INFLUENCE OF AGRICULTURAL EXTENSION PROGRAMME ON FARMERS' AGRICULTURAL PRODUCTION IN KANO STATE

BY

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THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS OF AGRICULTURAL EDUCATION.

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DECLARATION

I, Garba Idi hereby declare that this Thesis titled "Influence of Agricultural Extension Programme on Farmers' Agricultural Production in Kano State" has been written by me in the Department of Vocational and Technical Education under the supervision of Dr. D.O. Oni and Dr. B.I. Okeh. The information derived from the literature have been duly acknowledged in the text and a list of reference provided. There is no part of this Thesis that was previously presented for another degree.

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CERTIFICATION

This Thesis titled "Influence of Agricultural Extension Programme on Farmers' Agricultural Production in Kano State" by Garba Idi meets the regulations governing the award of the degree of Masters of Agricultural Education of Ahmadu Bello University, Zaria, Nigeria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This Thesis is dedicated to my father Malam Garba. May the Almighty Allah grant him all perfect peace and eternal rest, Amen. It is also dedicated to my mother Malama Amina.

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ABSTRACT

The study was carried out to investigate the Influence of Agricultural Extension Programme on Farmers' Agricultural Production in Kano State. Four specific objectives and four research questions were formulated. Four null hypotheses were also formulated based on the objectives. Twelve Local Government Areas (a village from each) were selected from the study area for the purpose of this study. 8,866 farmers (household heads) and 236 extension agents served as population for the study. 370 farmers and 152 extension agents were randomly selected from the population as samples. Survey research design was used for the study, where two sets of questionnaire were used as instrument for data collection, one for the farmers, and the other for extension agents. The data collected were analyzed using percentages and Spearman's Rho Correlation Procedure at 0.05 level of significance. The results of the study showed that 87.6% of the farmers were males, 62.2% acquired formal education at different levels, 54.6% belonged to farmers association. 87.6% used improved farm practices introduced to them frequently, 85% had increase in yield after the adoption of the improved practices. 59.4% indicated that cost and unavailability of fertilizers were the major problems that caused them not to adopt the improved farm practices. The results of the tested null hypothesis I indicated that the personal characteristics of the farmers were highly correlated with adoption of agricultural innovation, and that of null hypothesis II discovered that the types of teaching methods used by extension agents in disseminating the improved farm practices to farmers were significantly correlated with the rate of adoption by the farmers, also, the results of the null hypothesis III showed that the adoption of improved farm practices by the farmers was significantly correlated with change in agricultural production, and that of null hypothesis IV ascertained that the factors militating against the adoption of improved farm practices were significantly correlated with effectiveness of extension activities in the study area. Therefore the null hypothesis I, II, III and IV earlier stated were rejected. Conclusively, from the findings, Agricultural Extension Programmes were found effective in the study area, and led to increase in sorghum, millet and cowpea production. However, there were some factors such as high cost of agricultural production inputs and lack of technical knowledge on some improved farm practices that made some farmers not to adopt the improved farm practices introduced to them. Based on the findings of the study, some recommendations were given, that Kano State Government should encourage more adult literacy classes in rural areas, employ more trained male and female extension agents, and provide agricultural inputs to rural farmers on time and at subsidized prices for more effective agricultural extension programme in the state.

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OPERATIONAL DEFINITIONS

Adoption: Is a process composed of learning, deciding, and acting over a period of time. It is a decision to make full use of innovation (a new idea or method) as the best course of action available.

Farm inputs: The resources that are used in farm production, such as chemicals, equipment, feed, seed, and energy.

Land tenure: The rules and arrangements connected with the ownership of land, especially land that is used for farming.

Legume: Is a flowering plant that bears its seeds in a pod, such as the bean or pea.

Mono Cropping: Is a system of agriculture in which a single type of crop is grown in an area.

Thinning: Is the process of removing some of plants in a crop so that it is less crowded and those remaining have room to develop.

LIST OF ABBREVIATIONS

ADP: Agricultural Development Projects

APMEU: Agricultural Project Monitoring and Evaluation Unit.

ARMTI: Agricultural and Rural Management Training Institute.

FACU: Federal Agricultural Coordinating Unit

KNARDA: Kano State Agricultural and Rural Development Authority

NAERLS: National Agricultural Extension and Research Liaison Services.

NAFPP: National Accelerated Food Production Programme.

OFN: Operation Feed The Nation

PCU: Project Coordinating Unit

RBDA: River Basin Development Authority

T and V: Training and Visit

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The term extension education was derived from the practice of British Universities of having one educational programme within the premises of the University and another away from the University buildings. The programme conducted outside the University was described as "extension education". The expression connoted an extension of knowledge from the university to places and people far beyond. The term "extension education has since been popularized in the United States, where in the early part of the 20th century, the idea attained the status of a movement. Extension is concerned with two basic functions, namely:

i. The dissemination of useful and practical information relating to agriculture and home economics.

ii. The practical application of such knowledge to farm and home situations.

These where carried out in informal atmosphere with adults as the main clientele (Obibuaku, 1983). Extension education is an applied behavioural science, the knowledge of which is applied to bring about desirable changes in the behavioural complex of human beings usually through various strategies and programmes of change and by applying the latest scientific and technological innovations (Sharma, 2005). Extension education has now been developed as a full- fledged discipline, having its own philosophy, objectives, principles, methods and techniques which must be understood by every extension worker and others connected with the rural development (Sharma, 2005).

Prior to the World Bank's intervention in agricultural extension in Nigeria, Eremie, (2003) indicated that the Government had tried various forms of the bureaucratic approach for the management of extension services. In addition to this educational responsibility, the extension agent was the representative of the government in his area, distributing inputs and performing regulatory functions. The focus of the bureaucratic system was the achievement of some national or political objectives, as was the case in the decades of commodity development for cocoa, groundnuts, palm produce and robber. Similarly, the farm settlement schemes of the 1960s, the National Accelerated Food Production Programme, the River Basin Development Authorities, the Operation Feed the Nation and the Green Revolution Programmes, all initiated in the 1970s, and the Directorate of Food, Roads and Rural Infrastructure (DFRRI) programme of 1986, relied on a bureaucratic extension system.

World Bank support to the Government of Nigeria for agricultural extension dated back to the mid-1970s with the establishment of the nine enclave Agricultural Development Projects (ADPs) in Funtua, Gusau, Gombe, Lafia, Ayangba, Bida, Ilorin, Oyo North and Ekiti-Akoko between 1975 and 1980. By the mid 1970s. there was increasing concern in Nigeria over the apparent stagnation of agricultural production. The ADPs were designed to tackle three major constraints: generation and dissemination of improved technologies, supply of productive inputs and feeder roads to link the farms with markets. The enclave projects were followed by the generation of statewide ADPs (Bauchi, Kano, Sokoto and Kaduna) between 1981 and 1983, the multi-state ADPs (MSADP I, II and III) approved in 1986, 1988 and 1989 respectively, and the National

Agricultural Technology Support Project (NATSP) approved in 1992, and which closed in 1999.

1.2 Statement of the problem

Successive governments in Nigeria seemed to have recognized the importance of agricultural extension for the survival of the small scale farmers. This could be seen in the involvement of both Federal and State governments in the formulation and implementation of agricultural development policies and programmes with extension components. This was to increase the productivity and level of income of the farmers, but not many farmers benefited from these programmes as the programmes were not properly planned and executed (Ali, 1989). In most cases, farmers who constituted extension clients were not involved in planning the extension programmes (Benor and Bartex, 1984). Ineffective agricultural extension services are a major constrain to the performance of the agricultural sector (Forth National Development Plan, (1985); Ega, (1988); in Ali, (1989)). One of the serious problems in Nigeria was the rate at which available research results were transferred to farmers (Ogonfawara, (1981), in Novokhi, (2003)).

Agriculture is the mainstay of the people of the study area, as the researcher is familiar to the area. Despite all the efforts made by governments to increase agricultural production by creating awareness of improved farm technologies among peasant farmers through agricultural extension services, the researcher observed that many farmers in the study area are still farming in the same old way as their ancestors. That is, planting the same local seeds, using the same traditional storage methods, keeping the same local

breed of animals. In addition they depend largely on family labour due to unavailability and high cost of tractor hiring services. It is based on these problems that the researcher carried out a research to evaluate the influence of agricultural extension programme on farmers' agricultural production in Kano state.

1.3 Objectives of the study

The general objective of this study is to evaluate the influence of agricultural extension programme on farmers' agricultural production in Kano state.

The specific objectives are to;

i. examine the farmers' personal characteristics and their effect on the level of adoption of agricultural innovation in the study area.
ii. identify the extension teaching methods used by extension agents in the area in disseminating the improved practices to farmers, and their effectiveness.
iii. determine the extent of adoption of the recommended practices by the farmers in relation to change in their agricultural production.
iv. ascertain the factors militating against the adoption of extension recommendations in the area.

1.4 Research questions

The study provided answers to the following research questions:

i. What are the personal characteristics of farmers that are affecting the level of adoption of agricultural innovation?

ii. What are the extension teaching methods used by extension agents in disseminating the improved practices to farmers and their effectiveness?

iii. To what extent have farmers adopted the recommended practices in relation to change in their agricultural production?

iv. What are the factors militating against the adoption of extension recommendations in the area?

1.5 Research hypotheses

The researcher tested the following null hypotheses:

i. There is no significant relationship between the farmers' personal characteristics, and their level of adoption of agricultural innovation.

ii. There is no significant relationship between the extension teaching methods used by extension agents in disseminating the improved practices, and the rate of adoption by the farmers.

iii. There is no significant relationship between the rate of adoption of the recommended practices by the farmers, and the change in their agricultural production.

iv. There is no significant relationship between factors militating against the adoption of extension recommendations in the study area, and the effectiveness of the programme being carried out in the area.

1.6 Significance of the study

i. The study will be of importance to the agricultural extension decision makers by identifying the problems confronting extension activities for consideration in future development planning.

ii. The study will be of importance to the extension agents by providing them with information relevant to their extension activities.

iii. The study will provide useful information that will increase the standard of living of the farmers.

iv. The study will be significant to the researchers as it will serve as literature for future references.

1.7 Basic Assumptions of the Study

The study was carried out with the following assumptions, that:

i. the farmers' personal characteristics influence the adoption of agricultural innovation in the study area.

ii. the methods used by extension agents in the area in disseminating the improved practices to farmers are not encouraging.

iii. adoption of the recommended practices by the farmers increases their agricultural production.

iv. there are some factors militating against the adoption of extension recommendations in the study area that hinder the effectiveness of the programme.

1.8 Delimitation of the study

The state is divided into three (3) agricultural zones-zones I, zone II and zone III, according to Kano State Agricultural and Rural Development Authority (KNARDA) agricultural zoning. Four (4) Local Government Areas were selected from each zone for the purpose of this study.

The study therefore was delimited to twelve Local Government areas, namely; Kibiya, Kura, Madobi, Rogo, Danbatta, Bichi, Tofa, Gabasawa, Gaya, Warawa, Wudil and Garko. Twelve (12) villages were involved in the study, one village from each Local Government Area. The study was also delimited to the study of sorghum, millet and cowpea producing farmers, these are major crops grown in the study area. The extension agents in the Local Government Areas, were involved in the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature is presented under the following sub-headings:

2.1 Theoretical Framework

2.2 Historical background of extension strategies in Nigeria.

2.3 Objectives of agricultural extension and qualities of extension workers.

2.4 Characteristics of adult learners (farmers)

2.5 Five simple questions in evaluation

2.6 principles of extension education and the difference between extension education and formal education.

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2.1 Theoretical Framework

The theoretical background of this study is based on the theories of social change, and the concept of "process of change". Rogers (1995) in Ikani, (2004), defined social change as the process through which alteration occurs in the structure and function of a social system. Similarly, Horton and Hunt (1980), in Ikani, (2004), gave the definition of social change as the transformation of social structures and social relationship in society.

Murdock (1961), indicated that any event which produces change is historical. It occurs at a certain time and place, and the consequent changes will depend on the context. However, it is possible that similar events could have similar effects on other cultures.

Murdock outlines a general process of cultural change. First, there may be an innovation, which is "the formation of a new habit by a single individual which is subsequently accepted or learned by other members of the society". Innovations may be variations, that is slight changes of already existing habits. Variations may be small at any given time, but the accumulation over time may be very large. Innovations may also be inventions, which is transferring behaviors from one context to another, or is combining old behaviors in new ways. Murdock indicates that most of the technological innovations have been inventions. In addition, inventions can occur simultaneously within the same or similar cultures. A third type of innovation happens when, basically, entirely new habits are developed. These happen through trial and error, and may occur because old habits prove ineffective and people in the situations are strongly motivated to find new solutions. The final type of innovation is cultural borrowing, or diffusion. This type is the most common and important. Most often, societies borrow mostly from immediate neighbors, and trade, political conquest and inter-marriage are the usual means of enabling borrowing. Borrowing only occurs when there is need, when a society does not already have a trait or habit that fills its need. Borrowing is not necessarily exact, but commonly includes modification, for example, to fit the current cultural situation and needs.

The second process in change is social acceptance. That is, in order for an innovation to become part of the culture, it has to be accepted by more than the innovator. Thus, the innovation has to be socially shared. Whether the innovation is adopted by others largely depends on the prestige of the innovator and of the initial adopting group.

The third process is selective elimination. Those innovations which are more rewarding than their alternatives are more likely to be picked up, while, consequently, those which are less adaptive are likely to be dropped, and disappear. Murdock mentions through that many innovations, even when they become less effective or adaptive, are retained, but with a change in function. For example candles were replaced by electric lights, but were retained for ceremonial or other purposes.

The final process of change is integration. The shared habits that are accepted become adapted with other shared habits, such that they all form, more or less, an integrated whole. The adopted habit both is modified as it is adapted, and modifies the social situation, or culture, to which it is adapting.

Murdock concluded "The net effect of the various processes of cultural change is to adapt the collective habits of human societies progressively over time to the changing conditions of existence".

