THE IMPACT OF TRAINING AND VISIT EXTENSION SYSTEM ON AGRICULTURAL DEVELOPMENT IN KATSINA STATE

BY

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DECLARATION

I hereby declare that this thesis has been written by me and it is a record of my own research work. It has not been presented before in any previous application for a higher degree or reputable presentation elsewhere.

All borrowed ideas have been duly acknowledged by means of references and quotation marks.

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The above declaration is affirmed.

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CERTIFICATION

This thesis entitled "*THE IMPACT OF TRAINING AND VISIT EXTENSION SYSTEM ON AGRICULTURAL DEVELOPMENT IN KATSINA STATE*" by Abubakar Bakori Magaji, meets the regulations governing the award of the degree of Master of Science in Agricultural Extension and Rural Sociology of Ahmadu Bello University, Zaria, and is approved for its contributions to scientific knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to my old mother, my four children, especially the young Usman and Baby Umar who were born during the course of the study and to all those that taught me.

Special dedication to my late father, Abubakar, and my late close friend, Abdu Lado Kankia. May their souls rest in peace, Amen!

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ABSTRACT

This study«was designed to assess the impact of training and visit 'extension system on agricultural development in Katsina State. A sample of 150 household heads was randomly drawn, out of which 124 responded to the interview, which was carried out in six local government areas within the three zones of the Katsina State Agricultural and Rural Development Authority (KTARDA), namely: Daura and Zango Local Government Areas in Zone I, Funtua and Bakori in Zone II and Dutsin-Ma and Batsari in Zone 111.

The data collected in these areas showed an improvement on the production of agricultural products and standard of living of the farmers in the study area compared with the years before the T&V was introduced.

The T&V also indicated higher involvement of all the sectors of agricultural developments. The structure and management of the T&V system was moderately adjusted to suit the need of the organization and brought about reduction in the cost of managing extension activities, shortened the bureaucratic aspects of the extension and provided greater involvement of all the sectors of agricultural development.

Furthermore, the aggregate farm products in 1991 (year of study) is slightly higher than that ot 1904 (before the T&V was introduced). This might be due to the influence ot-the T&V introduced.

The study indicated that there were more small-scale producers in 1991 than the 1984. The cost of production was observed to have influenced the farmers' decision on whether to embark on small scale or large scale production.

The awareness, adoption/diffusion rate among the five categories, viz large, medium and small-scale, contact and non-contact farmers in the state was generally high, especially within the contact groups and the large-scale farmers.

On determining the impact of T&Vs on agricultural development, the rate of awareness and adoption of six recommended improved seeds of cowpea, millet, maize, sorghum,

groundnuts and cotton were considered. Majority of the respondents indicated their awareness by above one-half of all the respondents, while the adoption rate was relatively low in four crops out of the six listed.

The awareness rate of maize was indicated by most (98%) of the respondents, with two-third (66%) adoption rate in 1984 as against (65%) in 1991. While cotton was grown by all the respondents (100%) in 1984 with only two-fifth (41%) in 1991.

The women's participation in agricultural development was generally higher and on the increase especially among the young farmers with the introduction of women's associations, and Better Life programmes.

The introduction of Women in Agriculture (WIA) staff posted to all the blocks within the state for effective coverage, also brought about higher involvement of all sectors among the women folks.

The finding of the Pearson Correlation analyses also indicated that the independent variables showed very low contribution to dependent variables. In the whole analyses only six independent variables showed their significant relationship to dependent variables, in the. four different analyses.

Both variables contributed directly or indirectly to the agricultural development, and the impact of T&Vs but is sometimes hard to measure. For future research of this kind, better operationalisation of variables should be looked for as there are many of them.

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Chapter One

INTRODUCTION

Most of the developing countries, like Nigeria, have their economies are based on agriculture with sixty to eighty percent of the people living in the rural areas and most of the available resources consisting of land and people.

Capital is in limited supply and must be generated through the development of agriculture. It is for this reason, that the governments in African countries are becoming increasingly aware of the special position which agriculture occupies in the life, economy and progress of the people for whose future they have responsibilities.

Agricultural sector plays a key role in the economic development of Nigeria in terms of producing food, foreign exchange earnings from export, raw materials for industries and employment. Prior to discovery of oil, the agricultural sector was the most important contributor to the public revenues. Since the discovery of oil there has been a steady decline in the contribution of the agricultural sector to the national economy. Its share of the GNP dropped significantly from 61.2% in 1962 to 24.7% in 1973 and went further down to 10.4% in 1985 (CBN, 1986).

Also, the total agricultural export dropped sharply from 61.01% of the total export in 1965 to about 4.6% of the total export in 1980 and decreased further to 3.6% in 1983 (Federal Ministry of Science and Technology, 1985). The share of agricultural import to total export has also remained significantly high, at least in absolute terms (Abalu and

Ingawa, 1987). This has led to a soaring of import bills of up to ₦1,091 million in 1980 (First Bank, 1982).

1.1 Agricultural Extension and Rural Development Strategy

The need to increase agricultural production arose in the country to control the mass movement of rural dwellers to urban areas for employment and also to feed the increasing population. The need for rapid rural development could only be achieved through reaching large number of small- and large-scale farmers in the rural areas through effective agricultural extension services.

Ineffective agricultural extension services were the major constraint to the programmes of agricultural sectors (Fourth National Development Plan, 1985; Ega, 1988). This was considered in relation to the inability of the small-scale farmers to adopt improved inputs and farm practices associated with agricultural mechanization and productivity.

Furthermore, part of the problem of low productivity in this sector could be attributed to increasing population pressure on the cultivated land and the dwindling and uncertain oil revenue. The problem of staff motivation, effective delivery of agricultural inputs linkage between research and extension and the establishment of confidence in extension among farm families remained unsolved (Akinbode, 1981).

Nigeria made a shift into extension activities through the use of World Bank loan to instigate a series of agricultural extension programmes, credit facilities to

farmers, input supply projects, from the late 1970 (Howell, 1980). In this regard, various policies, programmes and projects have been formulated over the years, by both the Federal and State governments. Some of these programmes are the National Accelerated Food Production Programmes (NAFPP) of 1972; The Agricultural Development Projects of 1975 (ADPs); Operation Feed the Nation (OFN), 1976; the River Basin Development Authorities (RBDAs), 1977; the Green Revolution, 1980; the Directorate of Food, Roads and Rural Infrastructure (DFRRI), 1986; and the National Agricultural Land Development Authority (NALDA), 1991. The strategies are aimed at improving the farmers' technical knowledge and skills to bring about greater output and improvement in their standard of living.

1.2 State of Agricultural Extension Services in Katsina State

The above-mentioned programmes were therefore introduced and practised in Katsina State with same aim of improving the farmers' skills and technical know-how in agricultural development.

Apart from the Ministry of Agriculture, the following agencies are concerned with extension matters in the state: Katsina State Agricultural and Rural Development Authority (KTARDA), Directorate for Food, Roads and Rural Infrastructure (DFRRI), National Livestock Project Department (NALPD); Nigerian Agricultural and Co-operative Bank (NACB), Sokoto Rima Basin Development Authority (SRBDA), Katsina Afforestation Project Unit (KTAPU), Accelerated Wheat Production Programmes located at Jibia, Dutsin-Ma, Ajiwa,

Bakori and Funtua, Nigerian Agricultural Insurance Company (NAIC), National Land Development Authority (NALDA) and Katsina State Community Development financed by International Fund for Agricultural Development (IFAD) covering the sahel areas of the State.

These programmes were introduced to help boost agricultural production and the standard of living of the mass community. Some programmes were financed by Federal Government, some jointly financed by the State, Federal and World Bank while some were financed by State under the State Ministry of Agriculture.

KTARDA, even though affiliated to State Ministry, still exercised some autonomy in policy formulation and execution. Until May 1988, KTARDA had taken over from the Ministry of Agriculture majority of its extension staff and also the routine extension services in all the rural areas in the State. The State was divided into three administrative zones. These zones have their headquarters at Ajiwa for zone one, Funtua for zone two and Dutsin-Ma for zone three while Katsina is the general headquarters.

The T&V extension system was first introduced in 1985 before the creation of Katsina State, then under the Kaduna State Agricultural Development Project (KADP). After the creation of Katsina State in 1987 and the bifurcation of the Kaduna Agricultural Development Project (KADP), the Katsina Agricultural and Rural Development Authority (KTARDA) was created and the T&V system was adopted and mandated to cover the 500,000 farming families in the State.

The objective was to increase farm productivity, farm income and raise living standard of the farmers. These can be achieved through extension services, improved seed multiplication, agro-forestry programme, construction of rural feeder roads and infrastructures such as earth dams, tube wells, wash bores, open wells, bore holes and other irrigation facilities.

However, it is one thing to evolve a development programme and quite another thing to ensure its effective implementation. It is against this background that this study had been undertaken to assess the impact of T&Vs on agricultural development in Katsina State.

The T&V system is the model of extension advocated by the World Bank and has been in operation since the creation of the State in September 1987. The State project was re-designed and eventually took off in May 1988, with some target set and modifications to reflect areas in its geographical boundaries and population. These set objectives were to be achieved within a period of 1989-1991, with financial and some technical assistance from the World Bank.

With the T&V system now in place for a few years, however, latent problems are emerging, many of them arising out of the approach to agricultural extension embodied in the system. Administrative norms and procedures still emphasize office not fieldwork, as do supervisors, rural development strategies are still sometimes at odds with the single-purpose function of the extension worker, difficulties are still

arising in conducting research and adapting technologies to meet farmers' need.

1.3 Research Problem

This study will attempt to answer the following research questions:

1. What is the structure, operation and management of the T&V system in Katsina State,
2. What is the farmers' level of awareness, and adoption rate of farm innovation among the various categories of farmers in the State,
3. What had been the impact of the extension system on farm production, and
4. What are the level of women participation in agricultural production.

1.4 Objectives of the Study

The objectives of the study are to

1. describe the structure, operation and management of T$Vs in the State,
2. determine the impact of T$Vs on farm production,
3. determine the farmers' level of awareness, adoption rate of farm innovation among the various categories of farmers in the State, and.
4. To determine the level of women participation.

1.5 Hypotheses

The hypotheses of the study are designed to find the level of significance of:-

1. The relationship between the standard of living of the farmers and extension visits, demonstration trials, media extension programmes, participation in extension activities, pre-MTRM and MTRM, FNT and in-house training, workshops and seminars,
2. The relationship between adoption of improved technology and extension visit, demonstration trials, media extension programmes, participation in extension activities, pre-MTRM and MTRM, FNT and in-house training, workshops and seminars,
3. The relationship between expansion in crop production and extension visits, demonstration trials, media extension programmes, participation in extension activities, pre-MTRM and MTRM, FNT and in-house training, workshop and seminars, and
4. The relationship between yield of the farmers and extension visits, demonstration trials, media extension programmes, participation in extension activities, pre-MTRM and MTRM, FNT and in-house training, workshops and seminars.

1.6 Justification of the Study

The Nigerian agriculture and indeed, that of any developing country is characterized by low productivity, partly because of the use of primitive method of production

(Oluwasanmi and Alao, 1965 and Olaoloye, 1981). For this reason, there is a growing emphasis on the need to rapidly transform the traditional agriculture. The investment of the large amount of capital in form of credit, it is agreed, will result in the adoption of advanced techniques of production (Famoriyo and Nwagbo, 1981). Both the Federal and State Governments are quite aware of the role which agricultural extension plays in the transformation of traditional agriculture to a more technologically advanced stage. And much has happened to transform agricultural extension since Daniel Benor and James Q. Harrison released their paper, *Agricultural Extension: Training and Visit System* (World Bank, 1977).

It all started with cardinal objective of dramatically increasing yield per unit area. However, the extent to which success in this respect has been achieved, especially in Katsina State, has not been monitored in detail. This study was designed within the framework of T&V system to ascertain the extent to which the T&V system approach, farm production as well as the adoption of new technology has been successful as an extension strategy.

The T&V system has been claimed to be superior in result orientation in comparison to the extension system practised before; it provides for a constant contact between the researchers, Subject Matter Specialists (SMS), Village Extension Workers (VEWs) and the farmers with clear mode of feedback from all the participants concerned with extension activities.

It is envisaged that this study will give us insight into how the T&V system is operating in Katsina State and make it possible to make some suggestions for the improvement of this new extension system. It is hoped that the study will be used by extension agents, extension administrators, and most especially, the researchers who spent most of their time in the field and in their laboratory in search for better solution to farming problems for the poor farmers and the country at large. It will also serve as a guide to the Agricultural Development Projects (ADPs), especially that of Katsina State.

Chapter Two

LITERATURE REVIEW

2.1 Definition of Extension

Agricultural extension may be defined as "a service or system which assist farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, bettering their level of living, and lifting the social, and educational standards of rural life (Maunder, 1972).

Williams and Fenly (1984) defined extension as "a voluntary non-formal education which is planned out of school and designed to help farmers to help themselves." Yazid (1984) also defined extension education as "an informal systematic education of rural people through their own efforts", while Higgs (1985) is of the view of not being fond of the term "extension" because he is never quite sure what is being extended presumably the result of research, but he thinks of it as a much more general process of helping the farmers to help themselves and more, helping him (farmer) to adopt new ideas.

The above definitions are quite broad. They include the whole environment in which farmers live and operate as a legitimate field for extension activities. The definitions recognize the standards which are usually different from levels of achievements, it is not restricted to farmers contact work, but includes extension, research, training,

liaison and information work as integral parts of the agricultural extension system. Extension education involves changes: changes in the behaviour of rural people, presumably resulting in improved agricultural production, better living and strengthening of the national economy. But fundamental to any permanent behavioural change is that of attitude.

This is relevant when working with traditional societies. Extension is an educational enterprise. The people engaged in it must possess a good many abilities in common with teachers in school. Learning is an everyday part of most peoples' life. Because much of this learning takes place outside of the school or classroom, it is usually taken for granted and not considered as learning. However, people do learn things outside the formal education system (Frewin, 1976). It might be hard to generalize about adults as learners because their characteristics vary so widely with respect to age, background, educational level, personality, economic situation and many other characteristics.

2.2 The Role of Agricultural Extension in Nigerian Agricultural Development Policy

The goal of agricultural extension is to ensure that the knowledge and skill of farmers is continually enriched through their access to the continuous developments in agricultural research.

In Nigeria it has been estimated that not less than 80% of the country's nearly 80 million people live in rural areas and are engaged in agricultural production and other related occupations (Onazi, 1978). In addition to land, potential

labour is abundant in the rural areas. It has also been observed (Jibowo, 1979) that Nigeria's population is growing faster than food production. This implies that a significant number of Nigerians are underfed and undernourished. There is a tendency for this, to hinder the ability of the population particularly those acutely affected by hunger and malnutrition to participate effectively in the development of the country.

But people are the important resources of the nation, therefore, it is necessary that the government takes a conscious action to tap and re-direct the potential labour force towards increasing food production. One of the foremost ways to do this is through agricultural extension service.

In this context, the role of agricultural extension is very important in Nigeria. Williams (1973) and Ekpere (1978) indicated that the role of agricultural extension includes:

(a) increasing efficiency in production through dissemination of scientific information and adoption of improved technologies, and

(b) getting the farmers into a frame of mind necessary to acquire knowledge, skills and abilities that would enable them produce and market agricultural products efficiently.

In Nigeria, the role of extension is particularly important primarily because of the low productivity of farmers arising mainly from the use of traditional technologies on an average land holding of 2 hectares (Atala, 1988; Ega, 1988).

2.3 A Brief Historical Background of Agricultural Extension Services in Nigeria

The historical background of agricultural development and extension services in Nigeria has been a long struggle for modernization, establishment and reforms of various organizations in the hope of dramatically improving the welfare of the rural farmers. This struggle cannot be said to have succeeded.

The history may be divided into three main periods:

(a) the period of foundation of research and infrastructure for development by colonial administration - 1893 to 1959.

(b) the period of independence and expansion of extension efforts 1960 to 1970.

(c) the period of frantic effort to be self-sufficient in food production 1970 to date (Yazid, 1983).

The 1893-1920 period was described as the period of extension in embryo, characterized by experimental production of export crops (Wudil, 1980). During this period, emphasis was laid on importation of foreign crops for trial at the Moor Plantation and Samaru (Yazid, 1983).

There were notable achievements in the development of modern agriculture when two Departments of Agricultural Extension were created in the South at Moor Plantation in 1910 and in the North by 1912 at Samaru, Zaria (Williams, 1978; Forrest, 1979; Yazid, 1983). The establishment of the National Department of Agriculture in 1912 by the Central Government

marked a milestone in extension development (Ekpere, 1973; Williams, 1978).

During this period, agriculture indirectly financed major development projects in the country. The constitutional changes of 1954 which brought about regionalisation, saw the establishment of Ministry of Agriculture with extension services under the Chief Agricultural Officer in the North and Chief of Agriculture in the East (Yazid, 1983).

The period 1960 to 1970 was a period of independent thoughts for Nigeria. In 1962 the government requested from the Food and Agricultural Organization (FAO), to study agricultural sector and make recommendations for a long-term development on national basis. The report titled "Agricultural Development in Nigeria 1965-1980" made recommendations, that covered all aspects of agriculture e.g. crops, livestock and fisheries.

The government accepted the recommendations and established Federal Ministry of Natural Resources and Research in April 1965, which was later changed to Federal Ministry of Agricultural Advisory Committee (FMAAC). The Federal government started to develop feelings of dissatisfaction with agricultural development agencies as the 1970s approached (Yazid, 1983). It occurred to planners that the absence of impact was due to isolationist strategy hitherto adopted, and furthermore, that a number of factors required for agricultural development such as a good road network, water supply, health, etc., were lacking.

The realisation led to the establishment of twenty three research institutes, four federal departments of agriculture, four national development committees, with members from the States' Ministries, the Universities, research institutes and served by departmental planning division and the establishment of integrated rural development (IRD).

Between 1974 and 1975, the government of the Federation established the first generation of Agricultural Development Projects (ADPs) in Funtua, Gusau and Gombe. Later, other ADPs were established throughout the federation with the use of World Bank's loan. The ADPs were meant to provide effective extension services for all aspects of agriculture, and also to provide basic rural infrastructures, and efficient procurement centres for farm inputs.

It was later discovered that apart from the indebtedness to the World Bank, these projects have brought about the economic control of Nigeria externally (Ega, 1988). Other projects established were the University of Ibadan pilot project at Badeku while the University of Ife (now Obafemi Awolowo University) was in a full guidance of Isoya Rural Development Projects. The National Agricultural Extension and Research Liaison Services (NAERLS) in Zaria was established to reduce research findings to a format that would be useful to extension staff and farmers in general, while some non-governmental organizations (NGOs) in the country have also been involved in extension services in some parts of the country. They include the Nigerian Tobacco Company (NTC),

Philip Morris, Church organizations, etc. These NGOs had recorded some degrees of success in extension activities.

On introduction of the T&V system by the World Bank, the ADPs adopted the new extension system, the extension agents pay visits to villages on fixed schedule to train the farmers on daily basis, the extension system requires a single line of command and strict adherence to a work programme.

This brief historical background has indicated that the development of agricultural extension in Nigeria has been characterised by efforts to arrive at a more effective extension service capable of efficiently serving the small farmers.

2.4 Concepts, Components and Procedures of T&V Extension System

The (T&V system) aims at building a professional extension service that will be capable of assisting farmers in raising production and increase incomes of farmers by providing appropriate support for agricultural development. The system had been widely adopted in many countries. Considerable variation in the system exists within and between countries, reflecting particular agro-ecological conditions, socio-economic environments, and administrative structures. To be successful, the training and visit system must be adapted to fit local conditions. Certain features of the system, however, cannot be changed significantly without adversely affecting its operation. These features include professionalism, single line of command, regular and continuous training, and close linkages with research.

2.4.1 Concepts of the T&V system

Some features of the T&V system are outlined below:

(a) Professionalism. The extension staff must keep in close touch with relevant scientific developments and research in order to formulate specific recommendations that will be useful to farmers in all kind of resource situations.

(b) Single Line of Command. The extension must be under a single line of technical and administrative command. Support is required from teaching and research institutions, input supply and other agricultural support organizations, and local government bodies but all extension workers should be responsible administratively and technically to a unit within only one department.

(c) Concentration of Efforts. Effective T&V system is based on a concentration of efforts. All extension staff work only on agricultural extension. Staff are not responsible for the supply of inputs, data collection, distribution of subsidies, processing of loans, or any other activity not directly related to extension.

(d) Time-bound Work. Messages and skills must be taught to farmers in a regular, timely fashion, so that they will make best use of the resources at their command. The VEA must visit his farmers regularly on a fixed day (usually, but not necessarily, once each fortnight). Table 1 below shows a schedule of visit for VEA as planned under the T&V system.

Table 1: Time table for VEA (fortnightly visit).

	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Fri	Sat	Sun
First fortnight	1	2	3	4	TRA SMS	Ext. visit	H	5	6	7	8	TRA AEO	Ext. visit	H
Second fortnight	1	2	3	4	TRA SMS	Ext. visit	H	5	6	7	8	TRA AEO	Ext. visit	H

Key:

1-8 = Visit farmers group
TRA SMS = Training conducted by subject matter specialist (SMS)
Ext. visit = Extra visits for checking field trials, office work, make up visits due to holidays, illness, etc.
H = Holidays
TRA AEO = Training conducted by Agric. Extension Officer.

The time-bound work programme, as represented graphically in Table 1 provides a compelling matrix for the main actor's role performance. It is not just a rule imposed on the VEW: it becomes a self-organizing principle for the VEW's activity, simultaneously increasing his accountability to the 'clients' - the farmers - and facilitating the monitoring of his movement by his supervisors.

The system requires that all the farm families assigned to a VEW be divided into eight groups of about equal size. He will visit, in turn, each one of the eight groups in his circle for a full day once every fortnight; he always visits a group on the same day of the week, so the group learns when he should be with them and expects him. The VEW concentrates his efforts, during the village visit, on the 'contact farmers' who represent about 10 percent of the group, but extends advice to other farmers as well. In the remaining days of the week he attends the regular training sessions. The possibility of introducing such a stable work programme for

the mass of the enormously dispersed extension agents is, perhaps, one of the main keys to the effectiveness of the entire T&V system. All other extension staff must make timely and regular visits to the field, as required, to fulfill their job responsibilities.

(e) Field and Farmers' Orientation. To serve farmers effectively, an extension service must be in contact with them. Moreover, contact must be on regular basis, on a schedule known to farmers, and with a large number of farmers representing all major farming and socio-economic types. The farmers served by VEA are divided into groups; each group is visited on a fixed day once every two weeks by the VEA. All other extension workers, including SMSs, also spend a large part of their time in farmers' fields, generally on regularly scheduled visits. Researchers and trainers, as well as District extension officers and other senior staff, must visit the field often and regularly to understand the problems faced by farmers (and by extension workers).

(f) Regular and Continuous Training of Extension Staff. This is required both to teach, and discuss with them, the specific production recommendations required by farmers for the coming fortnights and to upgrade and update their professional skills.

(g) Linkage with Research. Effective extension depends on close linkage with research. Linkages are two-way. Problem faced by farmers that cannot be solved by extension workers are passed on to researchers for either an immediate solution or investigation. During seasonal and monthly workshops and

field trips, extension and research staff formulate production recommendations that will be adapted by extension workers, as necessary to make best use of the specific local environment and actual farmers' resources.

2.4.2 Component and procedures of the T&V system

The components and procedures of the T&V system include the organizational structures, management, operational activities, operators of the system and clients.

The organizational structure represented graphically in Figure 1, is a standard World Bank approved version. It was formed on the basis of grassroots unit, the 'VEW circle'. This takes into account the total number of farm families to be assisted in a given area and defines a reasonable number of farm families which one village worker could be expected to assist. Thus, the ratio is flexible and varies from place to place (1/600, 1/800 or 1/1000) depending, among other factors, on the physical environment, density of population, cropping patterns, etc.

The objective of the organizational structure is to ensure that each level of the organization has a span of control narrow enough to permit close personal guidance, training and supervision of the level immediately below. For example, an Agricultural Extension Officer (AEO) guides and supervises about eight Village Extension Workers (VEWs). In turn eight AEOs are guided and supervised by a Subdivisional Extension Officer (SDEO). The SDEO are supported by a team of Subject-Matter Specialists (SMSs), whose role is mainly to

define the contact of the extension messages for each given time sequence, to train the VEAs accordingly and to supervise their field work (Figure 1).

2.5 Conceptual Framework

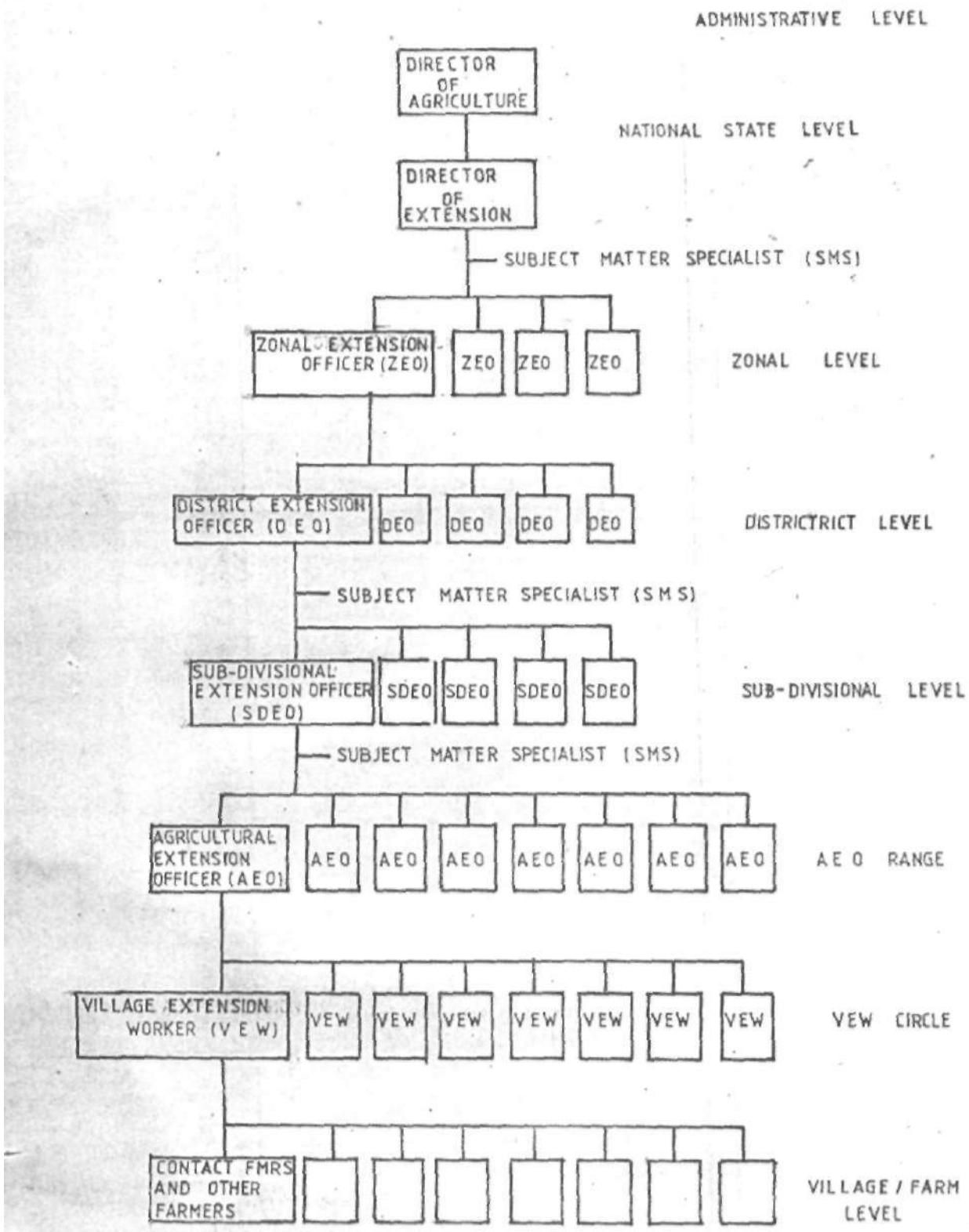
Various extension impact studies have been carried out in Nigeria and many of them use the "activities" carried out by extension organisations as their criteria for assessing the impact of extension on the target population, i.e., the rural farmers.

The need to assess the impact of any programme is very necessary since it will be concerned with effectiveness and goal achievement of the programme. The aim of any extension programme is to raise the productivity and income of the farmers. There is therefore, the need to look at the immediate outcome which includes awareness and adoption of farm technologies.

Impact is generally concerned with the outcome or effect of an intervention. Most studies done in the country are under the premises that certain social, economic, cultural and environmental factors are the ones affecting farmers' decision to adopt new practices (Basu, 1968; Alao, 1971; Voh, 1982; Atala, 1986; Akanya, 1989) many of the studies saw adoption as "a process through which an individual passes from knowledge of an innovation to a decision to continually use the innovation" (Rogers, 1962).

For instance, the Agricultural Project Monitoring, Evaluation and Planning Unit (APMEPU) in assessing the impact of rural integrated agricultural projects of (Funtua, Gusau

Figure 1 Organizational Pattern of the T & V System of Agricultural Extension (Approved Standard by World Bank).



SOURCE :- "TRAINING AND VISIT EXTENSION BY DANIEL BEWOR AND MICHAEL BAXTER" "A WORLD BANK PUBLICATION 1984."

and Gombe), use extension activities on rural farmers in 1978, took the number of film shows conducted, the listnership of its radio programme, number of posters distributed and displayed, extension programmes throughout the year as its yardstick for assessing the impact on its target population. Mijindadi and Arokoyo (1984) use crop demonstrations performed, the number of home visits by the home economics instructors as criteria for assessment. Impact on the other hand is generally considered to be a "long-term influence on the state of the environment surrounding the organization" (Auchan, 1977; Ilebanmi, 1983; and Akanya, 1989) in the line with Renald (1970) who considered the indicators of the impact of an intervention to be:

(a) change in knowledge and attitudes,

(b) mediating behavioural outcome e.g. (information-seeking activities),

(c) change in individual behaviour towards programmes e.g. (trial adoption),

(d) resulting effect of indices of economic and general well-being of the recipients.

There are many definitions of impact, as defined by many scientists. Carlo (1972) defined impact of social intervention as an output of the organisation which are related to the achievement of the programme objectives, while Norell (1979) defined impact, as an influence of a social programme on its clients and or its social content.

Impact of a programme can be seen in relation to what the service actually do to people who receive them. In an

empirical study Galjart (1968) found socio-economic status, education, literacy, farmer urban residence, contact with extension officers, and other personal resources of extension advises were positively and significantly associated with practices adoption. Also (Basu, 1959; Alao, 1971; Voh, 1979 and Atala, 1980) have found that certain socio-economic factors such as age, household size, formal education, farm size, farm income, urban residence and community status were related to adoption. While Osunyi (1988) also found out that extension services, distance from the source of information, income of the farmers and constant contact between the extension workers and the farmers are factors that affected farmers' response to agricultural education programmes.

Nwake and Akoine (1982) maintained that credit component is important in transfer programme for the purpose of purchase of inputs supply. Also, agricultural extension impact on farmers' awareness and adoption of agricultural innovations, farm output and standard of living. According to Rogers (1971), planned change seeks to introduce ideas in order to achieve goals they have defined. Whether these goals would be achieved or not would partly depend on the attributes of the innovations (the cost, the returns to investments, the efficiency of the innovation, the risk and its availability) and the socio-economic characteristics of the clients.

2.6 Specification of the Variables

This study considered the relationships of farmers' socio-economic and institutional factors. The dependent

variables considered were the yield of the farmers, farmers' standard of living, adoption of improved practices and expansion in crop production. The independent variables considered were the extension visits, demonstration trials, exposure to media extension programmes, participation in extension activities, Monthly Technology Review Meetings (MTRM), Fortnight training (FNT)/in-house training and workshops/seminars.

2.6.1 Dependent Variables

Impact of extension can be measured in terms of yield of the farmers, farmers' standard of living, adoption of improved practices and expansion in crop production, etc. In determining the impact of social intervention, therefore, Linsdaine and Bennett (1975), suggest that goals or objectives of the organization rendering the services should be established. Similarly, Hilton and Linsdaine (1975) suggest that programmes should be assessed considering the desirability of the goals or outcomes sought and the extent to which the goals are furthered by the demonstrable effects.

However, programme goals may be so poorly defined that their meaning is completely vacuum (Langbein, 1980). Thus Gilbert *et al.* (1975) observed that social intervention may be more than one goal such as primary and secondary goals, which may affect the choice of criteria in assessing its impact. Under this circumstance, it is desirable to use more than one outcome as a measure of impact. For instance, the overall aim of agricultural extension programmes is to

increase productivity and income of the farmers. However, more immediate outcome of the programme such as: yield of the farmers, farmers' standard of living, adoption of improved technologies and expansion in crop production are of great interest for this study, they are the determinants of the ultimate results.

Yield of the farmers. An immediate goal of agricultural policy in Nigeria is to produce more food. One way of doing this is to encourage greater output per crop, and per unit of land and labour. Gross farm output is the total output of crops grown by a farmer over a period of time (Atsu, 1974). the ability of a farmer to improve on his output may be determined by his physical and mental well-being, managerial skill, exposure to extension services and access to inputs. Relationship between yield and the selected socio-economic and institutional variables, therefore would be expected. Yield of the farmer refers to the total farm product accruing from crops grown by the farmer in 1989 to 1991. Six major crops were included in the survey. These are: maize, millet, groundnut, sorghum, cowpea and cotton. Consideration was given to these crops because their improved varieties are being encouraged by KTARDA. The measurement of the crop yields were obtained in tonnes.

Standard of living of the farmers. This is generally defined as all the things contributing to the quality of human existence (Smith, 1977). Atala (1980) refers to it as the material and impersonal resources which individuals possess and use to meet their physical, psychological, social and

economic condition or needs. Farm income is also an indication of standard of living of farm family. D'Silva and others (1981) have used standard of living to measure the impact of Funtua Agricultural Development Project (FADP). They use material possession as a measure of standard of living. Farming is the main source of living for farm families. Since yield may be related to the selected socio-economic and institutional variables, the standard of living tends to be related to the variables. Atala (1980) and Ahmed (1983) used durable goods items like radio, bicycle, motor-cycles, cars, zinc-roof, etc. to measure level of living. In addition, Atala (1980) also used livestock items like cows, goats, sheep, fowl, ducks, donkeys, horses, bush fowls and others to measure the same variables.

In this study farm income is computed as the sale of farm output for 1989 to 1991. Durable goods items considered were: bus/pick-ups, motorcycle, bicycles, television, radio, type of houses owned, and their value in Naira. The livestock items considered were donkey, horses, cows, sheep and goats, and their value in Naira. The farm equipment were ox-plough, hand plough, tractors, size of farm, farm ownership, and their value in Naira. Respondents were asked to indicate the prices of each items at the time of purchase in order to obtain the monetary value. The results of all were summed up and added to farm income to get the individual farmer's standard of living for both years.

Adoption of Improved Practices. Adoption is defined as the acceptance, incorporation and continued use of agricultural

innovation. Individuals in a social system do not adopt innovations at the same time. Rather, they accept innovations in an ordered time sequence. The adoption period is the length of time required for an individual to pass through the adoption process from awareness to adoption, measured in days, months or years (Hobbs, 1960, Katz, 1961; Rogers, 1962). As a result, adoption impact of agricultural extension programmes may also vary from farmer to farmer. In this study agricultural innovations refer to the following selected recommended practices based on the unified extension system:

(a) Improved variety of seeds
(b) Improved method of fertilizer application
(c) Improved method in the use of storage chemicals
(d) Identification of notifiable diseases in livestock
(e) Dry season feeds preservation in livestock
(f) Control of endo and ecto parasites in livestock
(g) Formation of co-operative societies
(h) Modern community fish farming
(i) Establishment of On-Farm Adaptive Research (OFAR) and Small Plot Adaptive Trial (SPAT)

The adoption score was calculated by summing up the number of practices the respondent reported as using. Equal weight was assigned to each practice, the possible score range from 0 to 9.

Expansion in Crop Production. To be able to increase production and income, land availability, capital, credit facilities, availability of inputs, accessibility to farm implements and adoption of agricultural innovations are very important components.

It is accepted that small fragmented land holding, lack of capital and limited credit facility, lack of inputs, little or no implements, distance from the farm land and poor extension services greatly hindered the expansion in crop production among majority of our farmers. Due to low level of earning, the propensity to save is very low among most farmers in developing countries. The access to land and loan by farmers would enable them to purchase the components of recommended practices for adoption and increase yield.

Income from other occupations may facilitate adoption and improve farm output where much is invested in farming by way of purchasing recommended inputs.

The variable will be measured on the number of hectares owned by the respondent, amount of money owned as a capital for farming, amount of money loaned either from agricultural or commercial banks in cash or in kind for the purpose of expansion in crop production.

Availability of inputs will depend on whether the farmer has at hand the inputs like fertilizer, seeds, chemicals, etc. or purchased from the Farm Service Centres or market. The farmer should indicate the amount used for the purchase of fertilizer, seeds, chemicals and other inputs for the 1989-91 period.

2.6.2 Independent Variables

Independent variables are variables manipulated by researcher or hypothesized to contribute to the observed effects. It is a dimension of human behaviour which can be explained in relation to dependent variable. The independent

variables for this study were explained in relation to their interactions in extension programmes as below:

Extension visits. Channel of communication are important in rural development activities. A major concern of agricultural extension is to try to translate technical information and research findings to simple format to a farmer to use. These will depend on the frequency of contact between extension agents and the farmers. Studies have indicated that change-agents reach the more influential farmers then the poor ones (Rogers, 1962).

Extension visit refers to the frequency of contact between extension agents and the farmers. This was measured on the total number of visits conducted by the extension worker to farmers' home and farm, and also of the farmers' to extension worker within the 1989/1991 period.

Demonstration trials. This is a practical demonstration/application of a technology proven to be more beneficial than the common practices within a small plot in farmers' field with the intention of promoting its general adoption. The most common trials practised under the T&V system were the On-Farm Adaptive Research (OFAR) and Small Plot Adaptive Trials (SPAT). Research develops new technologies through on-farm adaptive research (OFAR) trials and proved their worth to a relatively small number of farmers. While SPAT which is defined as simple, straight forward mini method/result demonstration established by a farmer using their own available resources under the advice, guidance and supervision of extension to depict the superiority of an innovation over

common traditional practices. The SPAT involves the teaching of "skills" to many people at once. The seeing, hearing, discussing and participating in a group situation stimulate learning and action.

This variable was measured based on the reported number of trials (SPAT, OFAR and On-Station Trials) established within the period of 1989-1991 by the respondents.

Media Extension Programme. It is the sources of information an individual farmer comes in contact with either through radio, newspaper, television and other extension prints. Channels of communication are important in rural development activities. A major concern of agricultural extension is to try to translate technical information and research findings to a simple format to a farmer to use. Studies have shown that change agents reach the more influential farmers than the poor ones (Rogers, 1962). It is because of this reason that the media extension programmes prove very effective in reaching the farming population with less segregations. This variable was measured on the total number of radio programmes the farmers listern to, number of printed materials the farmer came across and the number of posters displayed within his cell, total number of film shows conducted within his rural areas and the total number of agricultural programmes he watched over the television, all within the 1991 period.

Participation in Extension Activities. It is defined as the degree of active participation in such agricultural extension activities and programme as the Young Farmers' Clubs, Farmers'

Council Meetings, Field days and Agricultural Shows and any other extension activity that may expose the farmer to new farming ideas, not mentioned above. The variable is measured by asking the respondents to state whether he participates in such extension programmes and to what extent. His score was the total number of times he participated in any one or more extension activities. Each activity participated in had a score of 1.

Monthly Technology Review Meeting (MTRM) and Pre-MTRM. MTRM is defined as monthly in-service training of SMS and researchers, and also to deliberate on:

(a) Problem solving session/feedback from the field.
(b) Recommended practices development.
(c) Review the logistic support staffers
(d) Organizational problems.

While the pre-MTRM is defined as an extension visit by a team of experts (from the research institutes) to areas where problems are identified by the extension workers, in preparation for the MTRM. This was measured by asking the respondents to state whether they participated in MTRMs and how often and also to indicate the number of reported cases (identified problems) and how often the cases were attended.

Fortnight Training (FNT)/In-house Training. It is to provide BES/VEW the professional growth and technical up grading in order to carry out the extension activities, the FNT and in-house training are arranged with intense support and adequate guidance from supervisory staff (SMS, SZEO and the human resource and development HRD). The variable is measured by

respondent indicating how many times he attended the FNT and in-house training within the 1989-1991.

Workshops and Seminars. These are refresher courses arranged for senior extension officers by the research institutes, e.g. the Cropping Scheme, OFAR workshop, indigenous knowledge workshops, etc. The variable is measured by indicating the number of attendance to such workshops and seminars by the respondents within the last three years 1989-1991.

Chapter Three

METHODOLOGY

This chapter focused on the study area, population characteristic sampling technique and sample size, data gathering method, statistical analysis and limitations of the research design.

3.1 The Study Area

Katsina State, the study area, lies in the Sahel/Sudan agro-ecological zone of Nigeria, which borders with Sokoto, in the western part, Kaduna State in the southern part, Kano State in the east and Niger Republic in the northern part. The state had its lowest temperature during the harmattan between November and February/March, the wind is dry and blow with heavy dust, the average rainfall of 10 to 15 inches, with highest rainfall figure recorded in August. The southern part of the state records the highest rainfall figure annually.

The state has about six million population, with a total land area of about 23,662 km^2 and about 863,000 farming families, and a cultivated area of about 1.64 million hectares. The major crops grown are: maize, cotton, groundnut, guinea corn and millet which are commonly grown both in subsistence and in commercial quantities. There are agro-allied industries operating in the state, like flour mills, cotton crushing company, cotton ginneries, etc. Some agricultural agencies are also operating: seed cotton company, cotton and agricultural agencies, Nigerian Agricultural and

Co-operative Bank (NACB), National Livestock Project Department (NLPD) and National Land Development Authority (NALDA), which offer both assistance and contribution to agricultural development in the state.

The study area cover the whole of Katsina State, with Katsina State Agricultural and Rural Development Authority (KTARDA) used as an entry point. Six local government areas within the three zones were selected for the data collection which equally provide a fair representation of all the areas in the State (Figures 2 and 3). Figure 2 is the map of Katsina State showing block extension areas in Zone II covered by KTARDA while Figure 3 shows the zones, sub-zones and area of study within the State (Daura and Zango local governments in Zone I, Funtua and Bakori local governments in Zone II, and Dutsin-Ma and Batsari local governments in Zone III).

3.2 Population Characteristics

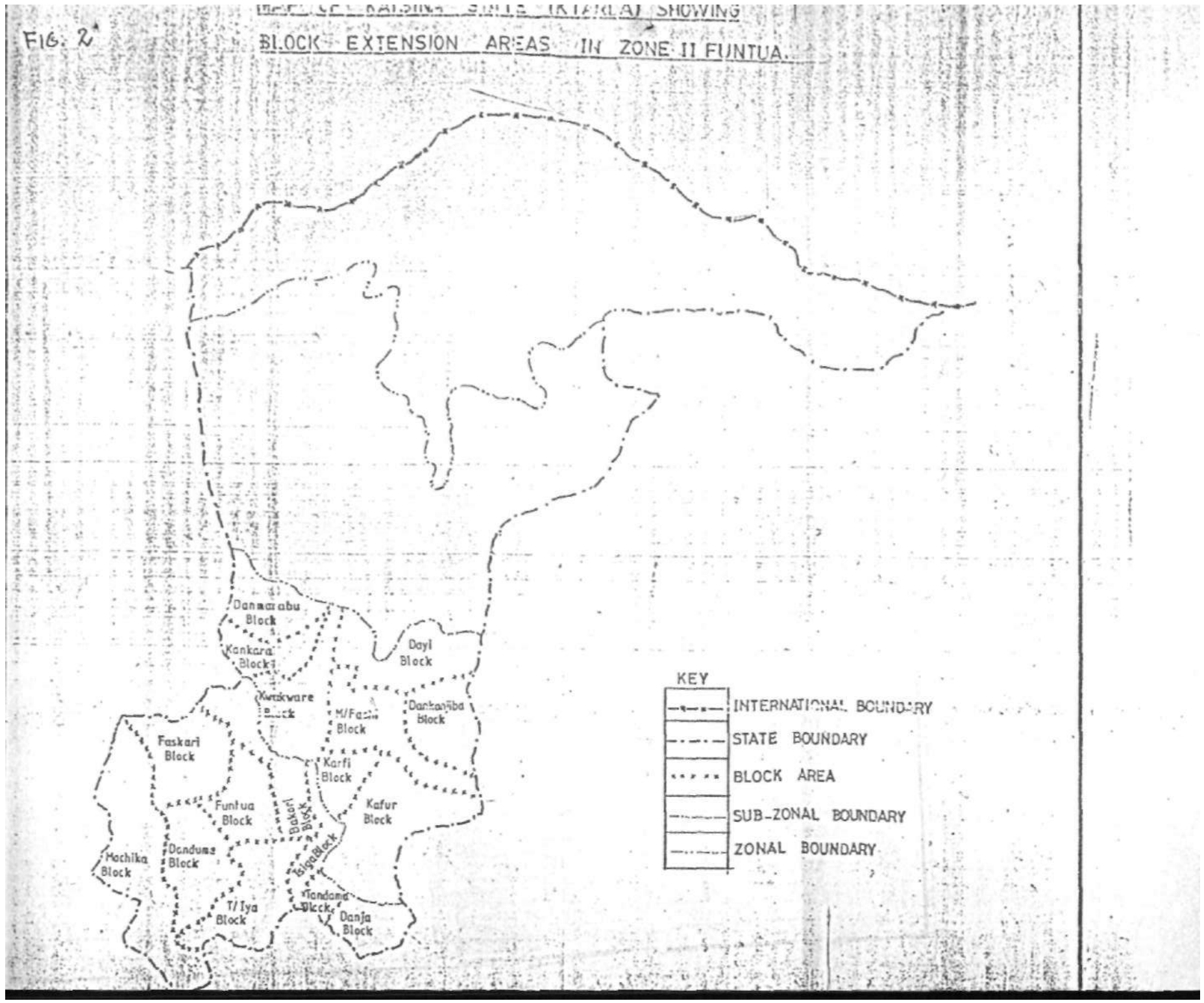
A total number of 330 subjects were chosen for the whole study in the State. This comprised the following sub-groups: Researchers, Subject Matter Specialists (SMS), Block extension supervisors (BES), Village extension workers (VEW) and the farmers. These were the subjects who were administered with questionnaires.

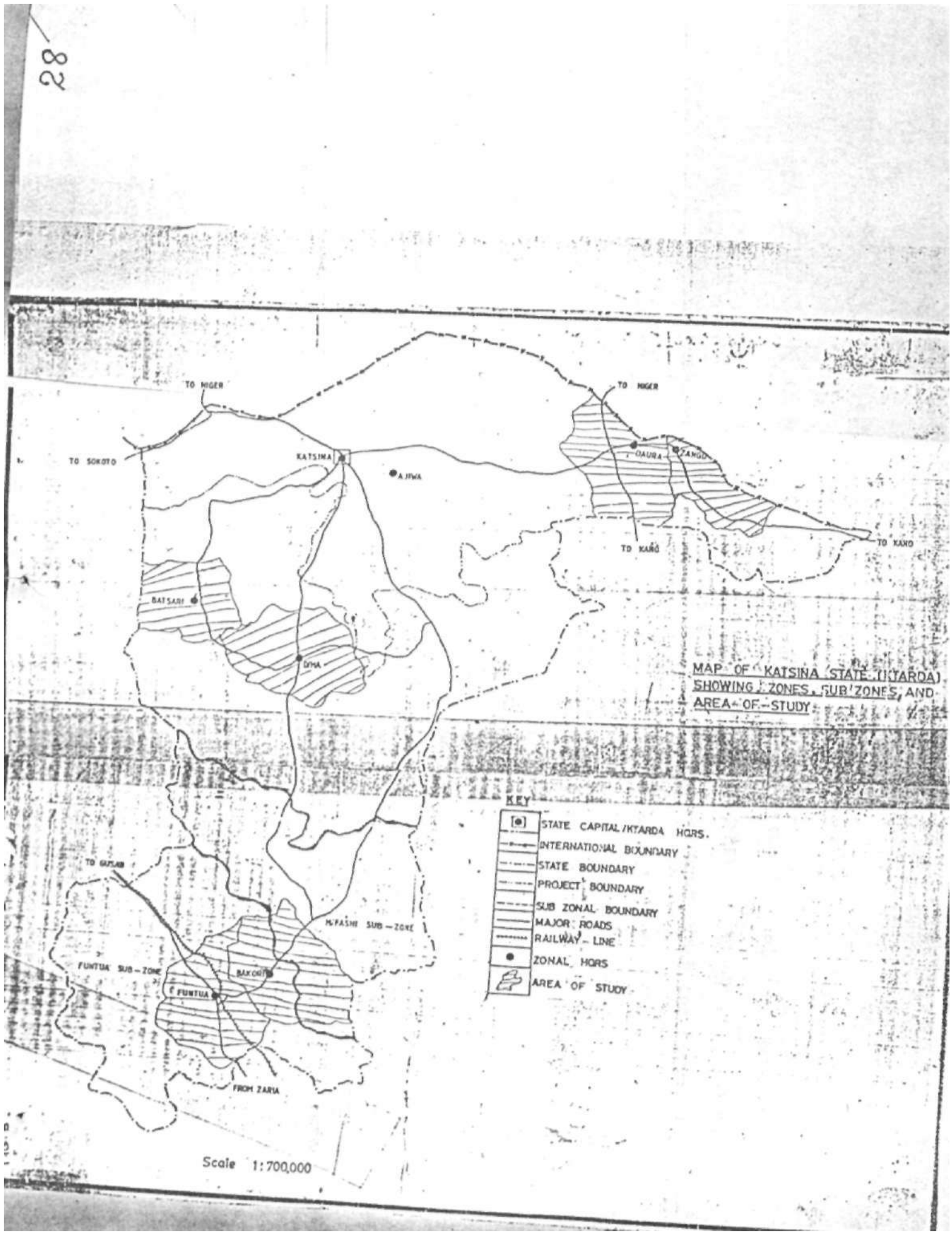
3.3 Sampling Technique and Sample Size

The sampling technique applied for the study was stratified random sampling, because the subjects drawn for the study are of heterogenous character drawn from different

FIG. 2

MAP OF KATSINA STATE SHOWING BLOCK EXTENSION AREAS IN ZONE II FUNTUA.





MAP OF KATSINA STATE (KTARDA) SHOWING ZONES, SUB ZONES AND AREA OF STUDY

backgrounds, educationally, socio-economically and even in their contact with the extension workers.

Researchers, SMS, BES and the VEWs were stratified in accordance to their educational background and official position, while the farmers were stratified according to their socio-economic background, extension contact and non-extension contact of a farmer. Among the researchers, SMS's group, a total of 60 respondents were drawn for interview out of which only 15 responded to the questionnaire, in the BES/VEWs group a total of 120 respondents were administered with questionnaires with 40 drawn from each of the three covered zones, with only 66 returned as completed questionnaires, while among the farmers, 150 household heads were administered with questionnaires with 50 household heads from each of the three zones, 124 questionnaires were returned as completed questionnaires.

In total, 205 questionnaires out of 330 were administered. Seventy-two (72) questionnaires were completed in Zone I, 92 questionnaires from Zone II while 26 questionnaires from Zone III.

3.4 Data Gathering Method

Data were collected from both primary and secondary sources. The primary source of the data were collected from farmers based on personal interview with the farmers and administration of questionnaires to the researchers, SMS, BESs and VEWs. The secondary data were mainly collected from organizations like KTARDA, IAR, NAERLS and the Ministry of

Agriculture, through the references to their documents and personal interview with their staff. The data were collected based on the respondents' relationship with agricultural development and the T&V extension programmes, to be able to find out the impact of the T&V system on agricultural development in the State. The data were collected in August 1992, the data were for a period of three years 1990-91.

3.5 Statistical Analysis

The data were subjected to statistical tools comprising of descriptive and quantitative techniques. The descriptive statistics comprised measure of central tendency and dispersion such as means, mode, median and standard deviation. A regression model of general form was used for analysis. It is as below:

$$Y_1 = A_o + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + a_7X_7 + U$$

where:

Y_1 = Standard of living (total No. of durable goods, items, livestock, farm equipment, etc) and their value in ₦.

X_1 = Extension visits (total number of visits by extension worker to farmer in 1991).

X_2 = Demonstration trials (total number of demonstration) TRIALS, SPAT, OFAR.

X_3 = Exposure to media extension programmes (total number of programmes in 1989-91).

X_4 = Participation in extension activities (total number of activities participation in 1989-91).

X_5 = Pre-MTRM & MTRM (total number held and participated within 1989-91).

X_6 = FNT & In-house training (total number held and participated from 1989-91).

X_7 = Workshop & seminars (total number held and attended within 1989-91).

U = Error term.

$a_1 - a_7$ = Regression model

A_0 = Intercept term

The same regression model was used to regress, Y_2 (adoption of improved technology), Y_3 (expansion in crop production), Y_4 (yield of the farmer).

3.6 Limitations of the Study Design

The design of any study is concerned with the scheme for collection, measurement and analysis of data in which inferences can be drawn from the result of the study.

However, the design of a study would be dictated by limitation of time, resources and the availability of data for the study. Data collected was for the 1984 and 1989-91 period. The 1984 data were used as a base data for comparison drawn from the farmers. The data were based on memory recalls as farmers don't keep records; they are subject to great errors due to passage of time.

Chapter Four

RESULTS AND DISCUSSIONS

4.1 Characteristics of the Respondents

4.1.1 Researchers/SMSs

The respondents were divided into three categories for easy assessment. They are researchers and SMSs, BES/VEWs and the farmers. The age of the first category (researchers and SMSs) ranges between 37-38 years which constitute about one-half (47%) of the total population while above one-quarter (27%) falls between the age of 28-34 years and (28%) falls between the age of 39-50 years (Table 2).

Table 2: Researchers'/SMSs' age range in years (n=15).

Age (years)	No.	%
28 - 34	4	27
37 - 38	7	47
39 - 50	4	26

In this category of respondents the highest educational qualification was HND with slightly above one-half (53%) among the respondents, followed by OND with one-quarter (27%) while the BSc holders had the lowest with one-fifth (20%) of entire population of the respondents (Table 3). In their area of specialisation the agronomist constituted the majority with two-fifth (40%), followed by livestock and irrigation personnel with both one-fifth (20%) while the soil

conservation had slightly above one-tenth (13% and forestry with the lowest of only 7% (Table 4).

Table 3: Researchers'/SMSs' educational qualification (n=15).

Qualification	No.	%
OND	4	27
HND	8	53
BSc	3	20

Table 4: Researchers'/SMSs' area of specialization (n=15).

Area of specialisation	No.	%
Agronomy	4	27
Livestock	8	53
Irrigation	3	20
Soil conservation	2	13
Forestry	1	7

4.1.2 BES/VEWs

The VEWs constituted the majority (73%) while the BES are just slightly above one-quarter (27%) of the whole respondents. The range in years among this category is very clear with the majority (60%) range between the age of 31-40 while 41-49 years constituted one-fourth (26%) while the younger ones, between the age of 24-30 years constituted only slightly above one-tenth of the respondents.

Table 5: BEW/VEWs range in years (n=66).

Range in years	No.	%
24 - 30	9	14
31 - 40	40	60
41 - 49	17	26

Among this category of respondents the (Ordinary National Diploma (OND) holders constituted the majority with about one-half (47%), followed by those with Agricultural related courses with one-third (35%) of the total population of the respondents while the HND (Higher National Diploma) had only (17%) and 2% Secondary School Leaving Certificate (Table 6).

Table 6: Educational qualification for BES/VEWs (n=66).

Educational Qualification	No.	%
Secondary	1	2
OND	31	47
HND	11	17
Other courses	23	35

4.1.3 Farmers

The farmers were divided into five different categories, in line with the objective of the study, these are contact and non-contact farmers. Then the small, medium and large-scale farmers.

The majority (78%) of farmers were contact farmers while only one-fifth (22%) were non-contact. 43% and 41% were medium and small scale farmers while the large-scale

constituted only 16%. Two-fifth (40%) of the farmers were from Zone II, one-third (31%) from Zone I while slightly below one-third (29%) were from Zone III. Majority of the respondents (94%) are married and majority (88%) are male and one-tenth (12%) are female.

The range in years among the farmers is good as two fifth (41%) of the farmers range between 35-50 years and one-third (30%) falls between the age of 51-75 while the younger farmers constituted one-fifth (21%) with the range of between 20-34 years. Majority of the respondents (82%) are household heads and about one-fith (18%) are still in *Gandu*.

Table 7: Farmers range in years (n=124).

Years	No.	%
20 - 35	37	30
36 - 50	50	41
51 - 75	37	29

The educational standard of the farmers is relatively very high as only 2% were indicated as never attended modern education, while 32% (one-third) indicated as having attended secondary education, one-third (31%) Ordinary Diploma and one-fourth (21%) primary education, while up to about one-tenth (7%) had university education (Table 7).

4.2 The Structure of T&V System in the State

Figure 4 represents the organizational structure of T&V system in Katsina State. The organizational structure consists of a structure of tightly interlocking roles, from the

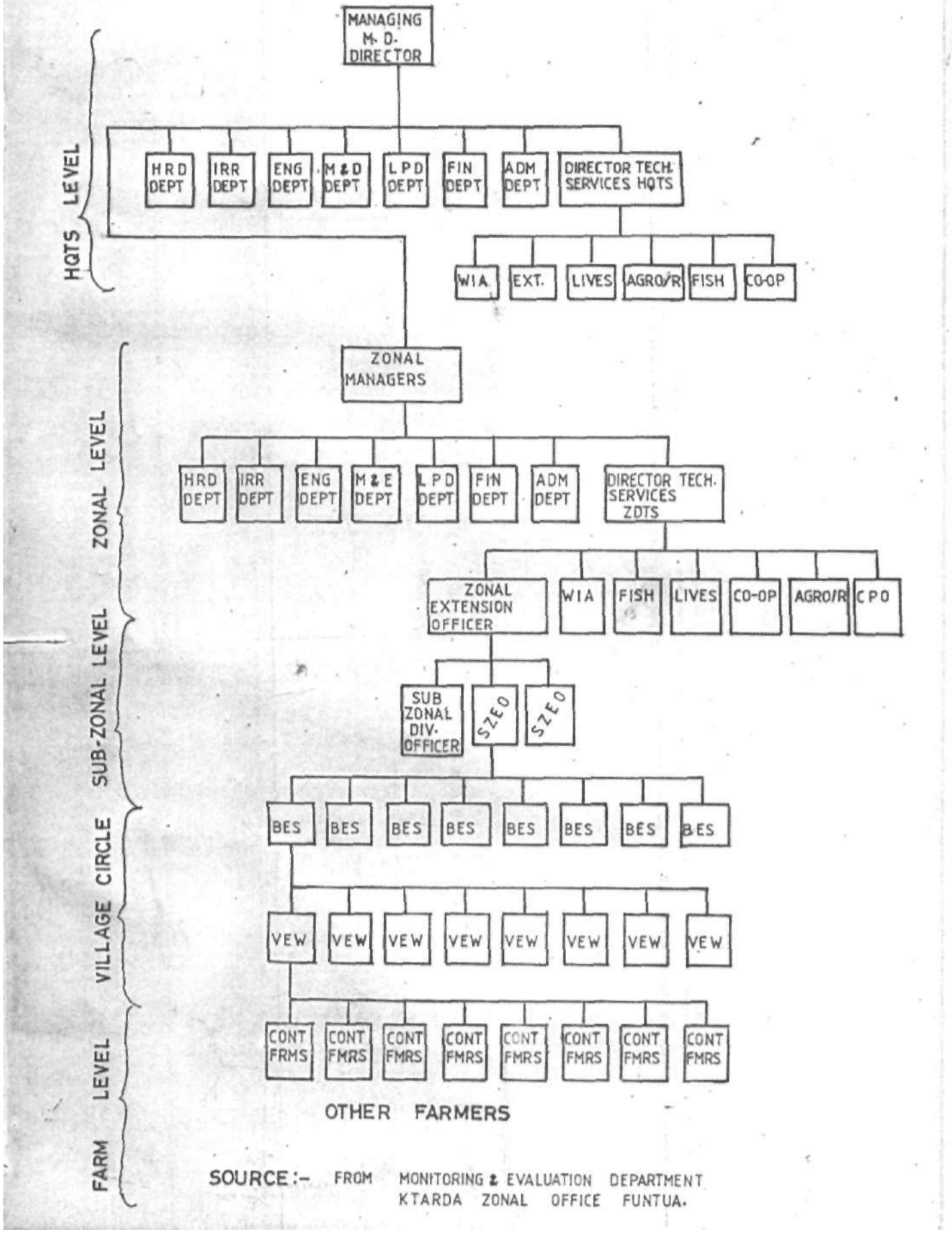
Headquarters to farmers' level and operational rule for each one of its members, and uses a basic technique of training and regular visits. It operates along a line of an extension philosophy stressing simplicity, low-cost improvements, use of available resources and link with research.

The interlocking roles were modified and reduced to suit the need of the State by KTARDA. The sectional heads at the Headquarters and Zonal levels were used as Subject Matter Specialists (SMSs) under the control of the Director of Technical Services (DTS). The Sub-Zonal Extension Officers (SZEOs) are answerable to Zonal Extension Officer (ZEO), while the Block Extension Supervisors (BESs) are answerable to Sub-Zonal Extension Officer, and the Village Extension Agents (VEAs) are answerable to Block Extension Supervisor. This provides a single line of command based on T&V system principle.

In comparing Figure 1 (the approved standard organizational structure of T&V system by the World Bank) and Figure 4 (the modified structure by KTARDA), they are both structures of tightly interlocking roles from the Headquarters, Zonal and Farm levels. They both use the principle of basic technique of training and regular visits, operating along the single line of command. From Figure 4 the post of ZEO and DEO are not in existence as in Figure 1, while the sectional heads under the technical department served as SMSs in their various disciplines.

The modification in the structure was understood not to have affected the administrative aspects of the extension system, the information dissemination and the monitoring and

ORGANISATIONAL PATTERN OF THE T & V SYSTEM OF AGRICULTURAL EXTENSION (AS OPERATED BY KTARDA MODIFIED SYSTEM).



SOURCE:- FROM MONITORING & EVALUATION DEPARTMENT KTARDA ZONAL OFFICE FUNTUA.

evaluation of the whole extension activities. The modification brought about reduction in the cost of extension activities without affecting its performance, and also the risk of distortion of information from the source to final destination and provides constant supervision of field staff on fixed schedule of visit.

4.3 Management System of the T&V system in Katsina State

The management is headed by Managing Director (MD) and is assisted by Head of Departments, with Director of Technical Services (DTS) as his Deputy. The agricultural activities are conducted from the Technical Department headed by Director, Technical Services (DTS) headquarters, assisted by six sectional heads (Livestock, Co-operatives, Agro-research, Fisheries, Extension and Women in Agriculture). This is at the headquarters' level.

At the Zonal level, the Zonal Manager is the overall head, assisted by Head of Departments. Agricultural activities are conducted from the Technical Department (Zonal level) headed by Zonal Director Technical Services (ZDTS), supported by seven sectional heads (Livestock, Co-operatives, Agro-research, Fisheries, Extension, Women in Agriculture and crop protection).

These sectional heads act as Subject Matter Specialists (SMS) in their various disciplines, they conducted the FNT with the BESs and VEWs, attend pre-MTRM, MTRM and field visits, and also conduct other sectional activities both operational and bureaucratic services.

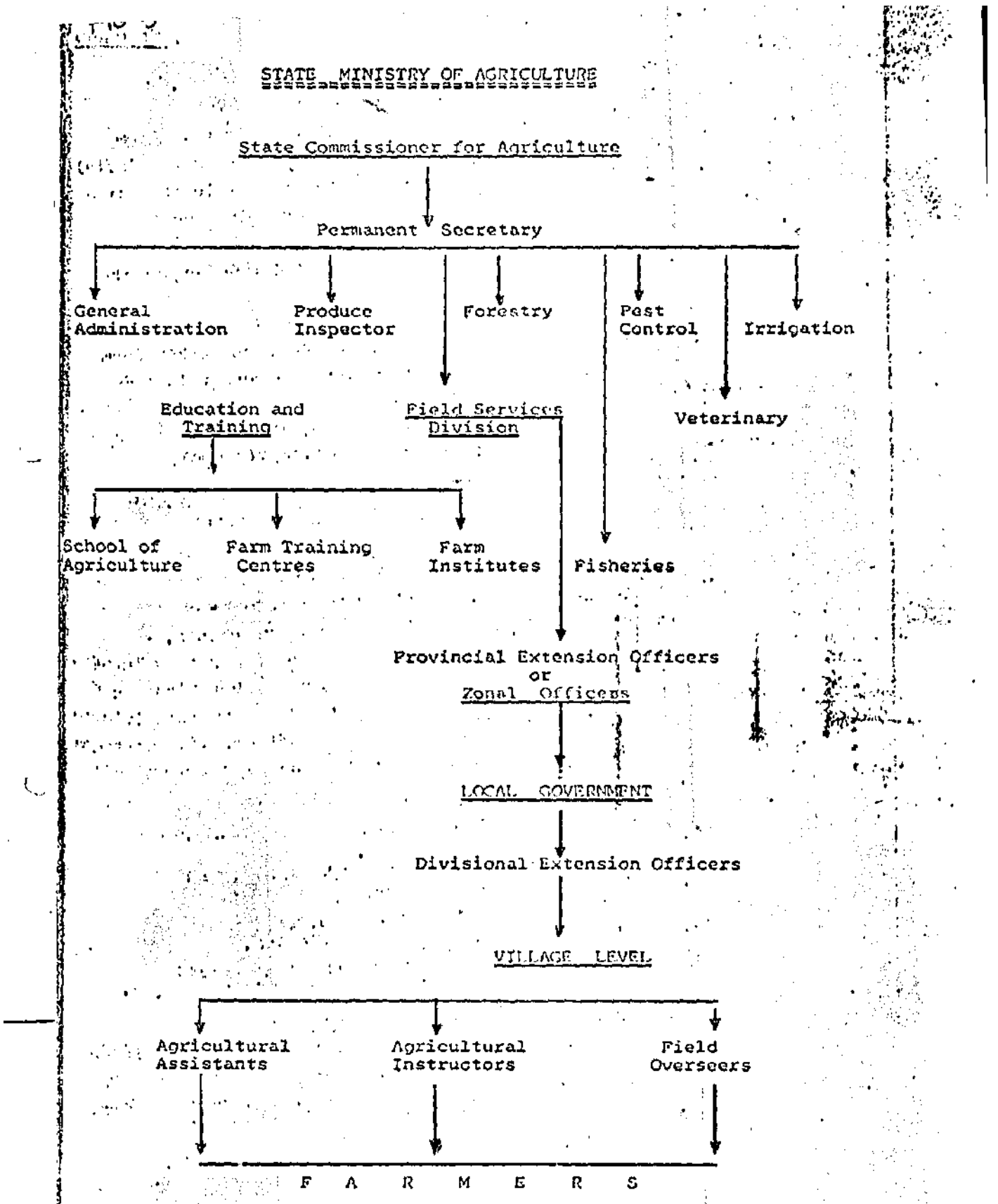
The Zonal Extension Officer (ZEO) is responsible to Zonal Director, Technical Services (ZDTS) and he directs all extension activities through the Sub-Zonal Extension Officers (SZEOs). The ZEO attend the MTRM, pre-MTRM, FNT training and other field visits, while the SZEO directs all his extension activities through the eight (8) BESs assigned under his responsibility. He conducts scheduled visits to the field, attend the FNT and review the last FNT topic treated before the SMS starts lectures and also conducts other office services.

The BES who is assigned eight (8) VEAs is answerable to SZEO, attends FNT and also supervises his VEAs at their various cells, arrange and attend field days and also other extension activities, while the VEAs who is responsible to BES, plans his area and divides it into eight (8) cells, make a contact point in each cell and where he meets with contact farmers, select contact farmers from each cell and planned his time schedule for the contact farmers' visit. The VEA delivers messages to the farmers on all aspects of agriculture based on Unified Extension Services. From each of the three zones where extension activities are conducted directly, there are: one Director of Technical Services each, seven SMSs, three to two SZEOs, eight BESs, eight VEWs and eight cells per VEW and their selected contact farmers of 10-12 per cell. The Technical Departments at the Headquarters and the zonal level work with the help of some supportive departments like the Human Resources and Development Department (HRD), Land

Planning and Development (LPD) and the Monitoring and Evaluation Department (M&E).

4.4 Operational System of T&V system and other Extension Systems

Before the introduction of the T&V in the mid 80s, the system of Visit and Demonstration was practised in all states under the Ministry of Agriculture headed by Commissioner of Agriculture, supported by many departments and units of agriculturally-related disciplines (Figure 5). Under this system trainings were conducted to only senior extension staff and they train their junior staff in return, while demonstrations are done on large-scale which was unaffordable to peasant farmers. With the creation of ADPs in the mid 70s, the system of training, visit and demonstration (TV&D) were adopted with emphasis on crops like cotton and maize, after sometimes some lapses were identified with the TV&D system, which led to the introduction of T&V system and was adopted by the KADP in the mid 80s, with some clear guidelines and specified operational activities and these are: Pre-MTRM and post-MTRM field visits and also the MTRM, FNT, post FNT-field visits, field days, in-house training, workshops and seminars. These operational activities were fully adopted by KTARDA and successfully implemented, along a single line of command under the unified extension system.


STATE MINISTRY OF AGRICULTURE
State Commissioner for Agriculture
Permanent Secretary
General Administration
Produce Inspector
Forestry
Pest Control
Irrigation
Education and Training
Field Services Division
Veterinary
School of Agriculture
Farm Training Centres
Farm Institutes
Fisheries
Provincial Extension Officers or Zonal Officers
LOCAL GOVERNMENT
Divisional Extension Officers
VILLAGE LEVEL
Agricultural Assistants
Agricultural Instructors
Field Overseers
F A R M E R S

4.4.1 Definition of Terms under the T&V System

Monthly Technology Review Meetings (MTRM): The KTARDA is responsible in organising the MTRM, pre-MTRM and post-MTRM field visits and makes suitable arrangements in providing MTRM hall equipped with audio-visual aids and seating arrangement. This involves arrangements for timely provision of transportation for the scientists attending MTRMs.

Pre-MTRM Field Visit: This visit is conducted 2-7 days before the MTRM by a team of extension workers, researchers, SMSs and Sub-Zonal Extension Officers, to a site where a particular problem is reported. This is used to provide on-the-spot advice to farmers and face-to-face interaction with clear feedback.

MTRM: This meeting is conducted once a month (at the last Thursday of every month) with the venue rotated each month within the three zones. The MTRM provides a forum where all the agricultural development agencies (KTARDA, NALDA, IAR, NAPRI, NLPD, KTAPU, FASCOM, Ministry of Agriculture) deliberate on production achievements, constraints and prospects. Innovations are usually disseminated and feedbacks are collected.

Post-MTRM Field Visit: This is conducted by a team of researchers, SMSs and other extension workers to a problem area to ascertain actual field situation based on the reported case.

FNT Training: This training is held after every two weeks by SMSs, to deliver the messages collected at the MTRM to BESs and VEWs who are to carry them to farmers for adoption. Before

the delivery of the innovation, a review of the last FNT messages in often carried out by the SMSs or SZEO.

Post-FNT Field Visit: This is conducted to farmers to ascertain if the messages are correctly delivered by the VEWs. The visit is done by the SMSs.

Field Visit: This is the visit of superior officers from both the Headquarters and Zonal Headquarters combined. They supervised the field officers in the field and conduct some interviews with the farmers on their field operations.

Field Days: The exposure of other farmers to a successful farm is an effective means of motivating them to practice and adopt an innovation. EA's should organise field days at critical stages of growth e.g. podding in cowpea, tillering for rice, etc. EA's should encourage farmers to come around sites, to observe, be trained during field days to acquire more knowledge and skills. EAs target 4 field days/season.

In the same vein, field days can be organised in the field of a farmer whose practices are clearly deficient and at variance with the current recommendations. Such identified areas could be used as focal training points, but EAs should be trained on how to exploit such situations without actually offending the owner.

On-Farm Adaptive Research (OFAR): It is the responsibility of the KTARDA to organise the conduct and funding of both diagnostic survey and OFAR trials in its different ecological zones. This include planning, design and implementation of the OFAR programmes and organisation of state level workshop each

year to finalise the package of recommendations for various OFAR trials.

In-House Training: It is a refresher course arranged for the extension workers based on their daily activities, mainly arranged for BES, VEAs. It is responsibility of Human Resources and Development Department.

Workshops and Seminars: These are refresher courses arranged for senior officers on general agricultural activities.

4.4.2 Demonstration and Visit System of Extension

The demonstration and visit system was practised before the FADP was established in 1975, by then the entire state extension activities was under the control of Ministry of Agriculture. The operational guidelines under this system, were the extension visits by A.Is, radio programmes (the *Noma Yanke Talauchi*) by late Garba ABCD and his company, films, extension posters and pamphlets, and large demonstrations mostly on government farms.

Visits to farmers' farms and homes are conducted but not on fixed schedule like in the T&V, while demonstrations are conducted in large-scale unlike in the T&V where demonstrations are conducted in small portion of mostly farmers' farm in a form of SPAT (Small Plot Adoptive Trials). Under this system extension (Demonstration and Visit System) messages are mostly passed to the farmers through the district head, village head and ward head by the Agricultural Assistant (AA) and Agricultural Instructors (AIs).

In-house training session is held once a year to most senior extension officers at Daudawa and Kafinsoli farm centres as a refresher course, they in turn train their junior officers whereby the messages are carried forward to farmers through the A.As and A.Is. Under the system of demonstration and visits the ratio of A.I. to farmers were 1:5000 unlike in the T&V where it is limited to only 1:500 which is relatively small compared, this may not be unconnected with the division of cells within each ward and farmers were selected into contact groups in each cell. There were limited number of extension officers during that period, but extension was supported with free inputs, chemicals and seed from the government, with the hope of pushing the ideas of their importance, while the work-bulls and their implements were provided on credit, but mobility was not made available to extension staff which contributed in making the extension coverage difficult.

4.4.3 Training, Demonstration and Visit System of Extension

This system of extension was a modification from the earlier extension system of demonstration and visit. It was modified after the FADP was established in 1975. The system recorded tremendous impact, because of the limited scope covered by the FADP plus higher concentration of agricultural experts and funds within the enclave, mobility were made available and extension was highly supported, with very little ratio (1:500) of extension worker to a farming families.

The monthly field extension programmes were outlined in an extension work book for all the extension workers. The extension workers were advised to follow them strictly (Tables 8 and 9) Extension work programme for the month of November.

Training: Training of extension staff is conducted by the training unit, a special mobile training plus equipment and training personnel are assigned to go to selected training centres, monthly or when the need arose, to train the extension workers based on seasonal farm operation (Table 8). (An extension work programme for the month of November). It based on the work programme a training session will be held to highlightened the extension workers.

These training centres are usually the development offices located in each district, headed by Development Officer (D.O) assisted by agricultural assistants (AAs) located in the villages, while the agricultural instructors (A.Is) are located in wards. They are all expected to gather up on invitation for the training at the D.O. office. They are to carry alone with them the booklets, containing the impact points on seasonal operations.

Demonstration: Unlike SPAT and OFAR under the T&V system, demonstrations are conducted at Farm Service Centres and some selected progressive farmers' within the A.I's area. These demonstration plots are small like SPAT, they are meant to guide farmers by comparing with their traditional practices, recommended seeds (improved) and other inputs; chemicals are provided. During each stage of production farmers are invited to see and compare.

Visits: Each extension worker is expected to draw his schedule of visit, messages are passed through visits to farmers,

Table 8: November: Extension work programme for the month.

1. Progressive Farmers

Identification of new progressive farmers starts this month.

Each Agricultural Instructor will have a list of the farming families in his area and will also know how many of these are progressive farmers. From his knowledge of the crops grown during the past season and the farmer contacts he has made it should be easy for him to identify further progressive farmers.

Discuss farming plans for next season with your present and potential progressive farmers.

2. Crops

(a) **Cotton**

Give advice and instruction on cotton harvesting.

(b) **Maize**
Continue advice on storage and marketing of maize.

(c) Cowpea

Give advice on the harvesting and storage of cowpea.

3. Demonstration plots

Continue 'result demonstrations' and display all crops harvested so that farmers can see, comment on and discuss the yields obtained.

4. Notes for Development Officers

(a) Ensure that all staff are familiar with the system of identification of progressive farmers.

(b) Check crop recording and send completed demonstration plot record books and records to Chief Technical Officer.

5. Notes for Group Agricultural Assistants

(a) Send demonstration plot record books to Development Officers as completed.

(b) Check progressive farmers forms and ensure that the system if being correctly operated.

(c) Check cotton spraying end of season returns.

(d) Ensure that all other records forms have been sent to your Development Officer.

Table 9: November work programme.

To be completed by all staff

Name_____ Rank_____

Farm Service Centre_____

Date	Day	Programme

market places, village heads, ward heads, radio programmes specially arranged for the FADP farmers, posters, pamphlets and film shows. Programmes for the visit were tightly followed and supervised by superior officers concerned. The A.I's area of coverage is not large so the ratio of A.I, farmer was very much lower compared to earlier system and mobility was made available to each extension worker. The extension was highly supported with inputs, chemicals and credit which led to high rate of adoption among farmers, and standard of living among the farmers in the area went significantly high, which can be observed through the springing up of new modern houses,

increase in business transactions, purchase of modern farm equipment, increase in production and purchase of vehicles around the FADP enclave, etc. Figure 8 represents organizational chart of the FADP under the Training, Demonstration and Visit system of extension).

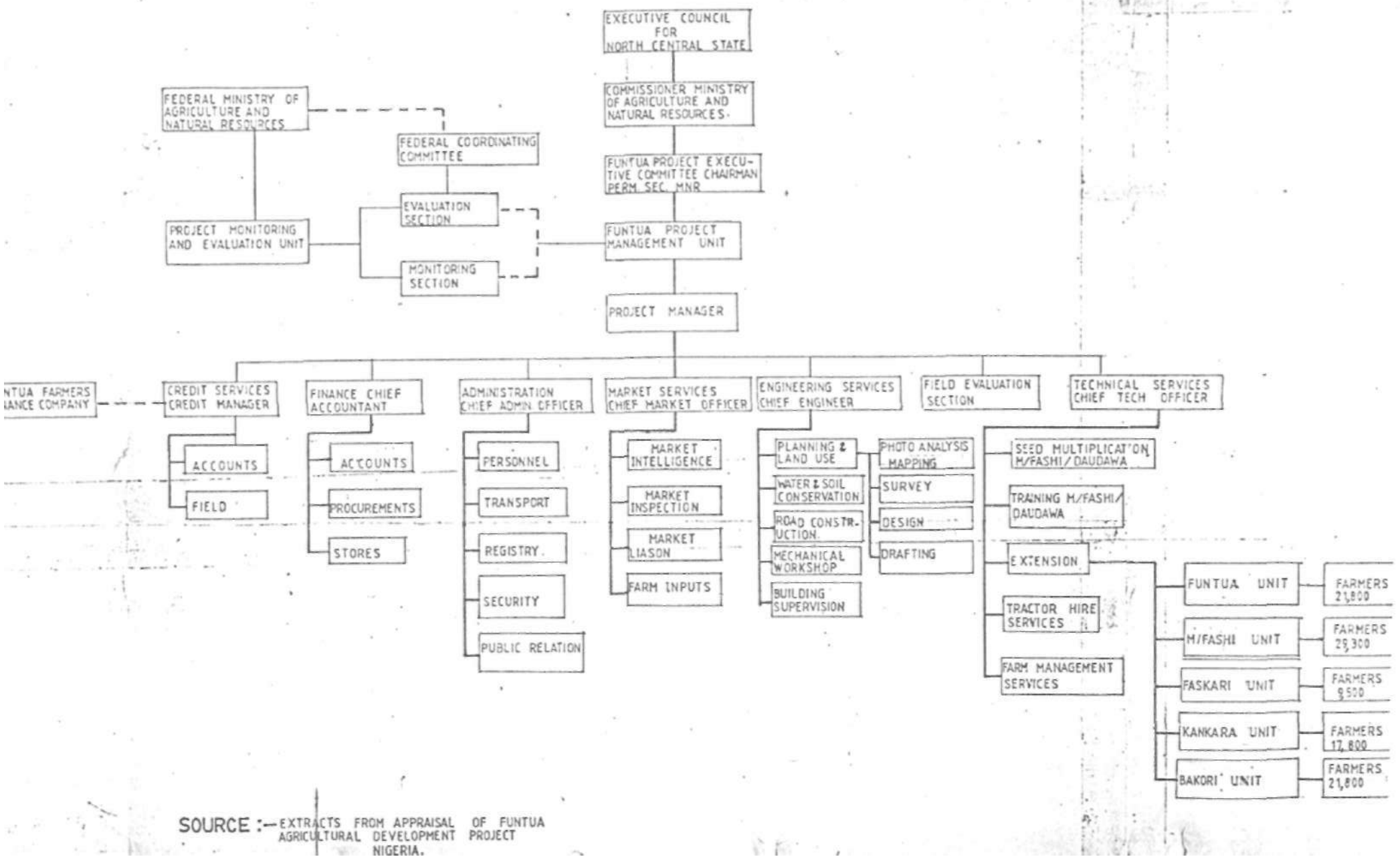
On comparing the three extension systems, it was observed that only the T&V system had not supported its extension programmes with the provision of inputs, chemicals, credit and other supportive items directly used like the other two extension systems earlier practised. The T&V system programmes were based only on technology transfer to farmers on a single line of technical command.

Very often the key extension workers under the T&V system were confronted with the question of input, credit and other items' availability. This was because the farmers were already used to such an assistance from the government and it happened the assistance was cut off at once with the introduction of the T&V system. It was on the basis of the above variation in programme implementation that some key operators of the T&V system extension system were interviewed, to give their views on the effectiveness of the T&V system, the modification of the T&V system and its impact on production.

4.5 Perception of Field Operators on T&V system's Effectiveness

From the Table 10, it was observed that one-half (53%) of the SMSs reported the system was effective as against slightly above one-quarter (27%) and one fifth (20%) who perceived it to be very effective and ineffective,

FIGURE 8, **FUNTUA AGRICULTURAL DEVELOPMENT PROJECT**
PROJECT ORGANIZATIONAL CHART.



SOURCE :— EXTRACTS FROM APPRAISAL OF FUNTUA AGRICULTURAL DEVELOPMENT PROJECT NIGERIA.

respectively. The perception was similar in pattern among the BESs where more than one-half (56%) perceived it as effective as against one-third (33%) and one tenth (11%) who affirmed it as very effective and ineffective, respectively. It was slightly different among the VEWs where over three-quarters (79%) perceived it to be effective as against about one-fifth (17%) with the perception of it as very effective and a negligible proportion (4%) confirming it as ineffective. The above results showed that the general perception of the respondents on the effectiveness was very high with negligible proportion reporting as ineffective. The perception of these respondents is very important because they constituted the key operators of the T&V extension system, whose responses could have been based on their field experiences over the years. The response has many among types of respondents reduce the biases that could have been associated or ascribed to be self-praise as the key operators (Table 10).

Table 10: Perception,of field operators on T&V system's effectiveness (n=75).

Type of respondent	SMSs' Perception on Effectiveness of T&V System						Total
	V. Effective		Effective		Ineffective		
	No.	%	No.	%	No.	%	
SMS	4	27	8	53	3	20	15
BES	6	33	10	56	2	11	18
VEW	8	17	38	79	2	4	48

4.6 Need for Modifying the T&V System's Structure, Operation and Management

The same categories of respondents (SMS, BESs and VEWs) registered their various opinions on the need for modifying the T&V system structure, operation and management. As represented below, (Table 11) showed more than half (53%) of the SMSs supported the need for modification of the T&V system, while a little below half (47%) were not in support. About three-quarters (72%) of the BESs supported the need for the modification and above one-quarter (28%) were not in support. It is about the same response from the VEWs where slightly more than three-quarters (79%) were in support, while about one-fifth (21%) were not in support.

Table 11: Perceived need for modifying the structure, operation and management of T&V by the key operators (n=75).

Type of respondent	Need for modifying the T&V system				
	Yes		No		
	No.	%	No.	%	Total
SMSs	8	53	7	47	15
BESs	13	72	5	28.	18
VEWs	38	79	10	21	48

The responses indicated that the general perception of the operator respondents were for the need for change or some modifications of the T&V system, with more than half of all categories of respondents supporting the need for modifying its structure, operation and management. These views may have been influenced by their experiences over the years and some problems met during the course of execution of their duties.

4.7 Perceived Assessment on the Impact of T&V system on Agricultural Production by the Key Operators of the Extension System

Table 12 shows the perceived impact of the T&V system on agricultural production by the key operators, where majority rated the T&V system as very high and high. One-third (33%) of the SMSs rated the impact as very high, while slightly less than half (47%) rated it as high with only one-fifth (20%) of the total SMSs rating it as average. Many (67%) of the BES, as field supervisors rated the impact as very high with about one-quarter (28) of them perceiving it as high, while less than one-tenth (6%) reported as average. The rating of the impact here is high due to the fact that their assigned role is specified and emphasized with majority knowing their schedule. Many (79%) of the VEAs as core extensionists perceived the agricultural production level as very high and while a little below one-fifth (17%) reported it as high with a negligible (4%) of them rating it as average.

Table 12: Impact assessment of T&V system on agricultural production (n=75) .

Type of respondents	Perceived Agricultural Production Level					
	V. High		High		Average	
	No.	%	No.	%	No.	%
SMSs	5	33	7	47	3	20
BESs	12	67	5	28	1	6
VEWs	38	79	8	17	2	4

The rating on the impact assessment of the T&V system on agricultural production is generally high among the key operators. The T&V is believed to give the key operators the

chance to attend to their extension activities on fixed schedule, with clear mode of operation, which contributed in exposing them to field situations within their area of responsibilities. The Table 12 shows distribution of respondents on the assessment of the impact.

4.8 Different Categories of Farmers in the State

As earlier stated the second objective of this study was to determine the level of awareness, adoption rate among the different categories of farmers in the state. For the purpose of this objective, the farmers were divided into five categories and these are: contact and non-contact farmers, stratified in accordance with the T&V extension system's mode of categorisation, while the large, medium and small scale farmers were stratified based on farmers' production ability.

As in Table 13, contact farmers constituted about three-quarter (78%) among the respondents as against non-contact with a little less than one-quarter (22%). The reason for higher number of contact farmers was due to their availability during any extension activities, but generally the non-contact constitute the majority among the farming families.

Among the second category, the large-scale had the lowest number of respondents with less than one-fifth (16%) and this might be due to their limited number among the farming families, while the medium-and small-scale both had slightly more than two-fifth (43%) and (41%), respectively. This was because majority of the farming families falls within these categories of farmers (Table 13).

Table 13: Distribution of farmers by TVs' and production scale categories.

Category of farmers	No. (N=124)	%
TVs' Categories		
Contact farmers	97	78
Non-contact farmers	27	22
Production Scale Categories		
Large-scale farmers	20	16
Medium-scale farmers	53	43
Small-scale	51	41

Table 14 showed distribution of respondents according to sex. Many (88%) of the respondents were male, with one-tenth (12%) female respondents. This was due to the fact that men constituted the majority among the farming families, while women represent a small proportion among the families in the State, which might be the influence of tradition and religious values among the society, as majority of young women which constituted more than one-half of the women work force are kept in "purdah" which restricts their movements.

Table 14: Distribution of farmer respondents according to their sex.

Sex	No.	%
Male	109	88
Female	15	12
Total	124	100

4.9 Farmers' Source of Agricultural Information

For agricultural information dissemination, farmers were asked to indicate the most available source of information

from the listed items in the Table 15. Most (92%) respondents indicated the use of Extension Agents (EAs), as against the use of Radio indicated by two-thirds (69%) of the respondents. This higher use of extension agents as a source of information may be connected with the constant visit to the farmers on fixed scheduled which provided easier contact with farmers within their cells, while the responses on the use of Radio may only be to those farmers who could afford the Radio or are able to listen to the programme through friends' or neighbours' radio.

About one-third (32%) indicated the use of friends as their sources of agricultural information. This represented a very low information flow as majority of other farmers (non-contact farmers) are expected to use the contact group for their information on new technologies. About one-fifth (23%) indicated the use of pamphlets. This signified a higher literacy among the farming families, while there was little indication in the use of neighbours and T.V. as sources with (3%) and (2%), respectively.

Table 15: Farmers' source of agricultural information (n=124).

Agricultural Information Source	No.	%
Radio	86	69
Extension Agents (EAs)	114	92
Pamphlets	28	23
Television (TV)	2	2
Neighbours	4	3
Friends	40	32

4.10 Utilisation of Various Sources of Farm Information by Various Categories of Respondents

To establish the extent to which the information sources are used among the various categories of farmers, the respondents were treated in accordance to the farmers' group they happen to fall and these groups are: contact and non-contact farmers, large, medium and small scale farmers.

Contact and Non-contact Farmers' Source of Farm Information: Among these categories, there was higher use of extension agents, especially among the contact-farmer with about three-quarters (73%) response as against one-fifth (20%) among the non-contact farmers (Table 16). This was due to fixed weekly schedule of visits arranged for the contact group.

The use of Radio was higher with over two-fifths (44%) response among the contact group as against below one-fifth (17%) response among non-contact. The use of friends was surprisingly very low, below one-fifth (15%) of the respondents among the contact group as against less than one-tenth (8%) among the non-contact. Friends and neighbours were commonly used in rural areas as a major source of farm information, but the response here was opposite, with a negligible number of only (3%) among the contact groups as against none among the non-contact. The use of pamphlets was indicated by about one-tenth (14%) among the contact group as against less than one-tenth (8%) among the non-contact. The use of T.V. was significantly low (1%) among both groups.

The above result indicated higher use of all the sources among the contact group of farmers which could be due to their direct involvement in the T&V system activities, and their high interest in farming business incorporated to their high interest in farming than the non-contact farmers. The high knowledge on farming among the contact groups are expected to trickle down to other non-contact groups within the VEAs' cells.

Table 16: Farmers' response on the use of source of farm information (among the contact and non-contact farmers)

Farmers' Category	Agricultural Information Sources (N=124)											
	Radio		VEA		Pamphlets		T.V.		Neighbours		Friends	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Contact	55	44	90	73	17	14	1	.81	4	3	19	15
Non-contact	21	17	25	20	10	8	1	.81	0	0	10	8

Farm Information Source to Large-, Medium- and Small-Scale Farmers: Among these categories, there were higher use of all the sources of information among the medium scale farmers. The use of VEAs was indicated by two-fifths (41%) of the medium-scale farmers as against the small-scale with about one-third (37%) response, while the large-scale was slightly above one-tenth (14%). The medium- used the Radio most among the groups with about one-third (31%) as against one-fourth (26%) and about one-tenth (12%) among the small-scale and the large-scale farmers, respectively.

The use of friends among the medium-scale was still higher with about one-fourth (24%) as against about one-fifth (19%) response among the small-scale and one-tenth (10%) among

the large-scale. The use of pamphlets was highest among the small-scale farmers with one-tenth (10%) response, about one-tenth (9%) among the medium-scale and only (3%) among the large-scale. The use of T.V. was by a negligible few (1%) among the large- and small-scale farmers with no farmer among the medium-scale, in the use of neighbours the medium-scale indicated (2%) and (1%) among the large-scale with none among the small-scale respondents.

The medium-scale used all the available information sources most; they constituted the majority among the farming families and also among the contact group of farmers, they constituted the majority of the farmers selected during the FADP as progressive farmers, and were directly involved in all the FADPs' extension activities. The large-scale farmers are not many in comparison to other groups but they are early adopters and highly progressive while the small-scale farmers constitutes the majority late adopters, managing only a very small portion of land (Table 17).

Table 17: Farmers' response on the use of source of farm information (among the large, medium and small scale farmers)

Farmers' Category	Source of Agricultural Information (N=124)											
	Radio		VEA		Pamphlets		T.V.		Neighbours		Friends	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Small-scale	32	26	46	37	12	10	1	0.81	0	0	23	19
Medium-scale	38	31	51	41	11	9	0	0%	3	2	30	24
Large-scale	15	12	17	14	4	3	1	0.81	1	0.81	12	10

4.11 Contact with Extension Workers

The respondents were asked to indicate the number of times they were visited by the extension workers at their farms or homes during the 1991 cropping season. The responses are summarised in Table 18.

Slightly above one-half (54%) reported of being visited 9 times and above as against about one-third (37%) responses of between 2-8 times visits over a period of 1991 cropping season by the respondents. About below one-tenth (8%) failed to respond to the questions while only (1%) among the respondents reported of being visited once by the extension workers. The report indicated high frequency of extension workers' visit to farmers farm or home which might be the influence of the mandatory fixed schedule of visits under the T&V extension system, even though the extension workers complained of the schedule to be too tight as very little time is given to them for their other personal undertakings.

Table 18: Frequency of visits made by the extension workers to the respondents' farm and homes.

Frequency of visits made	No.	%
No response (N.R)	10	8
1 (once)	1	1
2-8 times	46	37
9 times and above	67	54
Total	124	100

4.12 Extension Visits Made and Number of Demonstration Plots Established among the Categories of Respondents

Based on the above indication by the farmers on the frequency of visits made during 1991, the farmers were asked to indicate the total number of visits made during the season and the total number of demonstration plots established within the cropping season. Their responses are shown on Tables 19 and 20.

Contact and Non-Contact Farmers: Among these groups of respondents a total of 850 extension visits were conducted, out of which 680 visits (80%) were to the contact group, while the non-contact's were only one-fifth (20%). The majority among the contact group were influenced by their direct involvement in the T&V extension strategies. Similarly, a total of 329 demonstration plots were established within the season; 272 demonstration plots, over four-fifths (82%) being in contact farmers' farms while only 57, below one-fifth (18%) were conducted in the non-contact farmers'. The above results showed that contact farmers were always more active during the season than the non-contact farmers.

Table 19: Extension visits and demonstration plots established among the contact and non-contact farmers.

	Total Visits		Total Demonstration	
Farmers Category	No.	%	No.	%
Contact farmers	680	80	272	82
Non-contact farmers	170	20	57	18
Total	850	100	329	100

Table 20: Extension visits and demonstration plots established among the small-, medium- and large-scale farmers.

	Total Visits		Total Demonstration	
Farmers Category	No.	%	No.	%
Small-scale farmers	95	19	98	28
Medium-scale farmers	391	78	198	58
Large-scale	13	3	48	14
Total	499	100	344	100

Small, Medium-and Large-Scale Farmers: A total of 499 visits were conducted among these groups during the 1991 season, out of which the medium-scale farmers had the highest number of visits 391 slightly below four-fifths (78%) of the total visits. It was followed by the small-scale respondents with 95, just about one-fifth (19%) while the large-scale farmers had only (3%) out of the total number of visits.

On total number of demonstration plots established, still the medium-scale farmers had the highest with 198 plots constituting about one-half (58%) of the total established, followed by small-scale with 98 plots (28%) while the large-scale made 48 plots, just above one-tenth (14%). These demonstration plots included the OFAR and the SPATs encouraged with the introduction of T&V system.

4.13 Assessment of Adoption Rate Among the Various Categories of Respondents

For the purpose of assessment of adoption rate among the various categories of farmers respondents (contact, non-contact, small-, medium- and large-scale) a three year cross

sectional records were considered (1989-91). The data were collected from different sources, they include total number of technologies pushed, total number of technologies adopted, and the ones rejected within the three-year period.

Contact and Non-Contact Farmers: A total of 1109 technologies were pushed to these category of respondents within the 1989-91 period. Seven hundred and ninety-two technologies were adopted, that is, about three-quarters (71%) of the total technologies pushed while 317, about one-quarter (29%) were rejected. Within the three-year period, 1991 recorded the highest number of technologies pushed with 463 (42%) of the total technologies, followed by 1990 with 369 and 277 (25%) in 1989 (Table 21).

Table 21: Distribution of technologies pushed, adopted and rejected among various categories of respondents.

Farmers' Category	No. of Technologies Pushed						Total adopted		Total rejected		Total
	1989		1990		1991		No.	%	No.	%	
Contact farmers	213	24%	284	32%	381	43%	639	73	239	27	878
Non-contact farmers	64	28%	85	37%	82	35%	153	66	78	34	231
Total	277	25%	369	33%	463	42%	792	71	317	29	1109

In both categories of farmers the contact farmers had the highest number (878) of technologies pushed to them with the number of technologies increasing yearly from 1989-91. Of these, a total of 639, two-thirds (73%) were adopted while 239 (27%) were rejected. The non-contact farmers with a small

number of technologies had 231 with some slight variations in the number of technologies pushed over the years, 153 (66%) technologies were adopted with only 78 (34%) rejected. The result showed higher adoption rate by the contact group than the non-contact group. More technologies were pushed to the contact farmers because of their direct involvement in the T&V extension activities.

Small-, Medium- and Large-Scale Farmers: From these categories a total of 1175 technologies were pushed, out of which two-thirds (76%) were adopted; about one-fourth (24%) were rejected by the respondents within the 1989-91 period (Table 22). Within the three-year period, 1990 recorded the highest number of technologies pushed to the farmers, were about one-half (48% of the total technologies as against about one-third (36%) of the total technologies in 1989, while 1991 recorded the least with about one-fifth (16%) of the total technologies.

Among the categories of respondents listed above, the medium-scale had the highest number (579) of recorded technologies pushed two thirds (69%) of which were adopted with about one-third (31%) rejected. The year 1990 recorded the highest number of technologies pushed; about one-half (49%) followed by 1989 being about one-third (31%) while the 1991 recorded the least; one-fifth (21%) of the total technologies pushed. The small-scale farmers were second group in the number of technologies pushed with one-third (33%) of which above three-quarters (77%) were adopted with about one-quarter (23%) rejected. The year 1990 recorded the highest

number of technologies pushed to this group, above two-fifths (45%); followed by 1989, two-fifth (41%) of the total technologies pushed, with 1991 having the lowest, above one-tenth (14%) of the technologies.

Table 22: Distribution of technologies pushed, adopted and rejected among various categories of respondents based on farm size.

Farmers' Category	No. of Technologies Pushed						Total adopted		Total rejected		Total
	1989		1990		1991		No.	%	No.	%	
Small-scale	158	41%	172	45%	54	14%	294	77%	90	23%	384
Medium-scale	179	31%	281	49%	119	21%	398	69%	181	31%	579
Large-scale	85	40%	115	54%	12	6%	201	95%	11	5%	201
Total	422	36%	568	48%	185	16%	893	76%	282	24%	1175

The large-scale, with the least number (212) of technologies, about one fifth (18%) of all the technologies pushed at the same time had the highest rate (95%) of technologies adoption, with a rejection of 5%. 1990 still recorded the highest number of technologies pushed consisting about one-half (54%) while 1989 had two-fifths (40%) of the total technologies and 1991 with the lowest, 6%, less than one-tenth of the total technologies pushed over the years.

From the general observation of the above analysis, from the first group (contact and non-contact) there was more adoption rate among the contact group than the non-contact and the reason was because this group was more exposed to farming activities and they comprised the wealthy, large and medium even the small-scale producers. They also comprised the

educated, business people and the like, while the non-contact comprised of the very poor farmers in the community. Among the other three groups (small-, medium- and large-scale) the highest rate of adoption from the large-scale farmers had its base right from the FADP era when they were given special treatment as large-scale farmers, with provision of inputs, chemicals etc. on credit, on condition that they would follow strictly the FADP guidelines (extension advices). While the small-scale and medium scale farmers were among the progressives which also had some similar treatments as the large-scale farmers but no strict measures were taken on them. A similar study (Voh, 1984) which sought information about farm technology adoption among farmers in Gusau ADP reported a level of adoption rate comparable to this study.

4.14 Reasons for Rejection of Introduced Technologies

Based on the above analysis, respondents were asked to indicate their reasons for the rejection of the technologies introduced to them. Majority (97%) of the respondents (Table 23) indicated the high cost of inputs as a contributing factor while as much (93%) indicated the non-availability of credit, which was due to farmers' ignorance on sources of credit facilities, and those that were aware often faced the problem of protocols attached to obtaining the credit. Also, the late disbursement of the credit by the banks, sometimes the hardship before obtaining the credit and the high interest rates charged often discouraged the farmers, which at the end make the extension recommendations too costly to follow. The

late disbursement of credit was indicated by fairly above one-half (65%) of the respondents, while the lack of capital for a start up, greatly hindered the implementation of extension recommendations which was indicated by one-third (36%) of the respondents. This lack of money, may have been influenced by poor planning on the part of the farmers and poor market for their products as livestock are often sold by farmers to mobilise capital for farming.

Besides, one-fifth (20%) of the respondents indicated that too many recommendations at the same time contributed to making the implementation of the extension recommendations too difficult while about one-tenth (13%) indicated that the recommendations to be too scientific and slightly below one-tenth (9%) indicated that the recommendations reach them late, this might be due to their locations from the main source of information.

Table 23: Perceived reasons for non-adoption of the new technologies (n=124).

Reasons for non-implementation	No.	%
Recommendations too scientific	16	13
Too many recommendations at the same time	25	20
Lack of enough money at hand	45	36
Non-availability of credit	115	93
Late disbursement of credit	80	65
Inputs are costly	120	97
Recommendation reaching us late	11	9

4.15 Awareness and Adoption of Agricultural Innovations

For the purpose of determining the impact of T&V system on agricultural development in the state, the rate of awareness and adoption of six recommended improved seed varieties of cowpea, millet, maize, guinea corn, groundnut and cotton were considered because they are the major crops grown in the State. The rate of awareness and adoption of individual crops grown are presented in Table 24. Looking at the result, it could be stated that the level of knowledge on all the improved seed varieties was relatively high while the adoption was relatively low in four out of six improved crops considered.

About three-quarters (73%) indicated their awareness of improved varieties of cowpea, as against two-fifths (41%) adoption rate, while fairly above one-half (58%) indicated their awareness of improved varieties of millet as against two-fifths (40%) adoption rate. Majority (98) indicated their awareness of improved varieties of maize with two-thirds (66%) adoption rate and three-quarters (77%) indicated their awareness of improved varieties of guinea corn with about two-thirds (65%) adoption rate while about one-half (49%) indicated their awareness of improved varieties of groundnut as against one-third (34%) adoption rate, and slightly below three-quarters (71%) indicated their awareness of improved varieties of cotton with only two-fifths (41%) adoption rate.

Table 24: Distribution of respondents according to their awareness and adoption rate.

Agricultural innovations	Awareness and adoption rate			
	Awarness		Adoption	
	No.	% that were aware	No.	% of those that adopted
Improved varieties of cowpea	91	73	51	41
Improved varieties of millet	72	58	49	40
Improved varieties of maize	121	98	82	66
Improved varieties of guinea corn	95	77	81	65
Improved varieties of groundnut	61	49	42	34
Improved varieties of cotton	88	71	51	41

The adoption of these crops were influenced by many factors. One of them could be the agro-ecological location of the State, which greatly affected the adoption of improved varieties of maize because of its high demand for rain and the Sahel-Sudan is known for its short rainy period. Other crops like cowpea, millet, sorghum, groundnut and cotton were grown all over the State despite the agro-ecological influence because of the development of high drought-resistant varieties from the I.A.R. Costly inputs, especially fertilizers, chemicals and seed scarcity during the season greatly affected the adoption rate of these crops. Another study (D'Silva *et el.*, 1981) also reported that the extent of use of recommended farm practices was less than the level of knowledge. Atala (1980) and Arokoyo (1981) in their various adoption studies also reported differential levels of awareness and adoption.

4.16 Crop Producers for the 1984 and 1991

After determining the extent of awareness and adoption rate of the six major crops in 1991, it was appropriate to know the number of producers of the crops among the respondents. The respondents were, therefore asked to indicate any of the crops they grew within the two seasons (Table 25).

Table 25: Respondents who grew any of the six crops during the 1984 and 1991 seasons.

Season	Cowpea		Millet		Maize		G/corn		G/nut		Cotton	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1984	114	92	119	95	72	58	122	98	111	90	124	100
1991	82	66	64	52	64	52	114	92	58	47	51	41

From Table 25, it was observed that there were more producers of these crops among the respondents in 1984 than in 1991. Among the whole crops cotton had the highest producers as every respondents indicated having produced it in 1984, as against two-fifths (41%) in 1991, which was significantly low compared to other crops mentioned. Sorghum which was indicated by many (98%) of the respondents as against majority (92) in 1991 which was the highest in all the seasons. This was followed by millet which was indicated by most (95%) of the respondents in 1984 as against one-half (52%) in 1991, and cowpea which was grown by most (92%) of the respondents in 1984 as against two-thirds (66%) in 1991, while maize was indicated by fairly above one-half (58%) of the respondents in 1984 as against one-half (52%) in 1991.

The higher participation of the respondents in 1984 could be due to high impact of the FADPs' extension activities which supported its extension activities with inputs, chemicals and other support facilities before the introduction of the T&V system. The drop in participation observed for 1991 was due to the problems faced by the farmers in the sudden scarcity and rise in the prices of inputs and chemicals, whereas the available chemicals found in the market were often adulterated. Labour also became extremely expensive, all of which at the end led to sharp drop in participation and production.

4.17 Gross Farm Output

Table 26 shows the distribution of respondents according to gross farm output level for 1984 and 1991 seasons. Despite the sharp drop in the farmers' participation in farming, the output rates for the 1991 season were observed to be higher than the 1984. The increase in the output may not be unconnected with the considerable rate of awareness and adoption of the improved variety of seeds introduced, and the constant contact of the extension workers.

The proportion of respondents who realised above 600 kg of cowpea in 1984 are equal to those in 1991 with slightly above one-fourth (27%) each, while the non-growers among the respondents were higher in 1991 with one-third (34%) as against below one-tenth (8%) in 1984. The proportion for millet above the 600 kg was higher with only 3% in 1991, while the non-producers in 1991 were higher with about one-half

Table 26: Distribution of respondents according to gross farm output level for 1984 and 1991 seasons.

Gross farm output category (kg)	Farmers' frequency by crops																							
	Cowpea				Millet				Maize				Guinea corn				Groundnut				Cotton			
	1984		1991		1984		1991		1984		1991		1984		1991		1984		1991		1984		1991	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	10	8	42	34	5	4	60	48	52	42	60	48	2	2	10	8	13	10	66	53	0	0	73	59
100-300	51	41	33	27	55	44	4	3	3	2	0	0	26	21	16	13	25	20	10	8	8	6	5	4
301-600	29	23	15	10	21	17	12	10	9	7	0	0	19	15	12	10	29	23	12	10	7	6	15	12
601-900	14	11	8	6	23	19	3	2	15	12	1	1	29	23	11	9	27	22	4	3	19	15	10	8
901-1200	13	10	7	7	13	10	9	7	15	12	4	3	19	15	15	12	19	15	2	2	25	20	3	2
1201-3000	7	6	19	15	7	6	36	29	30	24	59	48	29	23	60	48	11	9	30	24	4	3	2	2
3001-5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	16	8	6
5001-7000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	23	4	3
7001 & above	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	10	4	3
Total	124	100	124	100	124	100	100	100	124	100	124	100	124	100	124	100	124	100	124	100	124	100	124	100

Source: Data collected during 1992..

(48%) as against 4% in 1984, 4% in maize in 1991 and about one-half (48%) constituted the non-producers in 1991 as against two-fifths (42%) in 1984 for maize producers.

The proportion of respondents who realised above 600 kg of guinea corn in 1984 was higher with only (2%) as against those in 1991, but the non-producers were higher in 1991 with about one-tenth (8%) as against only (2%) in 1984. It was the same thing with groundnut which had a decrease in production among the respondents who realised above 600 kg with about one-fifth (17%) decrease against the 1991, and the 1991 had the highest non-producers of fairly above one-half (53%) of the total respondents as against one-tenth (10%) in 1984. The proportion of respondents who realised above 600 kg of cotton, recorded a decrease of one-half (51%) in 1991 and recorded a sharp drop in producers among the respondents with about three quarters (75%) in 1991 as against none in 1984.

4.18 Farmers' Reasons for the Change in Farm Productivity

Table 27 represents farmers' responses to the sharp decline in production of crops like cotton by one-half (51%), groundnut by about one-fifth (17%) and guinea corn by a negligible percentage (2%) in the 1991 production season, while the increase recorded was very low, 3% for millet and 4% for maize during the 1991 season with no variation in cowpea production considering the output above 600 kg in Table 20. Farmers were asked to give reasons for these observed changes in output. The main reason given was lack of necessary inputs by four-fifths (80%) of the respondents (Table 27).

Others were, in order of their importance, poor marketing by about four-fifths (79%), government negligence indicated by above one-half (58%), lack of credit facilities by about one-half (48%), lack of modern implements indicated by slightly above two-fifths (44%), no available land by slightly above one-fourth (28%) and lack of effective extension services was indicated by about one-fifth (16%).

Table 27: Perception of the farmers on the reasons for the change in farm productivity (n=124).

Reasons for change in farm productivity	No.	%
Lack of effective extension services	20	16
Lack of necessary inputs	99	80
Lack of credit facilities	60	48
Lack of modern implements	55	44
No available land	35	28
Government negligence	72	58
Poor marketing system	98	79

Because of the change in productivity, respondents were asked to indicate the profit and loss recorded within the three-year production seasons. Their responses were very much favourable, since there had been no recorded loss within the three years (Table 28). There was no response from 6% of the respondents in 1989, 4% in 1990, and 1% in 1991. Over three-quarters (77%) recorded profit in 1989 as against over three-fifth (60%) in 1990 and fairly above one-half (55%) in 1991. This indicated a difference of 17% for 1989 and 5% for 1990, respectively, from 1989. About one-fifth (15%) in 1989, about one-third (32%) in 1990 and over one-third (38%) in 1991 were

on the margin between the profit and loss. This category of respondents recorded negligible profit and loss within the three years period, while only 2% in 1989, 3% in 1990 and about one-tenth (9%) recorded loss among the respondents. The three years (1989 to 1991) considered was the period the KTARDA was redesigned. Also within this period there was a recorded sudden rise in the prices of commodities, and high cost of labour within the State.

Table 28: Response of farmers on profit, profit/loss and loss recorded for 1989, 1990 and 1991 period (n=124).

Response	Years					
	1989		1990		1991	
	No.	%	No.	%	No.	%
No response	7	6	5	4	1	1
Profit	96	77	75	60	67	55
Profit/loss margin	18	15	40	32	47	38
Loss	3	2	4	3	9	7

Based on the results in Table 28, respondents were asked to indicate major problems influencing the fluctuation in profit, profit and loss margin and loss within the three-year period. Table 29 represents the farmers' responses, which showed most (98%) of the respondents indicating the lack of government involvement in the marketing, also most (97%) of them saw high cost of labour as a contributing factor, and many (65%) indicated poor transport facilities and roads as a contributing factor. Farmers pay a lot to transport farm products from the rural areas due to bad roads as very few vehicle owners could afford to reach rural roads. About one-

third (35%) indicated the poor marketing system, as the government had no policy on marketing of locally produced commodities, while fairly above one-tenth attributed it to poverty among the majority of the farming families which led to the sale of their products any how, when the need arise, as many could not meet the conditions for credit, about one-tenth (9%) saw it as poor extension coverage while only 3% attributed persistent drought as the main source.

Table 29: Perceived problems influencing the change in prices of farm products (N=124)

Perceived Problems	No.	%
Poor transport facilities and roads	80	65
High cost of labour	120	97
Poor marketing system	43	35
Persistent draught	4	3
Poor extension coverage	11	9
Poverty	15	12
Lack of government involvement in marketing	122	98

T&V system can help by educating the farmers on marketing strategies rather than only production technologies even though the co-operative unit is doing a lot on that, but is still not enough as farmers are bitterly complaining on marketing strategies.

4.19 Women's Participation in Agricultural Development as Related to T&V system in the State

With a lot of women's organizations springing up, and more government concern over the gendre issues, with high encouragement on their participation on agricultural

development within the State, it is desirable to assess the extent of women's participation under the T&V system. To explore this, questionnaires were administered to 109 male and 15 female respondents. For comparison, 1984 and 1991 data on women's assessments were considered.

The 1984 data (Table 30) showed about three-quarters (73%) indicating a very high rating as against three-quarters (75%) in 1991 with a slight increase of 2%. The high rating indicated by one-fifth (20%) in 1984 as against slightly above one-fifth (22%) in 1991 with a slight increase of 2%, while the average rate for 1984 was far below one-tenth (6%) as against 3% in 1991, and only 1% indicated poor response in 1984 as against none in 1991.

Table 30: Farmers' assessment on women's participation in agricultural development during 1984-91 (n=124).

Score	Frequency of farmers			
	1984		1991	
	No.	%	No.	%
Very high	90	73	93	75
High	25	20	27	22
Average	8	6	4	3
Poor	1	1	0	0

The increase in participation may be very small in the two years compared, but still might be due to the influence of the T&V system along with introduction of Women in Agriculture Programme (WIA) mandated solely on extension activities within the urban and rural communities within the State (Table 30).

Based on the full extension coverage with the help of Women in Agriculture (Extension Agents), the women respondents were asked to indicate the extent of their participation in any of the listed extension activities carried out under the T&V system guidelines. Based on the results in Table 31, 1984 had the lowest response in comparison to 1991 season. The farmers' group meetings were attended by about one-half (47%) in 1984 as against four-fifths (80%) in 1991, an increase of one-third (33%). There was no formation of SPAT and OFAR in 1984, while in 1991 they were by many (87%) of the respondents, an indication of high adoption of the trials while the visits by extension worker to the respondents was indicated by one-third (33%) in 1984 as against most (93%) respondents in 1991. This is an increase of over one-half (60%). The visit to extension workers by the respondents was indicated by slightly above one-tenth (13%) in 1984 as against the majority (87%) in 1991, an increase of about three-quarters (74%).

Table 31: Women's participation in extension activities within the 1984 and 1991 seasons (n=15).

Extension activities	Frequency of farmers			
	1984		1991	
	No.	%	No.	%
Farmers' group meetings	7	47	12	80
SPAT & OFAR formation	-	-	13	87
Visit by extension workers	5	33	14	93
Visit to extension workers	2	13	13	87
Problem discussion with extension workers	-	-	14	93
Field days and visits	1	7	10	67

The problem discussion session was introduced to women farmers under the T&V system. None of them participated among the respondents in 1984 while most (93%) did in 1991. This may not be unconnected with the established Women in Agriculture Staff (WIA) who provided extension services at the door front of women-farmers. The field days held and visited by women farmers, was done by only 7% in 1984 as against two-thirds (67%) in 1991, an increase of over one-half (60%) of the respondents. This was not because field days were not held before the T&V system, but only women were not involved directly within the prevailing extension system then.

4.20 Reaching the Women Farmers

To make reaching the women farmers easier, some associations and organizations were formed and some revived with the introduction of T&V system. Already, some were highly supported by government and covered by policies guiding them. Some of these are Better Life for Rural Women, Home Economics (under the local governments), Adult Education, etc. Table 32 represents comparative participation of women farmers between the 1984 and 1991 seasons. The results showed that there was a higher participation generally on all the agriculturally related activities in 1991 than the 1984.

Participation in women farmers' associations in 1984 was about one-third (33%) as against the most (93%) in 1991 with an increase of over one-half (60%). This might have been influenced by the mass enlightenment campaign on women, and the formation of programmes like Women in Agriculture

supported by staff who work in the rural areas. This WIA was participated in by slightly above one-tenth (13%) in 1984 and increased to a majority (87%) in 1991, an increase of about three-quarters (74%). While the Home Economic activities had over one-half (67%) in 1984 as against four-fifths (80%) in 1991 with an increase of over one-tenth (13%). The Young Farmers' Associations with one-fifth (20%) of the respondents participating in 1984 as against the many (87%) in 1991, an increase of over one-half (67%). The Association were revived through the facilities offered by agricultural banks and some commercial banks through provision of loans of low interest rates to enlightenment programme offered by T&V system through the co-operative section of Agricultural Department.

Table 32: Women's response on their participation in agriculturally-related activities (n=15).

Activities	Frequency of participating women			
	1984		1991	
	No.	%	No.	%
Women Farmers' Association	5	33	14	93
Women in Agriculture	2	13	13	87
Home Economic Society	10	67	12	80
Young Farmers' Association	3	20	13	87
Adult Education Classes	7	47	13	87
Better Life for Rural Women	-	-	14	93

The adult education classes which were an old established institutions since colonial era, was relaxed at one time, but was later revived with the introduction of Women in Agriculture under the T&V system. It was participated in by

about one-half (47%) in 1984 as against majority (87%) in 1991 with an increase of two-fifths (40%) while the Better Life for Rural Women which was introduced recently and greatly supported by government, financially, socially and in policy guidelines. This institution was non-existent in 1984 and being participated in by most (93%) of the respondents in 1991. The establishment of this institution brought about duplications of so many agricultural programmes, as at one time the WIA staff were confused of their role, since many directives were coming to them from many ends.

4.21 Women Participation in Direct Agricultural Production

With the participation in various extension activities by the women respondents, it is desirable to know the areas that they directly participated in. From Table 33 it was indicated that the women participated most in harvesting and threshing of farm products in 1984 to a level of over one-half (69%) as against nearly four-fifths (79%) in 1991; an increase of one-tenth (10%). Closely following was the inputs application in 1984 indicated by over one-half (69%) as against over three-quarters (78%) in 1991 an increase of fairly less than one-tenth (9%). These two areas of women's participation in agricultural development were considered among the lighter and most demanding areas in production which women can easily contribute, e.g. planting and sowing of seeds which was indicated by less than one-half (44%) of respondents in 1984 as against less than one-half (45%) in 1991, an increase of 1%. Transportation of farm products was indicated

by only one-tenth (10%) in 1984 as against above one-fifth (23%) in 1991, an increase of fairly above one-tenth (13%). Land preparation was indicated by only 6% in 1984 as against 2% in 1991, a decline of 4%.

Old women and children mostly provide cheap labour. With the rise in prices of labour and limited funds in hand, women and children provide a better alternative. And with the introduction of T&V system aged women and married ones have somewhat been encouraged to embark on their personal production rather than providing labour for sale. The encouragement came through the formation of different societies and organizations within the urban and rural communities.

Table 33: Perceived areas of participation by women in agricultural development.

Areas of participation	Frequency of women participation (n=124)			
	1984		1991	
	No.	%	No.	%
Harvesting and threshing	85	69	98	79
Inputs application	85	69	97	78
Planting and sowing of seeds	54	44	56	45
Transportation of products	13	10	29	23
Land preparation	8	6	3	2

4.22 Correlation of Factors Associated with T&V system and Agricultural Development

The next aspect of this study is the testing of hypotheses. There are four concepts used to measure the dependent variables impact (standard of living, adoption of improved technology, expansion in crop production and yield

of the farmers). The four hypotheses were tested using appropriate statistical tools.

The analyses were carried out using Pearson Correlation, Stepwise regression and multiple regression analysis to determine the relationship and the degree of association between each variable (dependent and independent variables). The result is contained in the correlation matrix table and stepwise regression table.

4.23 Measurement of Standard of Living (Y_1)

The hypothesis tried to find out the relationship between the dependent variable (standard of living) and independent variables (extension visits, demonstration trials, media extension programmes, participation in extension activities, fortnight training (FNT), in-house training, pre-Monthly Technology Review Meeting (MTRM), MTRM, workshops and seminars). These variables were tested at 0.05 level of significance.

Table 34 shows that out of the seven independent variables tested only one variable (media extension programmes) showed significant relationship with the dependent variable, while the other six independent variables showed insignificant relation-ship statistically, at 0.05 level of significance. This may be due to the fact that they are factors which contributed indirectly to farmers' standard of living, they are hard to measure directly, the data can be said not to have supported the hypotheses. Extension visits, FNT, in-house training, workshops and seminars are

statistically insignificant and negatively related to the standard of living according to the analysis in Table 34.

Table 34: Pearson correlation analysis of the relationship between the dependent variable (standard of living) and independent variables.

Variable	Correlation coefficient
Extension visits	-0.018 n.s.
Demonstration trials	0.164 n.s.
Media extension programme	0.243**
Participation in extension activities	0.098 n.s.
FNT and in-house training	-0.027 n.s.
Pre-MTRM and MTRM	0.013 n.s.
Workshops and seminars	-0.042 n.s.

n.s. = not significant at 0.05 level.
** = significant at 0.05 level.

4.24 Relationship of Adoption of Improved Technology (Y_1) with the Independent Variables

The hypothesis tried to find out the relationship between the dependent variable (adoption of improved technology and the independent variables (extension visits, demonstration trials, media extension programmes, participation in extension activities, FNT and in-house training, pre-MTRM and MTRM, workshops and seminars). They were tested at 0.05 level of significance.

Four independent variables were found to be significantly related to adoption of improved technology out of the seven independent variables listed. These were extension visits, demonstration trials, media extension programmes and participation in extension activities while the other three

found to be statistically insignificant and negatively related were the FNT and in-house training, pre-MTRM and MTRM, workshops and seminars (Tables 35). The extension visits showed greater significance and positive relationship to adoption of improved technology than all the variables listed. It can be observed that only the variables that directly involve the extension workers and the farmers were found to be related, while the other three variables (FNT and in-house training, pre-MTRM and MTRM, workshops and seminars) which indirectly involved the extension workers and farmers, were found to be insignificant, but the data can be said to support the hypotheses since four out of seven were significantly related.

Table 35: Pearson correlation analysis of the relationship between the adoption of improved technology and independent variables.

Variable	Correlation coefficient
Extension visits	0.649**
Demonstration trials	0.267**
Media extension programmes	0.312**
Participation in extension activities	0.263**
FNT and in-house training	-0.016 n.s.
Pre-MTRM and MTRM	-0.007 n.s.
Workshops and seminars	-0.022 n.s.

n.s. = not significant at 0.05 level.
** = significant at 0.05 level.

4.25 Expansion in Crop Production (Y_j) and Independent Variables

The third hypothesis was on the relationship between the dependent variable (expansion in crop production) and the

independent variable (extension visits, demonstration trials, media extension programmes, participation in extension programmes, FNT and in-house pre-MTRM and MTRM, workshops and seminars). They were tested at 0.05 level of significance.

The results are shown in Table 36, the dependent variables were measured against the independent variables, from the Table only one independent variable (participation in extension activities) was found to be statistically significant to the dependent variable, while the other independent variables were statistically insignificant. This indicated the influence of direct participation in extension activities to farmers. Many factors contributed in expansion in crop production of which this variable is one.

Table 36: Pearson correlation analysis of the relationship between the expansion in crop production and independent variables.

Variable	Correlation coefficient
Extension visits	0.012 n.s.
Demonstration trials	0.025 n.s.
Media extension programmes	0.133 n.s.
Participation in extension activities	0.660**
FNT and in-house training	0.074 n.s.
Pre-MTRM and MTRM	0.097 n.s.
Workshops and seminars	0.107 n.s.

n.s. = not significant at 0.05 level.
** = significant at 0.05 level.

4.26 Dependent Variable (Yield) of the Farmers

The fourth hypothesis was on the relationship between extension visits, demonstration trials, media extension programmes, FNT and in-house training, pre-MTRM and MTRM,

participation in extension activities, workshops and seminars and yield of the farmers.

From Table 37, none of the independent variable showed any significant relationship with the dependent variable at 5% level. Some variables like extension visits, participation in extension activities, FNT and in-house training, workshops and seminars were all found to be insignificant and negatively related while some were insignificant but positively related. Variables like the demonstration trials, media extension programmes and pre-MTRM and MTRM, the data can be said not to have supported the hypotheses. This might be due to the fact that other factors are more important in influencing the yield and they contribute more directly than these variables, these variables contributed indirectly to the yield of the farmers.

Table 37: Pearson correlation analysis of the relationship between the yield of the farmers.

Variable	Correlation coefficient
Extension visits	-0.044 n.s.
Demonstration trials	0.136 n.s.
Media extension programmes	0.054 n.s.
Participation in extension activities	-0.012 n.s.
FNT and in-house training	0.019 n.s.
Pre-MTRM and MTRM	0.026 n.s.
Workshops and seminars	0.096 n.s.

n.s. = not significant at 0.05 level.
** = significant at 0.05 level.

Table 38: Pearson correlation matrix of the study variables.

Variables	Y_1	Y_2	Y_3	Y_4	X_1	X_2	X_3	X_4	X_5	X_6	X_7
Y_1 Standard of living											
Y_2 Adoption of improved technology	0.437*										
Y_3 Expansion in crop production	0.185	0.447*									
Y_4 Yield of the farmer	0.606*	0.337*	0.052								
X_1 Extension visits	-0.018	0.649*	0.012	-0.044							
X_2 Demonstration trials	0.164	0.267*	0.025	0.136	-0.093						
X_3 Media extension programmes	0.243*	0.313*	0.133	0.053	-0.103	0.225*					
X_4 Participation in extension activities	0.098	0.263*	0.660*	-0.012	-0.022	0.017	0.111				
X_5 FNT and in-house training	-0.027	-0.016	0.074	-0.019	-0.019	-0.042	0.098	0.055			
X_6 Pre-MTRM and MTRM	0.013	-0.007	0.094	0.026	0.026	-0.190	0.008	0.059	0.015		
X_7 Workshop and seminars	-0.013	-0.022	0.107	-0.096	-0.096	-0.015	0.044	0.061	-0.133	-0.133	0.138

**Statistically significant at 0.05 level.*

Chapter Five

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Re-Statement of Research Objectives

Although the T&V system has been in operation in Katsina State for about a decade, no empirical study has so far been undertaken to ascertain the extent to which the extension programmes has been successful or otherwise. The broad objectives of the study, therefore, has been to find out the impact of T&V system on agricultural development in the State. To this end, three specific objectives were outlined and pursued. They were:

1. to find out how the structure, operation and management of the T&V system operate in the State,
2. to determine the impact of T&V system on agricultural development in the State, and
3. to determine the level of awareness and adoption rate among various categories of farmers.

To achieve all these objectives, literatures were reviewed, to provide a framework on which theoretical relationships between dependent and independent variables were drawn. There were four different variables to determine the general hypothesis that emerged as:

1. There is a significant relationship between the dependent variable (farmers' yield) and the independent variables (extension visits, demonstration trials, media extension programmes, Monthly Technology Review Meetings

(MTRMs), FNT, Workshops and Seminars and participation in extension activities.

2. There is a significant relationship between the dependent variable (standard of living of the farmers) and all the independent variables in 1 above,.
3. There is a significant relationship between the dependent variable (adoption of improved practices) and the pre-mentioned independent variables and
4. There is a significant relationship between the dependent variable (extension in crop production) and the same cited independent variables.

Three types of questionnaires were designed to fulfill the objectives of the study. The main questionnaire was used in gathering the appropriate data from a sample of 124 randomly selected farmers living within the three zones of KTARDA, 15 out of 60 served with questionnaires responded among the researchers and SMSs respondents while among the BESs and VEWs 66 responded out of 120 served with questionnaires.

The data were analysed using descriptive Pearson correlation coefficient statistics. The 5% level of significance was used in accepting the significance of relationships between variables.

5.2 Summary of Results

The results showed that the T&V system' organizational structure in KTARDA had been modified in comparison to the standard version approved by the World Bank. This was done

to suit the need of KTARDA, to cut down the operational cost, shorten the information flow and cut down the bureaucratic aspects of the T&V system. Two different extension systems practised before the introduction of the T&V system were compared with the T&V system and these were demonstration and visits extension system practised before the ADPs were in force and training, demonstration and visits, practised under the ADPs system of extension.

The operators of the T&V system were interviewed on their perception of its effectiveness. Only about one-fifth (22%) rated it as very effective, above two-thirds (70%) rated as effective while less than one-tenth (8%) rated it ineffective. On the need for modifying the T&V system' structure, operation and management, same key operators of the system were interviewed, about three-quarters (73%) were in support of the modification, while above one-fourth (27%) were not in support. On the perceived assessment on the impact of the T&V system on agricultural production, about two-thirds (70%) rated it as very high, and one-fourth (25%) rated it as high while only 5% rated it as average.

There was no change in the operation as approved by the World Bank as it was operated under a single line of technical command, consisting of hierarchy of roles narrow enough to permit close personal supervision, guidance and training of the level immediately below. The operational guideline under which it operated were: pre-Monthly Technology Review Meeting (pre-MTRM), MTRM, Fortnight Training (FNT), post-FNT, field visits (by extension

workers), field days, in-house training and workshops and seminars. The management is designed by the World Bank for each ADPs but some ADPs made some adjustments to suit their needs. KTARDA is headed by Managing Director (MD), assisted by 8 Heads of Departments, with Director of Technical Services (D.T.S. Headquarters) as his Deputy. The Zonal level is headed by Zonal Manager also assisted by Heads of Departments. Technical matters were under the Director, Technical Services, Zonal level (ZDTs) and supported by 7 units, with Extension Unit in control of all the extension activities within the zone, under which you find SZEO, BES, VEAs and the farmers. The sectional heads under the Technical Department were identified as Subject Matter Specialists (SMSs).

Farmers (respondents) were divided into five categories, contact and non-contact based on T&V system' classification of categories. Large, medium, small-scale farmers classified based on their production ability. Majority (88%) were male respondents as against slightly above one-tenth (12%) female respondents. The EAs constituted the major source of farm information as indicated by (92%). The contact group indicated higher use of EAs with about three-quarters (73%) as against non-contact with only one-fifth (20%), while the use of radio was still high with the contact group with over two-fifths (44%) as against non-contact with only below one-fifth (17%).

Among the other categories, there were higher use of EAs by medium-scale with two-fifths (41%) as against small-scale with a little over one-tenth (14%). The medium-scale

indicated the use of radio by a little below one-third (31%) as against small-scale with one-fourth (26%), with slightly above one-tenth (12%) indicating so by the large-scale farmers.

On the visits to farmers' farms by EAs, more than one-half (54%) confirmed this to be from 9 times and above while above one-third (37%) indicated between 2-8 times. On the total number of visits and demonstration plots conducted, a total of 850 extension visits were conducted, 680 four-fifth (80%) of the total visits were to contact farmers and 170 one-fifth (20%) were to non-contact farmers. 329 demonstration plots were established, 272 over four-fifth (82) were established by contact farmers and non-contact with 57, a little below one-fifth (18%) of the total number. Among the small-, medium- and large-scale farmers a total of 499 visits were conducted of which four-fifths (78%) were to the medium and about one-fifth (19%) to the small scale while 3% were to the large-scale. More than one-half (58%) of the total demonstrations were among the medium-scale while the large-scale had over one-tenth (14%) of the total demonstrations.

Adoption rate among the various categories of farmers was assessed. Results indicated a total of 1109 technologies were pushed among the contact and non-contact categories within the study period 1989-91. About three-quarters (71%) were adopted and above one-quarter (29%) rejected. The contact group had the highest technologies pushed to them and the highest adopted and also the highest rejected. Of the

four-fifths (79%) of the total technologies pushed, about three-quarters (73%) were adopted and above one-fourth (27%) rejected among the contact groups. The non-contact had 231, above one-fourth (29%) of the total technologies pushed to them of which two-thirds (66%) were adopted with one-third (34%) rejected within the three years.

Among the small-, medium- and large-scale farmers, a total of 1175 technologies were pushed. Only three-quarters (76%) were adopted while a little below one-fourth (24%) was rejected. The medium-scale had the highest number (579) of technologies pushed to them consisting about one-half (49%); about three-quarters (69%) were adopted while about one-third (31%) was rejected. The small-scale farmers had 384, one-third (33%) of the total technologies pushed; over three-quarters (77%) were adopted while over one-fifth (23%) was rejected. The large-scale farmers had the lowest number (212) of technologies pushed, about one-fifth (18%) of the total but with the highest adoption rate of 95% among the respondents and only a rejection of 5%.

Farmers were asked to state their reasons for non-implementation of the new technologies. Most (97%) of the respondents indicated the high cost of inputs, while a large the proportion (93%) indicated the non-availability of credit as against the late disbursement of credit indicated by two-thirds (65). One-third (36%) indicated the lack of money at hand.

For the purpose of determining the impact of T&V system on agricultural development, the rate of awareness and adoption of six recommended improved seeds of cowpea, millet,

maize, guinea corn, groundnut and cotton were considered. Majority of the respondents indicated their awareness by above one-half of all the respondents, while the adoption rate was relatively low in four crops out of the six listed. The awareness rate of maize was indicated by most (98%) respondents as against two-third (66%) adoption rate, two-thirds (65%) rate of adoption, the rate of awareness and adoption was higher among all the crops. The producers of these crops were considered for the two seasons, in 1984 and 1991 cotton was grown by all (100%) of the respondents as against two-fifth (41%) in 1991, then followed by guinea corn grown by most (98%) respondents in 1984 as against majority (92%) in 1991. Next crop was millet with most (95%) respondents in 1984 as against one-half (52%) in 1991. Despite the sharp drop in producers, the 1991 was observed to be higher than the 1984 with higher percentage of producers, the increase in the output may not be unconnected with the considerable rate of awareness and adoption of improved variety of seeds introduced, and the constant contact of the extension workers. Same respondents in 1984 and 1991 realised above 600 kg of cowpea with slightly above one-fourth (27%) each. The proportion for millet above 600 kg was higher with only 3% in 1991, and the proportion for maize above 600 kg was higher with 4% in 1991 as against the 1984 and for guinea corn the 1984 was higher with only 2% as against 1991 output, groundnut had a decrease of about one-fifth (17%) in 1991, the cotton output recorded a decrease of one-half (51%) in 1991.

Because of the sharp decline in the output of some crops like cotton with one-half (51%), groundnut with about one-fifth (17%) and guinea corn with a negligible percentage of 2% in 1991, while the increase recorded was very low, 3% millet, 4% maize with difference in cowpea output, considering the output above 600 kg. Farmers were interviewed on the change in the output, four-fifths (80%) indicated the lack of necessary inputs and fairly below four-fifths (79%) indicated the poor marketing system, and government negligence by above one-half (58%) while others were below one-half (50%) indications. Because of the change in productivity, and the factors influencing the changes, the farmers were asked to indicate their profit and loss within the three-year production seasons, the response was in favour of profit which was indicated by three-quarters (77%) in 1989, over one-half (60%) in 1990 and also above one-half (55%) in 1991 while those between the profit and loss margin were about one-fifth (15%) in 1989, about one-third (32%) in 1990 and over one-third (38%) in 1991 and the total loss was recorded with a negligible percentages of 2%, 3% and 7%, respectively, for the years.

The factors influencing the fluctuation in the prices of farm produce were asked. Respondents were given the chance to indicate, and most (97%) respondents indicated the high cost of labour and also most (98%) respondents indicated the lack of government involvement in marketing of farmers' commodities, poor transport facilities and roads was indicated by about two-thirds (65%) of the respondents while

one-third (35%) indicated the poor marketing system and some indicated poverty with over one-tenth (12%) response, poor extension coverage by less than one-tenth (9%) and persistent drought by only 3% response.

With a lot of women organizations springing up, and more government concern over the gendre issues, with high encouragement on their participation on agricultural development within the state, it became desirable to assess the extent of the women's participation under the T&V system. 1984 and 1991 were considered as comparative years. The 1991 indicated higher rate of women participation with three-quarters (75%) as against about three-quarters (73%) in 1984 and on a high rating 1991 still had slightly over one-fifth (22%) as against one-fifth (20%) in 1984. Generally, there was higher participation of women in agricultural development in 1991 than in 1984 compared. The increase might be small compared but may be due to introduction of the T&V extension system along with the introduction of women in agriculture mandated to carry extension activities within the urban and rural areas.

Women's participation in extension activities was generally higher in 1991 than the 1984. With some newly introduced activities like formation of OFAR, SPAT with majority (87%) participating in 1991 as against none in 1984 and also problem discussion session which was also introduced in 1991 with most (93%) participation as against none in 1984, other activities were supported very well by majority of the respondents in 1984, but majority of the response were

all below one-half. And to reach these women some organizations were formed and some were revived with the introduction of the T&V system. Reaching these women became much easier under these organizations because of the norms and culture of the society within the State. An indication of higher participation of all the women in 1991 was shown in Table 21, compared to 1984, and the Better Life for Rural Women was not in existence in 1984 until in 1991 with most (93%) respondents. The other association indicated higher participation below one-half except the Home Economics Society with two-thirds (67%) response in 1984.

On the women's participation on direct agricultural production, most women were identified to have contributed in lighter jobs like planting and sowing with slight difference of slightly over two-fifths (44%) in 1984 and (45%) in 1991, harvesting and threshing was indicated by about two-thirds (69%) in 1984 and slightly above three-quarters (78%) in 1991, so also the input application was indicated by same respondents. Generally, women participated more in direct production in 1991 than in 1984.

5.3 Summary of the Decision on the Hypotheses

Findings from the hypotheses indicated that out of the 4 empirical hypotheses that were formulated only one was found to have supported the hypotheses at 5% level of significance.

1. Standard of living as a dependent variable was measured against the seven independent variables (extension

visits, demonstration trials, media extension programmes, participation in extension activities, FNT and in-house training, pre-MTRM and MTRM and workshops and seminars), out of the seven independent variables only only media extension programmes was found to be significant at 5% level. