agents in the area. The result agrees with Birnier, (2006) who discovered that "the capacity and number of extensionists are part of the reasons for effective extension service delivery". Poor transportation (1.830) ranked third, it implies that farmers could have post harvest loses as a result of delay in conveying the produce from the farms. Incompetency of extension agents (1.80) ranked fourth, it implies that the extension agents who may be poorly trained require relevant trainings to enable them inform the farmers appropriately. Late distribution of inputs (1.581) ranked fifth, it implies that the respondents were not comfortable with the time inputs were made available to them. The result agrees with the report by FAO (2010) "That government extension system has been criticized for not delivering the production inputs on time in right quantities". However, difficulty access to information (1.114) was considered statistically insignificant. This contradicts the findings by Shehu *et al*.,

(2013) that inadequate credit/capital is one of the major problems faced by ginger farmers.

Table 4.19: Distribution of the ginger farmers based on constraints faced on extension services

Constraints	***Mean Score**	**Rank**
Price fluctuation	2.012*	1st
Inadequate Number of extension agents	1.985	2nd
Poor transportation	1.830	3rd
Incompetency of extension agents	1.80	4th
Late distribution of inputs	1.581	5th
Difficulty of access to information	1.114	6th

* Mean score greater than 2.00 = serious, Mean score less than 2.00 = not serious

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The main objective of the study was to assess the farmers' response to agricultural extension service delivery on Ginger production in Kaduna state. The specific objectives were to; describe the socio-economic characteristics of the respondents, assess their response to agricultural extension service delivery, examine the socio-economic characteristics affecting the respondents' response to agricultural extension service delivery, determine the effects of extension service delivery on the output of the respondents and determine the constraints faced by the respondents in extension services that are delivered by KADP for ginger production in Kaduna State for the year 2014.

The study used multistage sampling technique to collect primary data through structured questionnaire; the two local governments (Kachia and Jaba) were purposely selected for the study, 10% of the respondents were randomly selected from each village that made up a total of 155 farmers. Descriptive statistics were used to achieve objective (i), (ii) and (v). Objective (iii) and (iv) were achieved using t-test and multiple regression analysis respectively. The average age of the respondents was 51 years. Less than half (34%) of the respondents were old people. The respondents were educated (97%).

The extension services delivered to the respondents include; trainings on ginger production, linkage with financial institution, distribution of inputs to farmers and access to extension information.

It was discovered that the socio-economic characteristics of the respondents have positive effects on their response to extension service delivery with the exception of age. The variables collectively accounted for 47% variability in the degree of response to extension service delivery. It was also discovered that there was significant effect of extension service delivery on the output of the respondents; hence the null hypothesis was rejected. The major constraints faced by the respondents are; price fluctuation, inadequate extension agents, poor transportation, incompetency of extension agents, late distribution of inputs and difficulty access to information.

5.2 Conclusion

Based on the findings, the study revealed that respondents were influenced by their socio-economic characteristics such as gender, education level, household size and extension visits. However, age influenced the response negatively. The Farmers' responses were satisfactory on trainings on spacing, fertilizer application, weed control and mulching. However, training on harvesting was not satisfactory. Linkage with financial institution was satisfactory. Likewise, access to extension information was satisfactory.

The agricultural extension service delivery had significant effect on the output of the respondents. Price fluctuation, inadequate number of extension agents, poor transportation, incompetency of extension agents, late distribution of inputs, and difficulty access to information were the constraints faced by the respondents in the study area.

5.3 Recommendation

i. The ginger value chain should be improved to leverage and better the farmers' income, thereby stabilise ginger price.

ii. Extension agents should be recruited by government and non-governmental organization to increase the number of extension visit as well as reduce the extension to farmers' ratio.

iii. Rural roads should be maintained by the farmers through community efforts and they should seek assistance from government and non-governmental organization to rehabilitate or construct better roads.

5.4 Contribution to Knowledge

The study has contributed to knowledge in the following areas;

i. The study revealed that extension service delivery had a significant and positive effect on ginger farmers' output by 64.4%.

ii. Farmers' response to agricultural extension service delivery on ginger production was constrained by price fluctuation (40.24%).

iii. The farmers' age was inversely related to their response to agricultural extension services, with a coefficient of (-0.182) at 5% level of probability.

iv. Agricultural extension service delivery had a positive effect on farmers' access to information (100%) and trainings (80%)

v. The farmers' response to extension service delivery increased with increase of extension contacts (1.213) at 10% level of probability.

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DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY,FACULTY OF AGRICULTURE AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA

FARMERS' QUESTIONNAIRE ON:

"**Socio-economic Assessment of Farmers; Response to Agricultural Extension Service Delivery on ginger Production in Kaduna State".**

Instruction: Please fill or Tick (√) where appropriate

BACKGROUND INFORMATION OF THE FARMER

L.G.A:……..

A. **SOCIO-ECONOMIC CHARACTERISTICS OF THE FARMER**

1. Village:……
2. Name of respondent (optional)……
3. Sex (i) male [ ] (ii) Female [ ]
4. Age in years……..
5. Marital status: (i) Married [ ] (ii) Single [ ]
6. What is your educational level?
   (a) Adult Education [ ]
   (b) Primary School [ ]
   (c) Secondary School [ ]
   (d) Polytechnic/NCE [ ]
   (e) University [ ]
   (f) Others (specify)……...……
   .

7. Are you a member of any cooperative/ginger producers' association?
   Yes [ ] No [ ]……..years

8. What is the size of your household?
   (a) Male……..……
   (b) Female……..……
9. How long have you been in ginger production?..... years

11 Have you ever been visited by an extension agent?
   Yes [ ] No [ ]

12 If yes can you tell the number of times you were visited in the last production season? ……. Times

13 Do you have any other source(s) of income other than farming?
   Yes [ ] No [ ]

14 If yes in 13 above please state the source and amount
(a)…… …… (N)……..…
(b)…… …… (N)……..…
(c)…… …… (N)…….

15 Do you have any funding support?
Yes [ ] No [ ]

16 If Q15 is yes, state the source(s) and the amount gotten in the last production season

	Source	Amount (₦)
I		
Ii		
Iii		
Iv		

17 What is your output in (bags) a) fresh……b) dry……(x50kg)

B SATISFACTION TO AGRICULTURAL EXTENSION SERVICES

Production Services

	Services	**Responses: Satisfaction**				
	Training on;	5	4	3	2	1
I	Plant spacing					
Ii	Fertilizer application					
Iii	Mulching					
Iv	Weed control					
V	Harvesting					

Strongly satisfied = 5, Satisfied = 4, Indifferent = 3, Not satisfied = 2, strongly not satisfied = 1.

Production Services

	Production services	**Responses: Satisfaction**				
	Linkage with credit institutions	5	4	3	2	1
I	Bank of Agriculture					
Ii	Commercial Bank					
Iii	Micro Finance					
Iv	Others (specify)					

Strongly satisfied = 5, Satisfied = 4, Indifferent = 3, Not satisfied = 2, Strongly not satisfied = 1.

Production Services

	Ginger Production Services	Responses: Satisfaction				
	Timely Distribution of inputs;	5	4	3	2	1
I	Planting material (sett)					
Ii	Fertilizer					
Iii	Chemicals (herbicide and fungicide)					
Iv	Implements					

Strongly satisfied = 5, Satisfied = 4, Indifferent = 3, Not satisfied = 2, strongly not satisfied = 1.

Production Services

	Information Services;	Responses: Satisfaction				
	Medium of information delivery	5	4	3	2	1
I	Print medium					
Ii	ICT (Radio, Television, Internet, Telephone)					
Iii	Extension Agent(Verbal)					
Iv	Fellow farmers(Verbal)					
Iiv	Others(specify)					
Iiv						

Strongly satisfied = 5, Satisfied = 4, Indifferent = 3, Not satisfied = 2, strongly not satisfied = 1.

C. C**onstraints to extension services delivery by the KADP.**

S/No	Constraints	Very serious	Not serious	Mild
1	Inadequate No. Extension Agents			
2	Late distribution of inputs			
3	Difficulty of access to information			
4	Incompetency of Extension Agent			
5	Others (specify)			

18. What are your suggestions

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