2.2 Historical Background of Extension Strategies in Nigeria

The early history of agricultural extension in Nigeria can only be discussed in the context of agricultural development (Akpoko, 1996). Attempt at the application of science and technology to the problems of agricultural production started with the establishment of the Department of Botanical Research in 1893 at Olokemeji, near Lagos,

and the establishment of another Department in 1905 in Moor Plantation, Ibadan. However, the beginning of organized Agricultural Extension along modern lines in Nigeria can be traced to the establishment of Agricultural Departments for Southern and Northern Nigeria in 1910 and 1912 respectively, and a unified Agricultural Department for the whole country in 1921 at Moor plantation, Ibadan, following the amalgamation of South and North in 1914 into a single political unit (Akpoko, 1996).

Its major focus was to encourage increased peasant production and marketing of export crops to support colonial industries. In addition, it was actively engaged in promoting conservation of soil fertility and enforcing colonial governments rules and regulations on the peasantry. A better organized extension services started in 1952 when the Central Department of Agriculture was split into three separate Ministries of Agriculture; one each for the Northern, Western and Eastern regions. The creation of Regional Agricultural Ministries brought about greater specialization of functions and the Agricultural Extension Service division of the ministries became increasingly more involved in supply and education functions to build up foreign exchange earnings (Akpoko, 1996). This recorded remarkable success in raising the production and productivity of export crops and the country income. However, this was done at the expense of food crops production as the production of food crops were neglected by extension, the result of which was manifested in the food shortages of the 1970s (Akpoko, 1996).

The Commodity Specific Extension System was established in the 1950s to boost the production of major crops such as cocoa, rubber, groundnut, cotton and oil palm. Here, the Extension Agents performed advisory, input supply supervision and credit

recovery functions. During this period, the development of agricultural extension function was greatly influenced by the British and Western European agriculture extension concept of helping farmers increase production for export. As a result of limited experience and the implementation of an extractive agricultural policy, the system was less effective resulting in its abandonment. The provision of free agricultural extension services by the colonial administration culminated into establishment of extension stations across the country, under a ten year development plan that was launched in 1946 (Apantaku et al 2005).

Dissemination of agricultural information and innovation witnessed a new approach between 1952 and 1968 with the emergence of the first National Development Plan. This plan transferred extension responsibilities to regional governments via the regional extension services. However, the regional extension service was faulted because it concentrated on specific projects such as farm settlement scheme and the community based extension services which ended in failure (Okigbo, (1986) and Akinbode (1989) in Apantaku et al (2005)). The Federal Ministry of Agriculture, with responsibility for coordinating agricultural programmes throughout the country was established in 1968 almost a decade after the country's independence. Responsibility for agricultural extension during this period was with the Federal Department of Agriculture and the Federal Department of Rural Development in which both Departments discharged these responsibilities through units and parastatals under them (Akpoko, 1996).

With time, the organization of extension services improved as more Ministries of Agriculture came into being with further creation of regions and later states. Up till around 1962, the extension system of the Ministries of Agriculture apparently performed

below expectations. Apart from creating awareness of improved farm technologies among peasant farmers, to some extent, technological change in agricultural practices resulting from agricultural extension was slow and unimpressive (Atala and Abdullahi, (1988) in Akpoko, (1996)). The National Accelerated Food Production Programme (NAFPP) was a Federal Government Intervention Programme initiated in 1974 to significantly increase the production of six basic food crops namely, cassava, maize, millet, rice, sorghum and wheat. Operationally, the programme had an extension component which has closely linked with and supported by research and agro-service components (Akpoko, 1996).

The research component was aimed at developing technologies relevant to the needs of farmers using mini-kit trials. State Ministries of Agriculture Extension Personnel administered the mini-kit trials. The extension component of NAFPP was to take research information to small scale farmers, farmers problems to research scientists and educate the farmers through mini-kit, production kit and mass adoption. Mini-kit were tried on small areas on a farmer's fields, the production kit was a package containing the best performing crop variety from the mini-kit, and the agro-service component was designed to provide a dependable input delivery system through a network of agro-service centres (Akpoko, 1996).

The NAFPP used the farmer contact strategy, selecting progressive farmers in communities for the mini-kit and production kit. Being a well conceived and guided change programme, the scheme had a favorable impact on food production before 1976, when suddenly it was replaced by the Operation Feed the Nation (OFN) programme. The OFN programme was introduced in 1976 to identify constraints to agricultural

development and harness the potentials of the country towards substantially increasing food production through the supply of inputs. However, there was little attention in the programme to an articulated extension system, and it ended up with much propaganda and too little impact on the rural areas. Apart from raising the level of both rural and urban consciousness to the problem of food production, there was no substantial increase in production (Akpoko, 1996).

The Green Revolution was launched in 1979 to replace the OFN programme. It set a target of five years for attainment of self – sufficiency in food. The Green Revolution like its predecessor programmes placed emphasis on the supply of inputs, improvement of rural infrastructure, and the provision of price incentives and assumed that the existed extension arrangement would sustain the programme. Although the programme succeeded in raising the level of rural and urban consciousness to the problem of food shortages, it lasted for only a short period, during the Shagari's Regime. Running concurrently with the foregoing programmes was the River Basin Development Projects (RBDAs) introduced in 1976 to develop water resources of identified river basins for modern irrigation purposes (Akpoko, 1996).

The River Basin Development Authorities operated an extension system of various shades to meet the need of the farmers in their areas of jurisdiction. Later on however, the activities of the RBDAs were redefined to restrict the Basin Authorities to water resource development, and leave agricultural extension to the Agricultural Development Projects (ADPs). The ADPs system which began as an integrated Agricultural Development Projects in enclave areas of a state in the mid – 1970s have come to be associated with the implementation of reorganized and revitalized agricultural

extension system. The ADP was established in every state of the Federation, and that each state ADP has its own management structure and technical support system.

Right from inception the ADPs were supposed to follow the Training and Visit (T and V) system of extension. The T and V extension system was developed in Mid – 1970s by Benor and Harrison after an extensive field work in Asia. The main features of the T and V system of agricultural extension can be articulated as professionalism, single line of command, concentration of efforts, time bound work, field orientation and regular and continuous training. A lot of modifications were introduced into the T and V system by the pioneering staff because of inadequate knowledge of the system. Some of these features were missing and as such the system could not operate efficiently (Akpoko, 1996).

With the re-organization and strengthening of the extension services of the ADPs in the country along proper T and V lines in 1987 a number of activities were started to ensure the main implementation of the features which were:

i. The Monthly Technology Review Meeting (MTRMs).
ii. Fortnightly Training (FNTs)
iii. Fixed fortnightly visits schedule for Village Extension Agents (VEAs) and their Block Supervisors (BESs).
iv. Joint On-farm Adaptive Research (OFAR).
v. Conducting Small Plot Adoption Techniques (SPATs) on farmers' fields
vi. The use of contact farmers and continuous in-service trainings.

Prior to 1991, the Federal and the State Ministries of Agriculture had Extension Divisions which operated on sub-sectoral basis. There were for example, separate extension organizations for livestock, fisheries, agro-forestry and crops. Food crops were promoted by the ADPs and by 1991, the concept of unified extension system had seen adopted. The concept of unification of extension implies that parallel extension services as carried out by the ADPs and the various agricultural subsectors ceased to exist. The parallel system was replaced by the provision of extension services through a single line of command that is the ADPs have full administrative control over the entire extension system covering crops, livestock, fisheries, agro-forestry and Women in Agriculture (Akpoko, 1996).

The Federal Government supported extension services in Nigeria through four institutions, namely, Federal Agricultural Co-ordinating Unit (FACU) now known as Project Co-ordinating Unit (PCU) that coordinates and supervises the implementation of the extension system, Agricultural Projects Monitoring and Evaluation Unit (APMEU), designs and administers monitoring and evaluation formats to the projects to assess the impact of the extension system. There is also the National Agricultural Extension, Research and Liaison Services (NAERLS) with the function of supporting the extension system through the development and production of multimedia materials on innovations, and by undertaking adoption and extension – related on studies. Finally the Agricultural and Rural Management Training Institute (ARMTI) provided Management Training for Agricultural Personnel (Naswem et al., 2008).

2.3 Objectives of Agricultural Extension and Qualities of Extension Workers

The objectives and activities of agricultural extension in all parts of the country have basically been similar (Wudil, 1980), and aimed at raising the standard of living of the farmers and improving quality of life of the rural populace in general through the following:

i. The teaching of improved practices to farmers both in cultivation, storage and processing of crops.
ii. The teaching of improved methods of livestock husbandry
iii. The multiplication and distribution of improved planting materials and improved breeds of livestock.
iv. The planning organization and follow-up of Farm Institute leavers
v. The operation of demonstration farms/plots and conduct of extension experiments in collaboration with Research Organizations.
vi. The teaching and advising of rural families on child-care, hygiene, and hand-crafts.
vii. The organization of Young Farmers Clubs as a means of generating interest of youths in agriculture.
viii. The offering of advice to farmers on all aspects of plants and animals in agriculture.

The qualities of extension workers in their daily routine with contact farmers determined the quality products to be produced by farmers (Yakubu, 2007). The following qualities were expected from extension workers:

i. The extension workers must have a thorough knowledge of the subject with which they are concerned and or must know where to find answers to questions raised by farmers.

ii. They should be humble, polite, and friendly to the rural farmers.

iii. They should be well acquainted with ways and means of extension teaching and the use of audio-visual aids.

iv. They should be up to date in new ideas and techniques by reading journals, magazines, dailies, and keeping in touch with subject matter specialist, researchers and policy makers.

2.4 Characteristics of Adult Learners (Farmers)

Adult farmers constituted the majority of the clientele of the extension workers, (Omotayo, 1996). The education or training of this category requires that the educator or trainer understands their unique characteristics. Since the task of extension workers is to work with farmers, the characteristics discussed here, are mainly as they should help to plan and select the content and method of instruction for more effective learning.

i. Adult learners desire to learn by doing. They like to practice the skills or knowledge that the extension workers or trainers teach them.

ii. They want to develop new skills and abilities that will be usable in their farming.

iii. They desire functional information and training.

iv. They object to authoritarian methods of training.

v. They may be reluctant to recognize their own lack of knowledge or skill.

vi. They have usually had little or no formal training in agriculture. This is particularly true of the majority of farmers in Nigeria. This should be given prime consideration in planning and selecting content and method of instruction.

vii. They usually belong to one or more organizations. You can identify these groups or organization to which your adult learners or your farmer clients belong, and reach them as a group. The teaching/learning process can be effected through such groups.

viii. Adult learners have considerable community influence and several community responsibilities. An understanding of this characteristic should help you determine the timing of your trainings and in selecting useful adult leaders and volunteers.

ix. They are more independent and more individualistic than secondary school boys. Much as adults may like to work in groups, or cooperate and share knowledge and experiences, some situations do arise when the adult learner may like to be independent and display some individualistic tendencies.

x. Adult learners are often highly motivated by economic conditions. If farmers or adult learners consider a learning experience profitable, they eagerly embrace it.

xi. Adult learners often have family responsibilities which influence their outlook on many problems. The passing a knowledge or skill to the farmer, it may be useful to allow his young educated child to make some inputs where practicable.

2.5 Five Simple Questions in Evaluation

It has been found that by asking ourselves five simple questions, one can get off to a fast start on a problem requiring evaluation. Slight modifications will make them fit most situations (Bryn, 1965).

i. What information do you want to get?

The first thing you need to do is decide exactly what you want to find out. What are the questions you want answered by your evaluation? Work out these questions as carefully as you can because they determine and guide the conduct of the evaluation, and because the answers will help you in your work. The questions will guide you in stating the specific questions for the questionnaire or other devices used. Analysis can be made of the replies received to these questions. The report of your evaluation can be organized around these questions. In fact the report will be the answers to these questions. By carefully determining what you want to know, an initial, vague, general feeling of concern can be broken down into questions you can tackle.

ii. Where and how will you get the information?

This step has two parts: Where to get the information, and how to get it: Where means from whom or from what other source. Will it be from adults, from men, from all farmers, from cereal and or legumes farmers or from dairy farmers? Will it be from all persons in any one of the groups or from a sample of persons in one of the groups? Other sources of information are records and reports such as annual reports, the census, written programmes, minutes of meetings, and so on. How you will get the information refers to mail questionnaires, observations, interviews, tests, check lists, score cards, case studies, and so on. Forms are prepared on which the information can be recorded. They are used to facilitate handling the data and so you do not have to depend upon memory.

When you have thought through, and know the information you want and also where and how you will get it, you are well on your way in planning an evaluation.

iii. Who will collect the information?

The next step is to decide whether you or a group of other persons will collect the information. What training will be necessary if you have others collect the information?

iv. How will the information be analyzed?

Now is the time to go back again to the first step – the information you wanted. The replies on the record forms are organized and summarized to answer the questions formulated in step one.

v. What does it mean?

What are implications of the results to extension work? In what way can they be used to make our work better? After knowing these results, what changes should one make in his way of doing extension work?

2.6 Principles of Extension Education and Difference Between Extension Education and Formal Education

The extension work is based upon some working principles and the knowledge of these principles is necessary for an extension worker. Some of these principles as related to agricultural extension were stated by Sharma, (2005) which were:

i. **Principle of interest and need:** Extension work must be based on the needs and interests of the people. These needs and interests differ from individual to individual, from village to village, and from state to state, and therefore, there cannot be one programme for all people.

ii. **Principle of cultural difference:** Extension work is based on the cultural background of the people with whom the work is done. Improvement can only

begin from the level of the people where they are. This means that the extension worker has to know the level of the knowledge and the skills of the people, traditions, beliefs, values etc before starting the extension programme.

iii. **Principle of participation:** Extension helps people to help themselves. Good extension work is directly towards assisting rural families to work out their own problems rather than giving them ready-made solutions. Actual participation and experience of people in these programmes creates self-confidence in them, and also they learn more by doing.

iv. **Principle of adaptability:** People differ from each other, one group differs from another group and conditions also differ from place to place. An extension programme should be flexible, so that necessary changes can be made whenever needed, to meet the varying conditions.

v. **The grassroots principle of organization:** A group of rural people in local community should sponsor extension work. The programme should fit with the local conditions. The aim of organizing the local group is to demonstrate the value of the new practices or programmes so that more and more people would participate.

vi. **The leadership principle:** Extension work is based on the full utilization of local leadership. The selection and training of local leaders to enable them to help to carry out extension work is essential to the success of the programme. People have more faith in local leaders, and they should be used to put across a new idea so that it is accepted with the least resistance.

vii. **The whole family principle:** Extension work will have a better chance of success if the extension workers have a whole-family approach instead of piecemeal approach or separate and unintegrated approach. Extension work is therefore, for the whole family, i.e. for male, female and youth.

viii. **Principle of cooperation:** Extension is a cooperative venture. It is a joint democratic enterprise in which rural people cooperate with their village, local government and state officials to pursue a common cause.

ix. **Principle of satisfaction:** The end product of the effort of extension teaching is the satisfaction that comes to the farmer, his wife or youngsters as the result of solving a problem, meeting a need, acquiring a new skill or some other changes in behaviour. Satisfaction is the key to success in extension work. "A satisfied customer is the best advertisement."

x. **The evaluation principle:** Extension is based upon the methods of science, and it needs constant evaluation. The effectiveness of the work is measured in terms of the changes brought about in the knowledge, skill, attitude and adoption behavuiour of the people but not merely in terms of achievement of physical targets.

When extension education is put into action for educating the rural people, it does not remain formal education (Sharma, 2005). In that sense, there are several differences between the two. Some of these differences are shown in Table 2.1.

Table 2.1: Differences between formal education and extension education.

	FORMAL EDUCATION		EXTENSION EDUCATION
i.	The teacher starts with theory and works up to practicals	i.	The teacher (extension worker) starts with practicals and may take up theory later on.
ii.	Students must adapt themselves to the fixed curriculum offered.	ii.	It has no fixed curriculum or course of study, and the farmers to formulate the curriculum.
iii.	Authority rests with the teacher	iii.	Authority rests with the farmers.
iv.	Class attendance is compulsory.	iv.	Participation is purely voluntary
v.	The teacher has more or less homogeneous audience	v.	The teacher has large and heterogeneous audience
vi.	It is rigid	vi.	It is flexible
vii.	It has all pre-planned and pre-decided programmes	vii.	It has freedom to develop programmes locally, and they are based on the needs and expressed desired of the people.
viii.	It is more theoretical	viii.	It is more practical and intended for immediate application in the solution of problems.

Source: Sharma, (2005). Handbook of Agriculture (Facts and figures for farmers, students and all interested in farming)

2.7 Communication Methods in Agricultural Extension

Agricultural communication methods are those devices used to create situations in which communication can occur between agricultural extension officers and farmers. They are procedures used to create effective learning of agricultural practices. The purpose of using agricultural communication method is to create opportunity to establish rapport over a subject matter content between the communicator and information receivers or learners. Agricultural extension has evolved proven communication methods, which are used to encourage farm people to adopt improved practices. Different communication methods are used in offering extension services in order to appeal to the

different senses of our audience – to ensure that learning takes place through either the sense of hearing, sight, smell, tough or taste, or through a multi sensory approach.

There is no one communication method best suited for all situations. Studies have shown that a combination of methods (Media – Mix) is more effective in communicating information to an audience. The two main criteria used in classifying communication methods in contemporary times are: (a) according to the form in which messages are conveyed; and (b) according to the number of individuals that can be reached (Agbamu, 2006).

a. Classification of communication methods according to form in which messages are conveyed.

In accordance with this criterion, four classes of communication methods can be recognized. These are written form, audio (spoken) form, visual form and audio visual (spoken and visual) form. Some of the important methods under each of these categories are given in Table 2.2.

Table 2.2 Communication methods according to form of message delivery

Written	Audio (spoken)	Visual	Audio-visual
Bulletins	Telephone	Exhibits	Television
Leaflets	Meetings	Posters	Films in cinema
Personal letters	Group discussion	Charts	Video messages
Circulars	Farm & home visit	Slides	Puppets
Journals	Office calls	Film strips	Public campaigns
Newspapers	Radio	Flash cards	Method
Magazines	Recorded messages	Flannelgraphs	demonstration
Newsletters	Agric clinic	Result	Synchronized –slide
Research reports		demonstration	Projector
Notice and bulletin boards		Notice board	Computer-assisted
Printed advertisement		Bulletin board	training
Electronic mail (e-mail)			
Internet services			
Flag method			

Source: Agbamu, (2006). Essential of Agricultural Communication in Nigeria.

b. Classification of communication methods according to the number of persons that can be reached.

The classification of communication methods according to "number of persons that can be reached in a given time" is almost similar to classifying them according to "use of extension approaches". Using this criterion, the three communicaton methods that can be discerned are: individual, group, and mass methods. This classification is more distinct and widely used (see Table 2.3 below)

Table 2.3 Communication methods according to number of individuals reached.

Individual method	Group method	Mass method
Farm and home visit Personal letters Office calls Use of flags Agric clinics Telephone contact Informal/ unplanned contact in churches, mosques, markets etc e-mail computer information network computer assisted instruction	Group discussions Group training Method demonstration Result demonstration Field trip/field day Excursion/ conducted tour Team meeting Role play Computer –assisted training	1. Broadcast media .Radio .Television .Video/film .Audio cassette 2. Print Media .Bulletins, posters .Pamphlets .Newsletters .Leaflets .Flip charts .Flash cards 3. Screen media .Slides .Transparencies 4. Others .Exhibits/displays .Campaigns .Farmers fairs .Internet (world wide web)

Source: Agbamu, (2006) Essential of agricultural communication in Nigeria

Individual Methods

Extension methods under this category provide opportunities for face-to-face or person-to-person contact between the rural people and the extension workers (Sharma, 2005).

Group methods

Under this category, the rural people or farmers are contacted in a group which usually consists of 20 to 25 persons (Sharma, 2005).

Group methods are more frequently used in extension work than individual methods. This is because group methods enable the extension workers to reach more farmers at a time thereby saving cost and time (Agbamu, 2006).

Mass Methods

Mass methods involve the use of techniques that can reach a large number of people at the same time. One feature of this method of communication is the high speed and low-cost with which information is conveyed to people over a wide area. It is effective in reaching a large number of farmers within a short period of time (Akpoko, 1996).

The choice of agricultural extension method to use depended on the general level of education of the farmers, the subject matter or the type of innovation, the resources (Personnel and materials) available, the stage of infrastructural development, village location, time, season of the year, etc. no one method has been found to be most useful in

achieving the most effective form of agricultural education. For effective change, a combination of methods was recommended (Akpoko, 1996).

2.8 Gender Issues in Extension Delivery

The Nigerian rural women are involved in several agricultural cultural practices processing and marketing of products. Whereas earlier reports suggested that women were mostly involved in light duties. Studies have shown that they were also involved in heavy duties such as bush clearing, land preparation and weeding (Smock, (1972), Patel and Anthonio, (1973) and Fadipe, (1970) in Williams and Olowu, (1990)).

Consequently upon the inadequate perception and valuation of women's activities to development efforts the benefits of development efforts have generally not reached these women. Numerous factors which could be regarded as gender issues were germane to extension programmes not reaching the women sub-audience. Williams, and Olowu, (1990) explained some of these factors:

i. Style of living

The life style of the rural women is simple and their role is culturally defined, besides producing and rearing children, they and their offsprings contribute the manual labour force for farm operations, mainly characterized by archaic methods. The nature of their work which is subsistence and domestic is difficult to quantify and is therefore termed "unpaid family labour" by economic analysis. In a study of Rural Women's Time Budget, Williams (1983) in Williams and Olowu (1990) listed their activities as; primary and secondary occupation, child care, food preparation, house care, personal care, moving activity, leisure activities, visiting/entertaining, religious activities, sleeping

(rests). The non-participant study recorded the times spent for each activity, and reported that rural women always had an overlap of time in the course of a day's work. Chale (1990) reported that, Household duties prevented rural women from participating in training programmes, most of the work done by them were manual, laborious and time-consuming, leaving them with very little time to receive such training.

ii. Extension Contact

Studies have shown that male farmers are more likely than female farmers to have contact with agricultural extension agents. The result of this is two-pronged. First due to lack of contact with Extension Agents, women farmers lacked knowledge of improved agricultural practices. Second, women's production problems encountered on the field were seldom passed on to the research sub-system hence technologies appropriate for solving women's problems were also not available. The lack of adequate contact of women with agents may be a result of agent scheduling meeting and demonstrations at times and places that are not easily accessible to women. Chale (1990), also observed that, there were few women extension workers, and many traditional barriers prevented male extension workers to reach and train women farmers.

iii. Colonial research priority

Past colonial governments emphasized on export crops to the detriment of food crops, has resulted in extension having little or no improved technologies to extent to women farmers who grew the traditional food crops. However, the present spate of agricultural research institutes and universities in Nigeria coupled with their linkages to

the Agricultural Development Projects (ADPs) will with the time reduce the importance of this colonial "hangover" (Williams and Olowo, 1990).

iv. Access to land

One of the factors of production in agriculture is land. Therefore, women's non-access to land can serve as a major limiting projector. The present land tenure system operative in Nigeria directs access to land at the hands of their male counterparts. Given such circumstances, women farmers cannot acquire land for their agricultural production endeavours (Williams and Olowu, 1990).

v. Neglect of female heads of households

Most development efforts as well as agricultural extension programmes were usually directed at the male heads of households with the tacit assumption that the benefits of such programmes would eventually trickle down to the women folk. Chale (1990) observed that technologies intended for women farmers were developed without consideration for the end users, many village extension workers failed to understand and appreciate the women's peculiarities, status and multi-various roles.

vi. Access to inputs and credit

Many rural women have no property they can use as collateral. It appeared that credit amongst other factors were usually given to retired civil servants, teachers, and personnels who were able to provide the needed collateral. Women farmers have less access than male farmers to all agricultural inputs including credit. If information gets to them, at all, usually there is poor adoption of the technologies because they require many other inputs to which a rural woman may not to have access.

2.9 Problems of Extension Workers in Nigeria

A myriad of problems were known to plague agricultural extension service in developing countries. The problems varied with countries because varying extension systems were practiced in different places, and each system has its own peculiar problems. However, a lot of the problems are common to the different developing countries because of similar socioeconomic circumstances and stage of development (Agbamu, 2005).

i. Inadequacy and instability of funding

Agricultural Extension programmes requires adequate funding to ensure successful extension service delivery. Due to poor foreign exchange earning and low gross domestic product of developing countries, they are unable to adequately provide the funds needed to operate efficient agricultural extension system. Finance is needed to purchase audio-visual aids and other communication related facilities for training farmers, office equipments and secretariat material up to the zonal and district levels to provide transport facilities for field staff and to pay salaries and allowances of staff in the service (Williams and Olowu, 1990).

In developing countries like Nigeria, Ghana, Kenya, Uganda, Tanzania, Fiji, Pakistan and Bangladesh have at different times depended on financial support from International Organizations to finance their agricultural extension systems. When such international assistance expired, they found it difficult to sustain the level of performance in their agricultural extension organizations.

The developing countries need to ensure a more sustainable funding arrangement that is not dependent on temporary or occasional international assistance from donors.

ii. Dilution of extension agents specific responsibility

A preponderance of non-extension duties imposed on agricultural extension agents in certain developing countries has been bane of extension service delivery. In some countries, agricultural extension agents were saddled with the responsibility of writing applications for credit and subsidies for farmers, filling in many questionnaires and forms on data collection for headquarters, health, nutrition e.t.c. They were responsible for all aspects of rural development. The responsibilities of this extension workers were simply too broad, the effect of this inclusion of non-extension tasks in the responsibility of agricultural extension agents was that very little time was left for meeting typical agricultural extension obligation for farmers.

In order to ensure an effective agricultural extension system, it is important for extension workers to focus purely on assisting farmers with utilization of improved farming practices, while the work of input and credit supplies and those of enforcing government regulations are handled by other workers charged with such responsibilities (Williams and Olowu, 1990).

iii. Ineffective agricultural research-extension linkages

Effective communication links between researchers and extensionists are vital in the identification and pooling of farmers problems/research needs, modification of technologies through verification at the on-farm trials and in initiating further research. The linkages between agricultural research and extension organizations were weak in some developing countries. Weak research – extension linkages affected the quality of knowledge generation and knowledge management upon which the long term success of an extension organization depended. There is currently a weakening of agricultural

research-extension linkages in Nigeria because of the lesser involvement of village extension agents and block extension supervisors in collecting farmers needs for the formulation of research themes/plans and the technology review meetings between the two organizations not held regularly any longer.

The strengthening of institutions were required to enhance agricultural research-extension linkages in developing countries.

iv. Use of poorly trained personnel at the local level

As agriculture develops and intensifies, the agricultural extension worker must develop his or her skills and knowledge. The opportunities for the right type of staff training is low, the educational level of majority of the extension workers is still low, the quality of extension services offered to farmers in the developing countries is still poor. Another major factor that has been responsible for poor quality of personnel and poor service delivery was the poor type of pre-service training that the staff had prior to joining the extension service. The universities, colleges and polytechnics in less developed countries where the agricultural extension officers were trained did not have the required facilities for grooming agricultural graduates and imparting skills to them. Consequently, these insufficiently qualified, inexperienced and poorly trained personnel cannot do much to improve the quality of extension service offered to farmers (Agbamu, 2005).

There is the need for institutions that train agriculturists in Nigeria and other developing countries to substantially provide modern facilities in their teaching farms, laboratories, workshops and studios so that the product of such institution will be in a

good position to provide improved quality of agricultural messages to farmers (Williams, and Olowu, 1990).

v. Coverage and mobility

Extension agents have more areas than they can be effectively covered because the extension service usually lacked vehicles to ensure adequate mobility, it was impossible to achieve the close regular contact between extension workers and farmers that is essential for successful extension (Benor et al, 1984). Under these circumstances, extension agents have often found it necessary and convenient to concentrate only on larger farmers, thereby neglecting small ones.

Permanent vehicles should be provided to help extension service to achieve the goal of agricultural development.

vi. Disproportionate extension agent to farm family ratio

A critical problem facing agricultural extension in Nigeria is the insufficient number of agricultural extension workers that provide service to the huge population of farmers. The disproportionate extension agent to farm family ratio prevalent in the developing countries had led to a situation in which many farmers do not benefit from the services of agricultural extension agents.

Since farmers in most developing countries largely depend on public agricultural extension services, it will be appropriate to increase the number of extension workers so that more farm families can benefit from their services (Williams and Olowu, 1990).

vii. Lack of clientele participation in programme development

Agricultural programmes for farmers were planned by experts in an extension agency or Ministry of Agriculture, and decisions were taken by Senior Staff at the top who tended to be out of touch with local problems and the day-to-day difficulties facing the farmers and the extension workers. So extension programmes were developed without detailed diagnosis of the constrains on farming developing. In most cases, farmers who constitute extension clients were not involved in planning the extension programmes. The lack of involvement of farmers/stakeholders in the planning and implementation of extension programmes has been responsible for programme failures.

Once sufficient clientele involvement is achieved in developing programmes, and also involved in implementing the programme, the farmers will see the programme as theirs, suitable for their felt needs and will work relentlessly to ensure its success. Extension administrators must change their attitude and ensure that at all stages of planning and implementation, the farmers for whom the programme seek to improve should be given opportunity to participate in its planning and implementation phases (Williams and Olowu 1990).

viii. Failure of input supplies to ensure effective and timely distribution to farmers

Although agricultural extension workers should not personally get involved with organizing the distribution of input supplies and credit, they should be familiar with the activities of farm input suppliers and activities of credit agencies and be able to direct the farmers to those agencies. Most of the innovations requiring the use of new varieties of seeds, new forms of organically-fortified fertilizers, new breeds of animals, and fingerlings, portable equipment and heavy machinery, are normally supplied by agro-

marketing companies or subsidized public agro-supply agencies, such companies and agencies are not effective in distribution of the inputs partly because their sales depot are far away from where most rural farmers live. Again the supply agencies do not get the inputs to farmers who want to buy on time. Failures of these nature have often affected agricultural extension activities. When the farm inputs to be purchased by farmers are unavailable, the extension workers cannot have them to use in training farmers on their farms.

In order to solve this problem, it is important for input supply agencies to open up more distribution centres in rural areas and increase the stock of goods meant for sale to farmers (Williams and Olowu 1990).

ix. Irregular evaluation of extension programmes

Agricultural Extension programmes are expected to be subjected to monitoring and evaluation. Monitoring studies what is happening with regarded to programme input and output. It alerts an agricultural programme management on the dangers and constrains that are likely to occur which require urgent and timely corrective measure. On the other hand, evaluation in the process of determining the extent to which objectives of a programme have been achieved, both during the implementation and at the end of the programme. In the developing countries, monitoring and evaluation of extension programmes are not done regularly. As a result of irregular evaluation, it has been difficult to identify problems confronting extension programmes in order to deal with such bottlenecks at the right time (Williams and Olowu, 1990).

Agricultural extension organization in developing countries should put in place a scheme that will enable them regularly evaluate their programmes and let the

implications of their evaluation findings guide future formulation of extension programmes.

2.10 Empirical Studies

The following empirical studies were made by the researcher.

A study was conducted by ILU (2002) to assess the educational qualification and job performance of the frontline extension agents in Kano State of Nigeria. Three (3) specific objectives were stated. The study considered the village extension advisor, and the block extension supervisor as the frontline extension agents. The village extension advisor has the sole responsibility of extending extension messages to the farmers, while the block extension supervisors supervised the village extension advisor. A random sample of 25 block extension supervisors and 75 village extension advisors in Kano State Agricultural and Rural Development Authority (KNARDA) were selected. Both primary and secondary data were used for the study. Primary data were collected using three sets of questionnaire. The extension agents involved in the study completed the first set, supervisors completed the second, and management staff completed the third. The data collected were analyzed using both descriptive and inferential statistics.

The result showed that 77% of the village extension advisors possessed certificate in General Agriculture as their highest level of education, while 76% of the block extension supervisors had National Diploma. It was also revealed that there was a significant difference in level of job performance between village extension agents with certificate in general Agriculture and village extension advisors with a diploma. However, there was no significant difference in level of job performance between village extension advisors with diploma and block extension supervisors with diploma. The three

most important problems negating performance of the frontline agents in KNARDA were; inadequate means of transportation, low funding and lack of inputs.

The present study is similar to the past study, since the past study assessed the job performance of agricultural extension agents, and also carried out in Kano State. However, two sets of questionnaire were used for this present study, one for the farmers and the other for field staff extension agents, then, the farmers and extension agents were used as population for the study. The past study used three sets of questionnaire, one for the extension agents, one for the extension supervisors, and the other for the management staff, then extension agents were only used as population for the study.

A study was carried out by Navokhi (2003) to evaluate the community-based participatory extension approach in Bama and Konduga Local Government Areas in Borno State. Four (4) specific objectives and three (3) null hypotheses were stated. The sample size comprised a total of 120 farmers drawn from 6 different communities in Bama and Konduga Local Government Areas. In each community 20 farmers were randomly selected, 10 members and 10 non-members of the participatory extension approach model farmers groups with assistance of staff of both agricultural departments of the affected Local Government Areas and the State Agricultural Development Project in the respective Local Government Areas. A multi-stage sampling techniques was employed in the selection of each category of farmers included in the study.

Data collection involved the use of both primary and secondary sources of information. The primary data were obtained from field surveys through the use of interview and questionnaire. Frequencies and percentages, Product Moment Correlation,

co-efficient, chi-square analysis, and T-test were used for data analysis at 0.05 level of significance.

The findings showed that 67% of the respondents were within the age group of 20 to 40 years, 60% cultivated above five (5) hectares annually. Extension contact between the members of the farmers groups and the ADP extension agents were more regular (65.9%) than with the non-members (34.1%). The extent of technological adoption was higher among the members of the farmers group than among the non-members (83.3%).

The present study is similar to past study since an evaluation of extension approach was the centre of focus, and questionnaire and interview were used as instruments for data collection for the two studies. However, the present study was conducted in Kano State, and used both farmers and Extension Agents as population for the study, in which 370 farmers were sampled, then percentage and correlation procedures were used in data analysis for the study. While the past study was conducted in Borno State, and used farmers only as population for the study in which 120 farmers were sampled, also, percentage, product moment correlation coefficient, chi-square, and t-test were used for data analysis.

A research study was conducted by Ogunwale, Ayoade, and Ayansina, in Oyo State (2006) to examine the impact of extension services on farmers production activities with a view to investigating the extension methods used by village extension workers, and determine their impacts on farmers' production activities. Three null hypotheses were stated. Three Local Government Areas were purposively chosen based on their high level of rurality and agrarian activities. Multistage sampling technique was employed in the selection of the farmers while purposive sampling technique was used for selection of

extension workers due to their small population. 60 farmers and 13 village extension workers were used as samples for the study. Questionnaire and interview methods were used as instruments for data collection. Both descriptive and inferential statistics were used in data analysis. The descriptive tool such as frequency counts and percentages were used to describe selected personal characteristics of farmers and extension workers, while inferential statistics such as regression analysis was used to determine the relationships advanced in the research hypotheses at 5% level of significance.

The findings revealed that 90% of the farmers were males, while 10% were females, 80% were educated. 76.9% of the extension workers were between 40-90 years, 92.3% were males, while 7.7% were females, and all the extension workers were well educated. It also revealed that extension workers actually had impacts on farmers in many important areas of agricultural production activities. 84.6% of the extension workers identified individual method of farm and home visit as the most preferred extension method by farmers. All the farmers sampled indicated that adoption of farm technologies increased yield and productivity.

The present study is similar to the past study, since the past study assessed the impact of extension service on farmers' production activities, also farmers and extension agents were used as two population sub-groups, then questionnaire and interview were also used as instruments for data collection for the two studies. However, the past study was conducted in Oyo State, and sampled 60 farmers and 13Extension Agents, also percentage and Regression analysis were used in data analysis. While, the present study was conducted in Kano State and sampled 370 farmers and 152 Extension Agents, also, percentage and correlation procedures were used in the data analysis.

Idrisa, and Ogunbameru (2008) conducted a study to assess the performance of extension agents under the Unified Agricultural Extension System in Borno State. Four (4) specific objectives were stated. The state was divided into three Agricultural zones-Southern Borno, Central Borno, and Northern Borno. Three project areas were selected from each zone and five extension agents were in turn selected from each project area, giving a total of 45 extension agents. Multistage random sampling technique was used in selecting the respondents. Structured questionnaires were used to elicit relevant information from the respondents. The collected data were analysed using frequency distribution, percentage and correlation coefficient at 0.05 level of significance.

The result revealed that 85% of the respondents were male, while 15% were female, 95% were within the age range of 25 to 44 years, while 5% were above 44 years of age. 95% of the extension agents had acquired post secondary certificates. 95% of the respondents that received training had training in relation to crop production, 88% in livestock, 70% in fishery, while 65% in agro-forestry. It also revealed that 83% of the respondents had access to chart as a means of enlightening their clients (farmers), 5% were provided with cinema van, 20% had audio facilities, 53% were given required inputs to conduct trials, and 38% were provided with residential accommodations.

The research topics of this past and present studies are similar as the studies assessed the performance of agricultural Extension Agents also structured questionnaire were used as instrument for data collection, then percentage and correlation procedures were used in data analysis in both studies. However, the present study was conducted in Kano State, where farmers and Extension Agents were used as population for the study in which 152 Extension Agents were sampled, where as, the past study was conducted in

Borno State, and used Extension Agents only as population for the study in which 45 of them were sampled.

Study was conducted by Olayiwola (2008) to evaluate job performance in relation to the professional competence of village extension agents in Lagos State. Four (4) specific objectives were stated, and three (3) null hypotheses. One hundred and twenty-five (125) respondents were totally sampled across the three zones of the State. The respondents were selected through purposive sampling techniques. Data were collected using copies of questionnaire containing structured open and close-ended questions. Participant observation was also used. Two sets of questionnaire were used, one for the village extension agents, and the other for the extension supervisors. Descriptive statistics such as frequency counts, and percentage were employed for the socio-economic characteristics, while, chi-square analysis was used for the null hypotheses testing at 0.05 level of significance.

The test of null hypotheses showed a positive significant relationship at 0.05 levels, between (i) areas of specialization, (ii) years of experience and job performance of village extension agents. This means that the more their discipline is related to agriculture and the longer their years of experience on the job; the greater/better their level of job performance. Also, significant association was found between the professional competence and village extension agents job performance. That is, the more competent a village extension agent was, the higher the level of job performance. Also, significant association was found between the problems confronting the village extension agents and their job performance. This means that the more these problems are solved, the better their performance.

The present study is similar to past study because the past study evaluated job performance of village Extension Agent, and also two sets of questionnaire were used, however, the past study was conducted in Lagos State and used Extension Agents only as population for the study. Percentage and chi-square were also used in data analysis, whereas, the present study was conducted in Kano State, and used farmers and Extension Agents as population for the study, also percentage and correlation procedures were used in data analysis. The two sets of questionnaire used by the past study, one was for Extension Agents, and the other for Extension Supervisors, while in the present study, one was for Extension Agents, and the other for farmers.

2.11 Summary of Literature Reviewed

Agricultural growth and development are crucial in Nigeria's future national progress. Agricultural extension is required to achieve this aim. Food and Agricultural Organization of the United Nations, (1972) in Ogunwale, et al (2006) defined agricultural extension as a service that assists farmers through educational procedures in improving their farming methods and techniques, increasing production efficiency and income as well as improving their standard of living, and lifting their social and educational standard. It is a means by which technical information is passed to the farmers for the development of agriculture. Extension education is therefore an educational process directed to bring about change in people. It is a dynamic process which brings about changes in what people know, changes in how they react to situations and changes in what they can do with their hands. It can be seen that, the concern of extension education as an educational process, is to help farmers to make a decent living – to master the best way to handle their farms in order to improve their standard of living.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter described the methods and procedures used in carrying out the study under the following sub-headings:

3.1 Research design

Survey research design was used for this study. The most common descriptive research method is the survey design (Thomas and Nelson, 2001). The method involves systematic collection of data from entire population of people or sample drawn from the population through the use of questionnaire, interview or observation in order to find out the opinions of individuals about something. It is also used to investigate the changes that take place in the behavior or characteristics of a group of individuals over a certain period of time in their lives. The differences between groups of individuals are also studied using this method (NCE/DLS Course Book on Education cycle 3, 2000).

3.2 Population for the study

The populations for this study were full-time farmers and full-time extension agents. They were 8,866 farmers (household heads) and 236 extension agents making a total of 9,102. The two population groups were obtained from Kano State Agricultural and Rural Development Authority (KNARDA). These are shown in Table 3.1.

Table 3.1: Population for the study

LGAs	Villages	No. of Farmers (household heads)	No. of Extension Agents	Total
Kibiya	Fammer	970	20	988
Kura	Gundutse	559	19	578
Madobi	Kundurin	597	22	619
Rogo	Rogo ruma	730	19	749
Danbatta	Fayam fayam	450	23	473
Bichi	Balli	890	22	912
Tofa	Doko	280	20	300
Gabasawa	Yadai	470	22	489
Gaya	Gamarya	1,170	18	1,188
Warawa	Garindau	1,200	17	1,217
Wudil	Gware	760	16	776
Garko	Lamire	790	18	808
Total		8,866	236	9,102

Source: KNARDA Kano; Village Listing (1994) and Staff list (2010).

3.3 Sample size and sampling procedure

A sample size of 370 out of 8,866 farmers, (household heads), and 152 extension agents out of 236 were randomly selected. This is in accordance with Research Advisors, 2006 (htt://research-advisors.com) recommendation in determining sample size from a given population for research study (Appendix IV). Proportional sampling was used to select the appropriate samples this gave the total sample size of 522 for this study. The sample-size is shown in Table 3.2.

Table 3.2: Sample size for the study

LGAs	Villages	Population for farmers (household heads)	Sample for farmers (household heads)	Population for extension agents	Sample for extension agents
Kibiya	Fammer	970	40	20	13
Kura	Gundutse	559	23	19	12
Madobi	Kundurin	597	25	22	14
Rogo	Rogo ruma	730	30	19	12
Danbatta	Fayam fayam	450	19	23	15
Bichi	Balli	890	37	22	14
Tofa	Doko	280	12	20	13
Gabasawa	Yadai	470	20	22	14
Gaya	Gamarya	1,170	49	18	12
Warawa	Garindau	1,200	50	17	11
Wudil	Gware	760	32	16	10
Garko	Lamire	790	33	18	12
Total		8,866	370	236	152

Total population = 9102
Total sample size = 522

3.4 Instrument for data collection

The instruments for data collection used for this study were questionnaire and interview to enable the respondents to indicate their opinions about the problem of the study, and to have face to face interaction with the researcher. Two sets of questionnaire were used, one for the farmers, and the other for field staff extension agents in order to collect relevant and adequate information for the study (a copy each of the questionnaire- for the farmers and field staff extension agents is found in appendices II and III respectively). The questionnaire were designed to accomplish the objectives of the study.

The questionnaire for the farmers (Appendix II) was divided into four (4) sections – A,B,C and D, the questions in each section were designed to answer research questions I, II, III and IV respectively formulated for the study. That for the field staff extension agents (Appendix III) was divided into three (3) sections – A,B and C,

questions in section B and C, were constructed to answer research questions II and IV respectively.

3.4.1 Validation of the instrument

The two types of questionnaire were presented to the supervisors and other experts in the field to look at the questions for their necessary corrections and suggestions. The questionnaire were modified in line with the comments and suggestions given by the supervisors and other experts, to ensure their content validity.

3.4.2 Pilot study

Pilot study was conducted in order to identify questions that respondents might find difficult to answer, and also to eliminate the questions that may be considered ambiguous and embarrassing to the respondents. The pilot study was conducted in Kantsi, a village in Dawakin Kudu Local Government Area, in Kano State. The area has similar characteristics with selected area for the research. Thirty (30) farmers and ten (10) field staff extension agents were given the questionnaire to respond for this pilot study.

The researcher personally administered the questionnaire to the 30 farmers and 10 extension agents who were involved during the study. These were collected back immediately after completion for further statistical analysis to determine the reliability coefficient.

3.4.3 Reliability of the instrument

The data collected from the pilot study were subjected to a reliability test to determine internal consistency. Guttman Alpha method was used, and the coefficient was found to be as follows:

Farmers: Alpha = 0.9545 Standardized item alpha = 0.9753

Extension agents: Alpha = 0.9449 Standardized item alpha = 0.9536

Tunkman, (1975) in Abbas, (2004) indicated that an instrument can be said to be reliable when the reliability coefficient can be approximated to one (1). The reliability of instruments here, is therefore adjudged very reliable.

3.5 Procedure for data collection

The researcher administered the questionnaire with the help of four (4) research assistants. The research assistants were trained by the researcher on how to administer and collect the questionnaire back after completion by the respondents. The items of the questionnaire were discussed point by point during the training. Before proceeding for data collection, the cooperation of village heads and wards heads was sought. The question items were explained to the respondents where necessary to remove any possible misinterpretation of the questions. The administration of the questionnaire to the respondents and collecting them after completion have taken the estimated period of two (2)months.

3.6 Procedure for data analysis

The data collected were analyzed using percentage techniques for the research questions while correlation procedure was used to test the four (4) null hypotheses formulated from the objectives of the study at 0.05 level of significance. Correlation is a statistical technique used to determine the relationship between two or more variables (Thomas and Nelson 2001). Correlation co-efficient 'r' could be determined by using spearman's Rho (P) (Ajayi, 2004).

CHAPTER FOUR

DATA PRESENTATION AND RESULTS

This chapter contained the results and interpretation of the analysis of data collected of this study under the following sub-headings.

4.1 Data and Interpretation

4.2 Testing of Null Hypotheses

4.3 Discussions of Findings

4.1 Data and Interpretation

The responses of the respondents were presented in frequencies and percentages in tabular form based on the four research questions formulated in chapter one.

Research Question I: *What are the personal characteristics of farmers that are affecting the level of adoption of agricultural innovation?*

In order to give attention to this research question, gender, age, marital status, number of children, highest educational qualification and membership of farmers association were examined as presented in the data in Tables 4.1 to 4.6.

Table 4.1: Sex of Respondents

Sex	Frequency	Percentage
Male	324	87.6
Female	26	7.0
No response	20	5.4
Total	370	100

Table 4.1 showed that 87.6 percent were males and 7.0 percent females, while 5.4 percent did not respond to this question. This implied that majority (87.6%) of the respondents were males in the study area.

Table 4.2: Age of Respondents

Age (years)	Frequency	Percentage
Below 15	8	2.2
15 – 30	91	24.6
31 – 45	176	47.6
46 – 60	69	18.6
Above 60	26	7.0
Total	370	100

Table 4.2 indicated that 47.6 percent of the farmers were within the age bracket of 31 to 45 years, 24.6 percent within 15 to 30 years, 18.6 percent within 46 to 60 years, 7.0 percent were above 60 years, and 2.2 percent were below 15 years. This showed that majority of the farmers (72.2%) were middle age farmers (15-45 years).

Table 4.3: Marital Status of the Respondents

Marital status	Frequency	Percentage
Married	320	86.5
Single	24	6.5
Widowed	9	2.4
Divorced	17	4.6
Total	370	100

Table 4.3 indicated that 86.5 percent of the farmers were married, 6.5 percent were single, 4.6 percent were divorced and 2.4 percent were widowed. This revealed that majority (86.5%) of the farmers were married.

Table 4.4: Number of children of the Respondents

No. of Children	Frequency	Percentage
0 to 3	153	41.4
4 to 6	113	30.5
7 to 10	51	13.8
More than 10	43	11.6
No respond	10	2.7
Total	370	100

The data in Table 4.4 showed that 41.4 percent of the farmers had 0 to 3 children, 30.5 percent had 4 to 6 children, 13.8 percent had 7 to 10 children, 11.6 percent had more than 10 children, while 2.7 farmers did not respond to this question. The data showed that majority (41.4%) of the farmers sampled had 0 to 3 children.

Table 4.5: Educational qualifications of the Respondents

Highest educational qualification	Frequency	Percentage
Never attended school	25	6.8
Qur'anic education	110	29.7
Adult education	38	10.3
Primary education	38	10.3
Secondary education	73	19.7
Post secondary education	81	21.9
Others (specify)	5	1.4
Total	370	100

The data in Table 4.5 showed that 29.7 percent had Quranic education, 21.9 percent had post secondary education, 19.7 percent had secondary education 10.3 percent had primary education, another 10.3 percent had adult education and 6.8 percent indicated that they had never attended any school, but 1.4 percent responded that they had other type of educational qualification beside those mentioned. This pointed out that majority (51.9%) of the farmers in the study area acquired formal education.

Table 4.6: Membership of Farmers' Association.

Farmers Association	Frequency	Percentage
Belong	202	54.6
Not belong	166	44.9
No respond	2	.5
Total	370	100

Table 4.6 showed that 54.6 percent of the farmers in the study area belonged to Farmers' Association, and 44.9 percent did not, while 0.5 percent did not respond. This implied that majority (54.6%) of the farmers belonged to Farmers' Associations in the study area.

4.1.2 Research question II: *What are the extension teaching methods used by extension agents in disseminating the improved practices to farmers and their effectiveness?*.

The research question here was addressed on two dimensions. First, the opinions of the extension agents on various teaching methods they used in disseminating the improved farm practices to the farmers producing sorghum, millet and cowpea in the study area were presented in the data in Tables 4.7 and 4.8. In addition their expressed opinions on the effectiveness of the teaching methods towards adopting the improved practices, introduced to the farmers, were presented in the data in Table 4.9. Secondly, the expressed perceptions of the farmers on the effectiveness of the administration of the Agricultural Extension activities in the study area using the identified teaching methods were presented in Table 4.10.

Table 4.7: Methods used by Extension Agents to make contact with farmers.

Method used to make contact	Frequency	Percentage
Individual method	22	14.5
Group methods	71	46.7
Mass methods	10	6.6
Combination of individual and group methods	48	31.6
Others	1	0.7
Total	152	100

The Extension Agents were asked to indicate the extension teaching methods they used in disseminating the improved practices to farmers. Table 4.7 indicated that 46.7 percent of the Extension Agents used group methods, 31.6 percent used the combination of Individual and Group Methods, 14.5 percent used individual method, 6.6 percent used Mass Method, while 0.7 percent used other type of methods beside those mentioned. The data showed that majority (46.7%) of the Extension Agents in the study area used Group

Teaching Methods to disseminate improved farm practices to sorghum, millet and cowpea producing farmers.

Table 4.8: Use of Demonstration Method by Extension Agents in Disseminating Improved Practices to Farmers

Demonstration method	Frequency	Percentage
Used Demonstration method	145	95.4
Did not use demonstration method	7	4.6
Total	152	100

The Extension agents were asked to indicate whether they used demonstration method or not in disseminating improved practices to sorghum, millet and cowpea producing farmers. The data in Table 4.8 showed that 95.4 percent of the Extension Agents indicated that they used demonstration methods, while 4.6 percent said they did not. This revealed that majority (95.4%) of Extension Agents in the study area used Demonstration Teaching Method in teaching the improved practices to the farmers.

Table 4.9: Extension Agents' Opinion on the Adoption of Improved Practices by the Farmers

Extension Agents opinion	Frequency	Percentage
Adopt	137	90.1
Do not adopt	14	9.2
No response	1	0.7
Total	152	100

The data on Table 4.9 showed the expressed opinions of the Extension Agents on the adoption of improved practices introduced to the farmers, based on the data 90.1 percent of the Extension Agents had the opinion that the methods they used motivated their clients to adopt the innovation, while 9.2 percent said they did not, and 0.7 percent of them did not respond. This showed that majority (90.1%) of the Extension agents had

the opinion that through the various teaching methods they used, farmers in the study area adopted the innovation introduced to them.

Table 4.10: Farmers' Opinions on the Effectiveness of the Agricultural Extension Activities

Farmers opinion	Frequency	Percentage
Very effective	74	20.0
Effective	134	36.2
Not effective	72	19.5
No idea	79	21.4
No response	11	3.0
Total	370	100

Table 4.10 showed the data on the farmers opinions on the effectiveness of the agricultural extension activities in the study area using the identified teaching methods, that 36.2 percent said it was effective, 21.4 percent said they had no idea, 20.0 percent mentioned very effective, 19.5 percent indicated not effective while 3.0 percent did not respond. This pointed out that majority (56.2%) of the farmers expressed opinions that administrations of the agricultural extension activities in the study area were either very effective or effective.

4.1.3 Research Question III: *To what extent have farmers adopted the recommended practices in relation to change in their agricultural production?*

This research question was considered from the farmers expressed opinions on their various levels of adoptions of the technologies introduced to them on sorghum, millet and cowpea production. The responses were described as "frequently" for highly adopted "occasionally" for partially adopted, "Used and discontinued" for adopted and subsequently rejected, and lastly 'never" for not adopted. Nine (9) improved farm

practices were presented to the farmers. Tables 4.11 to 4.19 presented the data on the extent of adoption.

The other aspect of this research question is the impact of this adoption on changes in yields of sorghum, millet and cowpea production in the study area. These are indicated in the data in Tables 4.20 to 4.22.

Table 4.11: Frequency of Using Fertilizers by the Farmers.

Use of fertilizer	Frequency	Percentage
Frequently	276	74.6
Occasionally	72	19.5
Used and discontinued	15	4.1
Never	7	1.9
Total	370	100

Table 4.11 showed that 74.6 percent of the farmers used chemical fertilizers frequently, 19.5 percent used it occasionally 4.1 percent used it but discontinued, and 1.9 percent never used it. This showed that majority (74.6%) of the farmers used chemical fertilizers, frequently on sorghum, millet and cowpea production in the study area.

Table 4.12: Frequency of Using Seed Dressing Chemicals by the Farmers.

Use of seed dressing chemicals	Frequency	Percentage
Frequently	262	70.8
Occasionally	81	21.9
Used and discontinued	9	2.4
Never	18	4.9
Total	370	100

The data in Table 4.12 indicated that 70.8 percent of the farmers used seed dressing chemicals frequently, 21.9 percent used it occasionally, 2.4 percent used it but discontinued, while 4.9 percent never used it. This showed that majority (70.8%) of the farmers used seed dressing chemicals frequently on sorghum, millet and cowpea production in the study area.

Table 4.13: Frequency of Using Weed Control Chemicals by the Farmers.

Use of weed control chemicals	Frequency	Percentage
Frequently	241	65.1
Occasionally		
Used and discontinued	94	25.4
Never	19	5.1
	16	4.3.
Total	370	100

Table 4.13 showed that 65.1 percent of the farmers used weed control chemicals (herbicides) frequently, 25.4 percent used it occasionally, 5.1 percent used it but discontinued, while 4.3 percent did not use it. This revealed that majority (65.1%) of the farmers used weed control chemicals frequently to control weeds on sorghum, millet and cowpea farms in the study area.

Table 4.14: Frequency of Using Storage Chemical by the Farmers

Use of storage chemicals	Frequency	Percentage
Frequently	257	69.5
Occasionally	91	24.6
Used and discontinued	15	4.1
Never	7	1.9
Total	370	100

Based on the data in Table 4.14, 69.5 percent of the farmers used storage chemicals frequently, 24.6 percent used it occasionally, 4.1 percent used it but discontinued, and 1.9 percent never used it. This showed that majority (69.5%) of the farmers used storage chemicals frequently to store their sorghum, millet and cowpea in the study area.

Table 4.15: Frequency of Using Plants Spacing Technique by the Farmers.

Use of plants spacing	Frequency	Percentage
Frequently	273	73.8
Occasionally	59	15.9
Used and discontinued	27	7.3
Never	11	3.0
Total	370	100

Based on the data in Table 4.15, 73.8 percent of the farmers used plants spacing techniques frequently, 15.9 percent used it occasionally, 7.3 percent used it but discontinued, 3.0 percent never used it. This pointed out that majority (73.8%) of the farmers used plants spacing techniques frequently during planting of sorghum, millet and cowpea in their farms in the study area.

Table 4.16: Frequency of Using Extension Recommended Seeds Rate by the Farmers.

Use of recommended seed rate	Frequency	Percentage
Frequently	266	71.9
Occasionally	77	20.8
Used and discontinued	12	3.2
Never	15	4.1
Total	370	100

Table 4.16 showed that 71.9 percent of the farmers used extension recommendations on seed rate frequently, 20.8 percent used it occasionally, 3.2 percent used it but discontinued, while 4.1 percent did not use it. This implied that majority (71.9%) of the farmers applied extension recommended seed rate frequently in planting sorghum, millet and cowpea on their farms in the study area.

Table 4.17: Frequency of Using Improved Variety of Sorghum Seeds by the Farmers.

Use of improved sorghum seeds	Frequency	Percentage
Frequently	254	68.6
Occasionally	64	17.3
Used and discontinued	20	5.4
Never	32	8.6
Total	370	100

The data in Table 4.17 indicated that 68.6 percent of the farmers used or planted improved variety of sorghum seeds frequently, 17.2 percent planted occasionally, 5.4

percent used it but discontinued, and 8.6 percent never used it. This revealed that majority (68.6%) of the farmers used improved variety of sorghum seeds frequently when planting sorghum on their farms in the study area.

Table 4.18: Frequency of Using Improved Variety of Millet Seeds by the Farmers

Use of improved millet seeds	Frequency	Percentage
Frequently	268	72.4
Occasionally	74	20.0
Used and discontinued	13	3.5
Never	15	4.1
Total	370	100

Table 4.18 indicated that 72.4 percent of the farmers used improved variety of millet seeds frequently, 20.0 percent used it occasionally, 3.5 percent used it but discontinued, while 4.1 percent never used it. This revealed that majority (72.4%) of the farmers used improved variety of millet seeds frequently in planting millet on their farms in the study area.

Table 4.19: Frequency of Using Improved Variety of Cowpea Seeds by the Farmers.

Use of improved cowpea seeds	Frequency	Percentage
Frequently	167	45.1
Occasionally	96	25.9
Used and discontinued	22	5.9
Never	85	23.0
Total	370	100

The data in Table 4.19 indicated that 45.1 percent of the farmers used improved variety of cowpea seeds frequently, 25.9 percent used it occasionally, 5.9 percent used it but discontinued, while 23.0 percent never used it. This showed that majority of the farmers used improved variety of cowpea seeds frequently when planting cowpea on their farms in the study area.

Table 4.20: Opinions of Famers on Changes in Yields of Sorghum after Adoption of Improved Farm Practices for Sorghum.

Change in yields	Frequency	Percentage
Increased	308	83.2
Decreased	17	4.6
No change	27	7.3
Uncertain	17	4.6
No respond	1	0.3
Total	370	100

Table 4.20 showed that 83.2 percent of the farmers had increase in yield of sorghum, 7.3 percent did not experience any change, 4.6 percent experienced decrease in yield, while 4.6 percent were not certain and 0.3 percent did not respond. This pointed put that majority (83.2%) of the farmers had increase in yields of sorghum after the adoption of improved farm practices on sorghum production in the study area.

Table 4.21: Opinions of Farmers on Changes in Yields of Millet after Adoption of Improved Farm Practices.

Change in yield	Frequency	Percentage
Increase	337	91.1
Decrease	10	2.7
No change	18	4.9
Uncertain	4	1.1
No respond	1	0.3
Total	370	100

Table 4.21 showed that 91.1 percent of the farmers had increase in yield of millet, 4.9 percent did not experience any change, 2.7 percent experienced decrease in yield, while 1.1 were not certain, and 0.3 percent did not respond. This implied that majority (91.1%) of the farmers had increase in yield of millet after the adoption of improved farm practices on millet production in the study area.

Table 4.22: Opinions of the Farmers on Changes in Yields of Cowpea after Adoption of Improved Farm Practices.

Change in yield	Frequency	Percentage
Increased	299	80.8
Decreased	21	5.7
No change	33	8.9
Uncertain	16	4.3
No respond	1	0.3
Total	370	100

Table 4.22 indicated that 80.8 percent of the farmers had increase in yield of cowpea, 8.9 percent did not experience any change, 5.7 percent experienced decrease, while 4.3 percent were not certain, and 0.3 percent did not respond to the question. This observed that majority (80.8%) of the farmers had increase in yield of cowpea after the adoption of improved farm practices for cowpea production in the study area.

4.1.4 Research Question IV: *What are the factors militating against the adoption of extension recommendation in the area?*

The research question was looked upon from farmers and extension agents perceptions. The expressed perceptions of the farmers were indicated in the data presented in Table 4.23, and those for extension agents in Tables 4.24 and 4.25.

Table 4.23: Factors Militating against the Adoption of Improved Production Technologies for Sorghum, Millet and Cowpea Production in this Area.

Farmers' opinions	Frequency	Percentage
Cost of fertilizer	174	47.0
Unavailability of fertilizer	46	12.4
Cost of labour	18	4.9
Lack of ready market to sell the produce	27	7.3
Cost of agro-chemicals	9	2.4
Lack of adequate technical knowledge about recommended	60	16.2
farm practices.	10	2.7
Some practices run contrary to our needs	14	3.8
Inadequate rains	12	3.2
others (specify)		
Total	370	100

Table 4.23 described that 47.0 percent of the farmers mentioned cost of fertilizers, 16.2 percent mentioned lack of adequate technical knowledge about recommended farm practices 12.4 percent said unavailability of fertilizers, 7.3 percent indicated lack of ready market to sell the produce, 4.9 percent complained on cost of labour, 3.8 percent complained on inadequate rains, 3.2 percent mentioned other factors which included lack of funds, lack of good roads and poor methods of storage, 2.7 percent said some practices ran contrary to their needs, while 2.4 percent complained on the cost of agro-chemicals. This revealed that the most problems that affected majority (75.6%) of the farmers who did not adopt improved production technologies in the study area were cost and unavailability of fertilizers, and lack of adequate technical knowledge about the recommended farm practices.

Table 4.24: Factors Responsible for Some Farmers not adopting the Improved Practices.

Extension agents' opinion	Frequency	Percentage
Lack of necessary inputs	94	61.8
Some of the practices are rather difficult to follow	31	20.4
Some practices run contrary to their needs, interests and tradition.	24	15.8
Others	3	2.0
Total	152	100

Table 4.24 reported that 61.8 percent of the extension agents mentioned lack of necessary inputs, 20.4 percent indicated that some of the practices were rather difficult to follow, 15.8 percent said some practices ran contrary to their needs, interests and tradition of the farmers, while 2.0 percent responded to other reasons. It was discovered that majority (61.8%) of the extension agents had the opinions that inability of the farmers to obtain necessary inputs for the improved farm technology was the major factor

responsible for some farmers not adopting the improved farm practices introduced to them in the study area.

Table 4.25: Major Problem that Limited the Success of the Extension Activities in the Study Area.

Problems	Frequency	Percentage
Lack of cooperation from local leaders	6	3.9
Lack of cooperation from farmers	14	9.2
Lack of encouragement from my employer	20	13.2
Too many assignment to be handled	13	8.6
Delay in receipt of production inputs	96	63.2
Others	3	2.0
Total	152	100

The expressed opinions of Extension Agents on the major problems that limited the success of their extension activities in the study area were presented in the data in Table 4.25 in which 63.2 percent of the extension agents indicated delay in receipt of production inputs, 13.2 percent mentioned lack of encouragement from their employers, 9.2 percent complained on lack of cooperation from farmers, 8.6 percent said they had too many assignment to handle that limited the success, and 3.9 percent complained on lack of cooperation from local leaders, while 2.0 percent indicated other reasons such as problems of transportation means, inadequate fund. This pointed out that the majority (63.2%) of the Extension Agents expressed the opinions that the most problems that limited the success of their extension activities in the study area was delay in receipt of production inputs.

4.2 Testing of Null Hypotheses

Four (4) Null Hypotheses were formulated for this study as indicated in chapter one. Each Null Hypothesis was tested separately to determine the relationship between the variables.

4.2.1 Null Hypothesis I: *There is no significant relationship between the farmers' personal characteristics and their level of adoption of agricultural innovation.*

For the test of this Null Hypothesis, adoption of improved farm practices was computed as the aggregate score at which farmers agreed that they used the improved technologies introduced to them. The Spearman's Rho Correlation procedure was used to relate the personal characteristics of the farmers with level of their adoption. The result of the correlation test is presented in square matrix in Table 4.26.

Table 4.26: Correlation between Personal Characteristic of Farmers and Level of their Adoption of Improved Technologies

Variables	Adoption	Gender	Age	Marital status	No. of children	Highest educational qualification	Do you belong to any farmer association
Adoption	1.000	.015	.018	.013	.072	.117*	.234**
Gender	.015	1.000	.075	.310**	.038	.052	.021
Age	.018	.075	1.000	.213**	.628**	.181**	.008
Marital status	.013	.310**	.213**	1.000	.108*	.024	.081
No. of Children	.072	.038	.628**	.108*	1.000	.260**	.029
Highest educational qualification	.117*	.052	.181**	.024	.260**	1.000	.237**
Do you belong to any farmers association	.234**	.021	.008	.081	.029	.237**	1.000

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

The correlation matrix showed the inter-correlation between the personal characteristics of the farmers and their adoption of the improved technologies. From the

Table 4.26, gender, age, marital status, and number of children did not significantly correlate with adoption of improved farm technologies by the farmers (P>0.05). But the farmers' educational level and membership of organization were observed to be highly correlated with the adoption of the improved technologies by the farmers (P<0.05).Therefore, the null hypothesis was rejected. This means that personal characteristics of farmers could be a major influence in their adoption of improved technologies in the study area.

4.2.2 Null Hypothesis II. *There is no significant relationship between the extension teaching methods used by extension agents in disseminating the improved practices and the rate of adoption by the farmers.*

The Null Hypothesis II was tasted based on the expressed opinions of the farmers on the level of adoption, and the methods of extension propagation used by extension agents for improved farm technologies. Table 4.27 showed a summary of the Spearman's Rho.

Table 4.27: Correlation between Extension Teaching Methods and Rate of Adoption by Farmers of Improved Technologies

Variables	Adoption	Teaching method
Adoption	1.000	.278**
Teaching method	.278**	1.000

** correlation is significant at the 0.01 level (2 tailed).

The Table 4.27 indicated that adoption of improved farm technologies is significantly correlated with teaching methods used by the extension agents in propagating the improved farm technologies among the farmers in the study area

(P<0.05). Therefore the null hypothesis was rejected. This means that adoption of the improved farm technologies by the farmers is greatly influenced by the type of teaching methods used by extension agent.

4.2.3: Null Hypothesis III: *There is no significant relationship between the rate of adoption of the recommended practices by the farmers and the change in their agricultural production.*

The Null Hypothesis III was tested using the expressed perceptions of the farmers on the level of their adoption of various farm technologies for sorghum, millet and cowpea production introduced to them, and the change of crops yield they observed. Spearman's Rho procedure was used to correlate the change in the crops yield with the level of adoption. The summary of the correlation test is presented in Table 4.28.

Table 4.28: Correlation between Adoption of Improved Technologies and Changes in the Production of Farmers.

Variables	Adoption	Change in sorghum	Change in millet	Change in cowpea
Adoption	1.000	.228**	.180**	.222**
Change in sorghum	.228**	1.000	.451**	.314**
Change in millet	.180**	.451**	1.000	.414**
Change in cowpea	.222**	.314**	.414**	1.000

** Correlation is significant at the 0.01 level (2 tailed)

The test in the Table 4.28 revealed that adoption of the improved technologies was highly correlated with change in agricultural production measured in terms of changes in yield of sorghum, millet and cowpea (P<0.05). This then means that the null hypothesis was not retained. In other word, adoption of improved technologies led to increase in the yield of sorghum, millet and cowpea in the study area.

4.2.4 Null Hypothesis IV: *There is no significant relationship between factors militating against the adoption of extension recommendations in the study area and the effectiveness of the programme being carried out in the area.*

The Null Hypothesis IV was tested concerning the farmer's opinions on the factors militating against their adoption of the improved technology. The summary of the Spearman's Rho correlation procedure used in the test is given in Table 4.29.

Table 4.29: Correlation between factors militating against extension recommendations and effectiveness of the programme.

Variables	Adoption	The factors militating against the adoption of improved technologies for sorghum, millet and cowpea.	the ownership states of your farm	The assistance you need to improve sorghum, millet and cowpea production.
Adoption	1.000	.144**	.036	.053
The factors militating against the adoption of improved technologies for sorghum, millet, and cowpea	.144**	1.000	.116*	.035
The ownership status of your farm	.036	116*	1.000	.146**
The assistance you need to improve sorghum millet and cowpea production	.053	.035	.146**	1.000

** Correlation is significant at the 0.01 level (2 tailed)
* Correlation is significant at the 0.05 level (2 tailed)

Result of the test in Table 4.29 revealed that adoption of improved technology was constrained with some factors ($P<0.05$). This means the null hypothesis was rejected.

4.3 Discussion of Findings

The purpose of this study was to examine the influence of Agricultural Extension Programme on farmers' agricultural production in Kano State. The findings of the study were discussed in line with stated objectives and Null Hypotheses.

The findings of the study implied that 87.6 percent of the farmers were males (Table 4.1). The result is almost similar with that of Ogunwale et al (2006) that indicated 90 percent of the farmers in his study were males. Williams and Oluwo (1990) indicated that male farmers were more likely than female farmers to have contact with Agricultural Extension agents, due to this, women farmers lacked knowledge of improved agricultural practices. The study also observed that (Table 4.2) majority (72.2%) of the farmers were relatively young (15 to 45 years). Auta et al (1992) indicated that age was found significantly associated with acceptance of improved farm practices. This agreed with the theoretical logic that young farmers tend to be more flexible in their decisions to adopt new ideas.

The study pointed out that 51.9 percent of the farmers (Table 4.5) had acquired formal education at different levels. Education is an important factor in farming and contributed significantly to the acceptance of agricultural innovation. Auta (1992) indicated that education's contribution to innovativeness can be looked at in terms of the opportunities that become open to the literate farmers in the form of posters, bulletins, magazines etc. It was observed (Table 4.6) that majority (54.6%) of the farmers belonged to farmers cooperatives. Mijindadi (1990) reported that a declared policy of both Federal and State governments on Nigeria was to use the cooperative system as a vehicle of

social and economic development. Therefore, through cooperatives, the members accepted agricultural innovation and also solved their problems collectively.

The study observed in Table 4.7 that majority (46.7%) of the extension agents used group methods to disseminate improved farm practices to farmers. Agbamu (2006) recommended that group methods offered the possibility of greater extension coverage because large number of farmers could be reached at a time, and therefore were very appropriate for teaching skills to farmers. It was also discovered (Table 4.8) that the majority (95.4%) of Extension Agents used demonstration methods in teaching the improved practices to the farmers. This is a very effective method of propagating improved practices to farmers. Agbamu (2006) added that in method demonstration, the farmers were shown how to do something step-by-step that is, in sequence for instance how to spray insecticides or apply fertilizers. The expressed opinions of the 90.1 percent of Extension Agents as indicated in Table 4.9 that the teaching methods they used influenced the farmers to adopt the innovation introduced to them in the study area.

The findings discovered that 68.0 percent of the farmers used the nine (9) improved farm practices introduced to them frequently, 21.3 percent occasionally, 4.6 percent used but discontinued, while 6.2% never used (Tables 4.11-4.19). For the impact of adoption of the improved farm practices on the yields of sorghum, millet and cowpea, it was observed that 85.0 percent of the farmers indicated that the production had increased, 4.3 percent said produce had decreased, 7.0 percent had no change, and 3.3 percent were uncertain, while 0.3 percent did not respond to those questions (Table 4.20-4.22).This was close to Ogunwale,et al(2006)findings which showed that all the farmers sampled indicated that the adoption of farm technologies increased yield and productivity.

The findings also discovered that lack of necessary inputs was the most serious problems (61.8%) responsible for some farmers in the study did not adopt the improved farm practice introduced to them (Table 4.24). This was in line with Agbamu (2005) who said that the necessary inputs required by most of the innovation were supplied by agro-marketing companies or subsidized public agro-supply agencies. These were not effective in distributing the inputs to rural farmers. It was also discovered that (table 4.25) delay in receipt of production inputs was the major problems that limited the success of majority (63.2%) of extension agents in discharging their extension activities. This is contrary to Ilu (2002) findings who ranked the problems as inadequate means of transportation, low funding and than lack of inputs. Olayiwola (2008) reported that significant association was found between the problem confronting the village extension agents and their job performance. This means that the more these problems are solved the better their performance.

On the tested Null Hypotheses, the results showed that there was significant relationship between the personal characteristics of the farmers, and their level of adoption of agricultural innovation introduced to them (Table 4.26). Therefore the Null Hypothesis I stated was rejected. It was also observed from the results that there was significant relationship between the extension teaching methods used by extension agents in disseminating improved practices to farmers, and the rate of adoption of the improved practices by the farmers (Table 4.27), thus the Null Hypothesis II formulated was rejected. It was also identified that there was significant relationship between the adoption of the recommended practices, and change in agricultural production (Table 4.28), hence the Null Hypotheses III was rejected. The results also showed that there was

significant relationship between factors militating against the adoption of extension recommendation, and the effectiveness of the programme (Table 4.29). Therefore, the Null Hypothesis IV stated was rejected.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This chapter presented the summary of the research work, the conclusion and the recommendations based on the findings. The Limitation of the study and suggestion for further Studies were also presented.

5.1 Summary

The study was conducted to determine the Influence of Agricultural Extension Programme on Farmers' Agricultural Production in Kano State. Four (4) specific objectives were formulated. The specific objectives were to examine the farmers' personal characteristic and their effect on the adoption of agricultural innovation in the study area, to identify the extension teaching methods used by Extension Agents in the area in dissemination of the improved practices to farmers and their effectiveness. In addition, the objectives were to determine the extent of adoption of the recommended practices by the farmers in relation to their agricultural production, and to ascertain the factors militating against the adoption of extension recommendations in the area. In line with these objectives, four (4) research questions, and four (4) Null Hypotheses were formulated.

The study was delimited to the study of sorghum, millet and cowpea producing farmers. Eight thousand, eight hundred and sixty six (8,866) farmers (household heads) and two hundred and thirty six (236) extension agents, were used as population for the study making up a total of nine thousand, one hundred and two (9,102). The sample size of three hundred and seventy (370) farmers and one hundred and fifty two (152) extension agents were randomly drawn from the population given

a total of five hundred and twenty two (522). Survey research design was used for this study in which two sets of questionnaires were used, one for the farmers, and the other for extension agents, as instruments for data collection. Three hundred and seventy (370) and one hundred and fifty two (152) copies of questionnaire were distributed to the farmers and the Extension Agents respectively. Percentage and Spearman's Rho Correlation Procedures were used for data analysis and test of the Null Hypotheses at 0.05 level of significance.

The results of the tested Null hypotheses I indicated that, the personal characteristics of the farmers were examined as highly correlated with adoption of improved farm practices ($P<0.05$). This means that the personal characteristics influenced the acceptance and adoption of agricultural innovations in the study area, and that of Null Hypothesis II indicated that the type of teaching methods used by Extension Agents in disseminating the improved practices to farmers was significantly correlated with rate of adoption by the farmers ($p<0.05$). That is the methods encouraged farmers to adopt the improved farm practices in the area. In addition, the results of the tested Null Hypotheses III showed that the adoption of improved farm practice by the farmers was significantly correlated with change in agricultural production ($P<0.05$). This means that the adoption increased the agricultural production in the area, while that of Null Hypotheses IV ascertained that the factors militating against adoption of improved farm practices was significantly correlated with effectiveness of extension activities. ($P<0.05$). That is, adoption of improved farm practices was constrained by some factors in the study area. Therefore, the Null Hypotheses I, II, III and IV earlier stated were rejected.

The results of the finding showed that 87.6% of the farmers were males, while 7.0% females. 72.2% were within age category of 15-45 years, 86.5% were marriage and 41.4% had 0.3 children, 62.2% had acquired formal education at different levels and 29.6% had Qur'anic education. 54.6% belonged to Farmers Association in the study area.

The study identified that 46.7% of the Extension Agents used Group Method in disseminating the improved farm practices to famers. Those that used the combination of Individual and Group Methods constituted 31.6%, and 6.6% used Mass Methods. The Demonstration Methods were used by 95.4% of the Extension Agents in the study area. 90.1% of the Extension Agents had the opinion that farmers in the study area adopted the innovation introduced to them, while 36.2% of the farmers had the opinion that the agricultural extension services in the area was effective, 20.0% was very effective, while 19.5% not effective.

The results showed that 68.0% of the farmers used the improved farm technologies introduced to them frequently, 21.3% occasionally, 4.6% used and discontinued, while 6.2% never used. It was also observed that 85.0% of the farmers had increase in yield after the adoption of the improved practices introduced to them 4.3% had decrease and 7.0% did not see any change, while 3.3% were uncertain.

The findings revealed that high cost of fertilizers was the major problem that affected adoption of improved farm technologies than any other problems listed, this was indicated by 47.0% of the farmers involved in this study. Others were lack of adequate knowledge about recommended farm practices (16.2%), unavailability of fertilizers (12.4%) lack of ready market to sell produce (7.3%), cost of labour (4.9%)

cost of agro-chemicals (2.4%). 61.8% of the Extension Agents interviewed during the study also expressed their opinion that unability of the farmers to produce necessary production inputs hindered the effectiveness of Agricultural Extension activities in the study area.

5.2 Conclusion

The following conclusions were derived based on the findings of this study.

Many farmers in the study area acquired formal education at different levels, and belonged to different farmers' associations. The extension agents in the area preferred group and demonstration teaching methods in disseminating improved farm practices to farmers. These methods were found effective in motivating the farmers to adopt improved practices introduced to them, and the adoption of the improved farm practices by the farmers increased their agricultural productivity. Both the farmers and extension agents identified some problems that limited the success of agricultural extension activities in the area.

It can therefore be concluded that agricultural extension activities were found effective in the study area and the adoption of improved farm practices introduced to the farmers by Agricultural Extension Agents led to increase in sorghum, millet and cowpea productivity in the area. However, there were certain factors such as high cost of fertilizers, unavailability of the fertilizers, cost of agro-chemicals, lack of technical knowledge about the recommended farm practices that caused some farmers not to adopt the improved farm practices.

5.3 Recommendations

The following recommendations are put forward based on the findings of the study in order to improve agriculture extension activities in the study area.

i. Based on the fact that a number of farmers in the study area had low level of Western education, therefore, Kano State Ministry of Agriculture is recommended to translate agricultural extension materials into Hausa language in order to make those farmers who had the low level of Western education to read and understand the information disseminated to them.

ii. Kano State Government is advised to recruit more trained male and female extension agents to make the farmers to have more effective contact with agricultural innovation in order to increase agricultural production.

iii. Kano State Agricultural and Rural Development Authorities should develop frequent and regular supervision of the extension agents in the rural areas by their senior officers in order to ensure effective monitoring and evaluation of agricultural extension activities in the study area.

iv. High costs and unavailability of farm inputs are the most problems affecting most of the farmers in the study area to adopt improved farm practices. Therefore it is recommended that Kano State Government should provide the farm inputs to farmers at subsidized prices and at right time. Tractors should also be given out and hired to farmers at a low price in order to reduce the cost of labour.

v. Famers are advised to organize adult literacy classes in their areas in order to increase their literacy level, and also for better understanding and adoption of improved farm practices.

vi. Farmers should establish effective Farmers' Organization in their areas in order to be used to facilitate procurement of the farm inputs from relevant agencies.

5.4 Limitation of the Study

The conduct of the research was constrained by some factors, these were:

i. The administration of some questionnaires to some villages was very difficult due to transportation problems. Some villages in the study area were not connected with good motorable roads. This delayed the administration of the questionnaires to the villagers.

ii. Due to lack or low level of Western education of some farmers in the study area, the items in the questionnaires had to be translated into Hausa language. This extended the period for the conduct of the research.

Despite the constraints encountered the conduct of the research was very successful.

5.5 Suggestion For Further Studies

A similar research is suggested to be conducted in the field of livestock production.

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APPENDIX I

Agricultural Education Section,
Voc. And Tech. Education Dept,
Faculty of Education,
Ahmadu Bello University, Zaria.

15th December, 2010.

Dear Sir/Madam,

Request to Complete Questionnaire

I am a Postgraduate Student of the above named Institution, conducting a research titled "Influence of Agricultural Extension Programme on Farmers' Agricultural Production in Kano State.

The research is purely for academic purpose, and all your responses will be treated confidentially. Please, I solicit for your full cooperation on the information requested towards the success of the study.

Thank you.

Yours faithfully,

Idi Garba.

APPENDIX II

QUESTIONNAIRE FOR FARMERS

Please tick [√] the best answer to your opinion from each question or give your information in the space indicated 'others' (other response).

Section A: Farmers' Personal Characteristics

1. Local Government Area_____
2. Village_____
3. Gender: (i) Male [ ] (ii) Female [ ]
4. Age (years)
   i. Below 15 [ ]
   ii. 15 to 30 [ ]
   iii. 31 to 45 [ ]
   iv. 46 -60 [ ]
   v. Above 60 [ ]
5. Marital status:
   i. Married [ ]
   ii. Single [ ]
   iii. Widowed [ ]
   iv. Divorced [ ]
6. No of children
   i. 0-3 [ ]
   ii. 4-6 [ ]
   iii. 7-10 [ ]
   iv. More than 10 [ ]
7. Highest educational qualifications
   i. Never attended school[ ]
   ii. Qur'anic education [ ]
   iii. Adult education [ ]
   iv. Primary education [ ]
   v. Secondary education [ ]
   vi. Post secondary education [ ]
   vii. Other (Specify)_____
8. Please, indicate other sources of your income apart from farming
   i. None [ ]
   ii. Trading [ ]
   iii. Brick layering [ ]
   iv. Tailoring [ ]
   v. Others (specify)_____

9. Do you belong to any farmers' association
   i. Belong [ ]
   ii. Not belong [ ]
10. If belong, which type?
   i. Farmers' producer comparative [ ]
   ii. Farmers' produce marketing cooperative [ ]
   iii. Farmers' credit cooperative [ ]
   iv. Farmers' consumer cooperative [ ]
   v. Farmers' multipurpose cooperative [ ]
   vi. Others (specify)_____
11. How beneficial does your belonging to such association contribute to your sorghum, millet and cowpea production?
   i. Highly beneficial [ ]
   ii. Beneficial [ ]
   iii. Somehow beneficial [ ]
   iv. Not at all [ ]

Section B: Farmers' Opinion on Effectiveness of Extension Teaching Method

12. What is your main source of information on new farm practices for sorghum, millet and cowpea production?
   i. Extension worker [ ]
   ii. Family and neighbors' [ ]
   iii. Radio [ ]
   iv. Newspaper [ ]
   v. Agricultural shows [ ]
   vi. Posters and leaflet [ ]
   vii. Cooperatives [ ]
   viii. Others (specify)_____

13. Who showed you how best to apply the improved practices on your farm for example, fertilizers, herbicides, insecticides etc?
   i. Extension workers [ ]
   ii. Family and neighbors [ ]
   iii. Information written on the container [ ]
   iv. Others (specify)_____

14. Do you notice any difference in yield between improved practices and traditional method of farming?
   i. Yes [ ]
   ii. No [ ]
   iii. I could not differentiate between the two [ ]

15. If yes, how can you rate the difference between the improved practices and the traditional method of farming in terms of the yield?
    i. Very large [ ]
    ii. Large [ ]
    iii. Not large [ ]

16. Please indicate frequencies of times you had contact with extension worker(s) during production season on how to apply modern farm practices
    i. Weekly [ ]
    ii. Monthly [ ]
    iii. Once in 3 months [ ]
    iv. Occasionally [ ]
    v. Never [ ]
    vi. Others (specify)_____

17. How effective is the administration of the agricultural extension activities by the extension workers in this village?
    i. Very effective [ ]
    ii. Effective [ ]
    iii. Not effective [ ]
    iv. No idea [ ]

Section C: Extent of Adoption of Recommended Practices by the Farmers

18. Do you take part in extension demonstration plot for sorghum, millet and cowpea production?
    i. Yes [ ]
    ii. No [ ]
    iii. I never see any [ ]

19. If yes, do the extension demonstration plots encourage you to adopt improved farm practices in the production of sorghum, millet and cowpea?
    i. Very much encouraged [ ]
    ii. Some how encouraged [ ]
    iii. Not encouraged at all [ ]

20. How often do you use the following improved farm practices in your production of sorghum, millet and cowpea? (tick as appropriate)

S/N	Improved Farm Practice	I Frequently	II Occasionally	III Used and discontinued	IV Never
I.	Chemical fertilizers				
II.	Seed dressing chemicals				
III.	Weed control chemicals				
IV.	Storage chemicals				
V.	Plant spacing				
VI.	Seed rate				
VII.	Improved variety of sorghum seeds				
VIII.	Improved variety of millet seeds				
IX.	Improved variety of cowpea seeds				

Please how can you describe the change in yield in your production after adoption of improved farm practices for.

21. Sorghum
    i. Increase [ ]
    ii. Decrease [ ]
    iii. No change [ ]
    iv. Uncertain [ ]

22. Millet
    i. Increase [ ]
    ii. Decrease [ ]
    iii. No change [ ]
    iv. Uncertain [ ]

23. Cowpea
    i. Increase [ ]
    ii. Decrease [ ]
    iii. No change [ ]
    iv. Uncertain [ ]

Section D: Farmers' Opinion on Factors Militating Against the Adoption of Extension Recommendations in the Study Area

24. What do you think are the factor(s) militating against the adoption of improved production technologies in this area for the production of sorghum, millet and cowpea? (Please tick those applicable).
    i. cost of fertilizer [ ]
    ii. Unavailability of fertilizer [ ]
    iii. cost of labour [ ]
    iv. Lack of ready market to sell the produce [ ]
    v. cost of agro-chemicals [ ]
    vi. Lack of adequate technical knowledge about recommended farm practices [ ]
    vii. Some practices run contrary to our needs [ ]
    viii. Inadequate rains [ ]
    ix. Others (specify)_____

25. What is the ownership status of your farm?
    i. Personal farm [ ]
    ii. Family farm [ ]
    iii. Both personal and family farm [ ]
    iv. Borrowed farm [ ]
    v. Renting farm [ ]

26. Do you ever try to obtain or hire a tractor or ox-drawn plough.
    i. Yes [ ]
    ii. No [ ]

27. If yes, what was the result.
    i. Successful [ ]
    ii. Not successful [ ]

28. If no, what was the reason?
    i. High cost [ ]
    ii. Unavailability [ ]
    iii. Others (specify_____

29. What assistance do you need to improve your sorghum, millet and cowpea production?
    i. Supply of agric inputs on time [ ]
    ii. Subsidizing the prices of inputs [ ]
    iii. Securing loans [ ]
    iv. Supply of more extension workers [ ]
    v. Eradication of pests and diseases [ ]
    vi. Developing farmers' organization [ ]
    vii. All of the above [ ]
    viii. Others (specify)_____

APPENDIX III

QUESTIONNAIRE FOR FULL-TIME EXTENSION WORKERS

Please tick [√] the best answer to your opinion from each question or give your information in the space indicated 'others' (other response).

Section A (Bio Data)

1. Station (L.G.A)_____
2. Gender:
   i. Male [ ]
   ii. Female [ ]
3. How many years have you been in agricultural extension service?
   i. Below 5 [ ]
   ii. 6 - 10 [ ]
   iii. 11 - 15 [ ]
   iv. Above 15 [ ]
4. Your highest educational qualification
   i. No training [ ]
   ii. SSCE/TC II [ ]
   iii. NCE/OND [ ]
   iv. Degree/HND [ ]
   v. Others (specify)_____

Section B: Extension Teaching Methods and Their Effectiveness

5. Indicate method used to make contact with farmers
   i. Individual methods [ ]
   ii. Group methods [ ]
   iii. Mass methods [ ]
   iv. Combination of i and ii above [ ]
   v. Others (specify)_____

6. During your stay in this area, how often do you call special meeting with farmers to discuss extension programme on sorghum, millet and cowpea production?
   i. Never [ ]
   ii. Once [ ]
   iii. Twice [ ]
   iv. Three times [ ]
   v. More than three times [ ]
   vi. Every cropping season [ ]
   vii. Others (Specify)_____

7. Do you ever demonstrate new practice(s) on sorghum, millet and cowpea production?
   i. Demonstrated [ ]
   ii. Not demonstrated [ ]

8. If demonstrated, indicate how often you demonstrate new practice(s) to farmers on the crops?
   i. Frequently [ ]
   ii. Occasionally [ ]
   iii. Every cropping season [ ]
   iv. Others (specify)_____

9. Please, indicate number of times you visited farmers in your extension area, in a production season
   i. Weekly [ ]
   ii. Every 2 weeks [ ]
   iii. Monthly [ ]
   iv. Once in 3 months [ ]
   v. Occasionally [ ]
   vi. Others (specify)_____

10. Do you think farmers in this area adopt improved practices for the production of sorghum, millet and cowpea?
   i. Adopt [ ]
   ii. Do not adopt [ ]

11. If adopted, how many of the farmers would you say have adopted the improved practices?
   i. All of the farmers [ ]
   ii. Most of the farmers [ ]
   iii. Half of the farmers [ ]
   iv. Less than half of the farmers [ ]
   v. Just a few [ ]
   vi. None [ ]

12. How often are the following improved farm practices used in this area for the sorghum, millet and cowpea production? (tick as appropriate)

S/N	Improved Farm Practice	I Frequently	II Occasionally	III Used and discontinued	IV Never
I.	Chemical fertilizers				
II.	Seed dressing chemicals				
III.	Weed control chemicals				
IV.	Storage chemicals				
V.	Plant spacing				
VI.	Seed rate				
VII.	Improved variety of sorghum seeds				
VIII.	Improved variety of millet seeds				
IX.	Improved variety of cowpea seeds				

13. Indicate the proportion of participating farmers in willing to carry out the recommended practices?
    i. Most of them very willing [ ]
    ii. About half of them willing [ ]
    iii. Less than half of them willing [ ]
    iv. Only few of them willing [ ]

Section C: Extension Agents Opinion on Factors Militating Against the Adoption of Extension Recommendations in the Area

14. In your opinion, what do you think is/are responsible for some farmers not adopting the improved practices?
    i. Lack of necessary inputs [ ]
    ii. Some of the practices are rather difficult to follow [ ]
    iii. Some practices run contrary to their needs, interest and tradition [ ]

    iv. Others (specify)_____

15. What is the farm size of an average farmers in this area in hectare?
    i. Less than one [ ]
    ii. 1-2 [ ]
    iii. 3-4 [ ]
    iv. Over 5 [ ]

16. How will you rate the adequacy of the services you provide to your clients (farmers)?
    i. Very adequate [ ]
    ii. Adequate [ ]
    iii. Not adequate [ ]

17. What is the adequacy of supervision by your senior officers while conducting the extension activities?
    i. Very adequate [ ]
    ii. Adequate [ ]
    iii. Not adequate [ ]

18. What are the major problems that limited the success of your extension activities in this area? (Please tick those applicable)
    i. Lack of cooperation from local leaders [ ]
    ii. Lack of cooperation from farmers [ ]
    iii. Lack of encouragement from my employer [ ]
    iv. Too many assignment to be handled [ ]
    v. Delay in receipt of production inputs [ ]
    vi. Others (specify)_____

19. What assistance do you think would improve sorghum, millet and cowpea production in this area?
    i. Supply of production inputs on time [ ]
    ii. Subsidizing the prices of inputs [ ]
    iii. Securing loans [ ]
    iv. Supply more extension workers [ ]
    v. Eradication of pests and diseases [ ]
    vi. Developing farmers organization [ ]
    vii. All of the above [ ]
    viii. Others (specify)_____

APPENDIX IV

Sample Size Table*

From The Research Advisors

There are various formulas for calculating the required sample size based upon whether the data collected is to be of a categorical or quantitative nature (e.g. is to estimate a proportion or a mean). These formulas require knowledge of the variance or proportion in the population and a determination as to the maximum desirable error, as well as the acceptable Type I error risk (e.g., confidence level).

But why bother with these formulas?

It is possible to use one of them to construct a table that suggests the optimal sample size – given a population size, a specific margin of error, and a desired confidence interval. This can help researchers avoid the formulas altogether. The table below presents the results of one set of these calculations. It may be used to determine the appropriate sample size for almost any study.

Many researchers (and research texts) suggest that the first column within the table should suffice (Confidence Level = 95%, Margin of Error = 5%). To use these values, simply determine the size of the population down the left most column (use the next highest value if your exact population size is not listed). The value in the next column is the sample size that is required to generate a Margin of Error of ± 5% for any population proportion.

However, a 10% interval may be considered unreasonably large. Should more precision be required (i.e., a smaller, more useful Margin of Error) or greater confidence desired (0.01), the other columns of the table should be employed.

Thus, if you have 5000 customers and you want to sample a sufficient number to generate a 95% confidence interval that predicted the proportion who would be repeat customers within plus or minus 2.5%, you would need responses from a (random) sample of 1176 of all your customers.

As you can see, using the table is much simpler than employing a formula.

Required Sample Size†

Population Size	Confidence = 95% Margin of Error				Confidence = 99% Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

Professional researchers typically set a sample size level of about 500 to optimally estimate a single population parameter (e.g., the proportion of likely voters who will vote

for a particular candidate). This will construct a 95% confidence interval with a Margin of Error of about ±4.4% (for large populations).

Since there is an inverse relationship between sample size and the Margin of Error, smaller sample sizes will yield larger Margins of Error. For example, a sample size of only 100 will construct a 95% confidence interval with a Margin of Error of almost ±13%, too large a range for estimating the true population proportion with any accuracy.

Note that all of the sample estimates discussed present figures for the largest possible sample size for the desired level of confidence. Should the proportion of the sample with the desired characteristic be substantially different than 50%, then the desired level of accuracy can be established with a smaller sample. However, since you can't know what this percentage is until you actually ask a sample, it is wisest to assume that it will be 50% and use the listed larger sample size.

The number of sub-groups (or "comparison" groups) is another consideration in the determination of a sufficient sample size. Since the parameter must be measured for each sub-group, the size of the sample for each sub-group must be sufficiently large to permit a reasonable (sufficiently narrow) estimation.

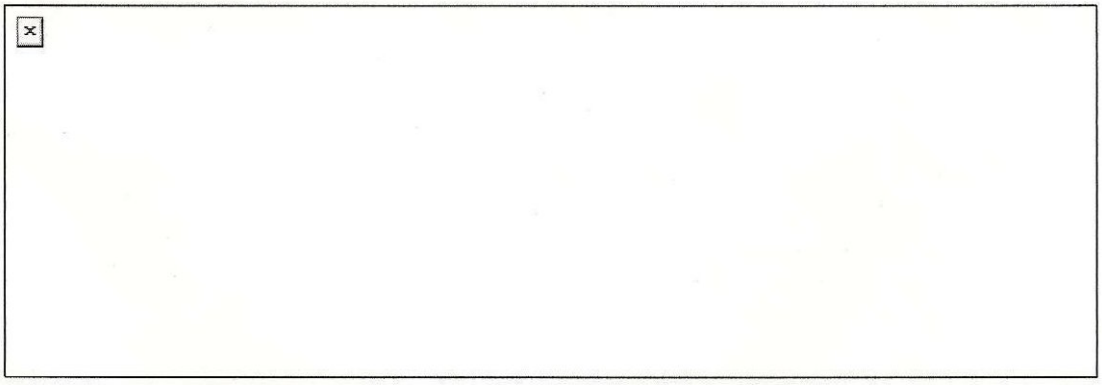
Treat each sub-group as a population and then use the table to determine the recommended sample size for each sub-group. Then use a stratified random sampling technique within each sub-group to select the specific individuals to be included.

If you would like to calculate sample sizes for different population sizes, confidence levels, or margins of error, download the Sample Size spreadsheet and change the input values to those desired.

Download the spreadsheet by clicking on the download button: 

Note: The spreadsheet was designed for a 17" monitor, so you may have to resize it ("Zoom" it out).

The formula used for these calculations was:



This formula is the one used by Krejcie & Morgan in their 1970 article "Determining Sample Size for Research Activities" (*Educational and Psychological Measurement*, #30, pp. 607-610).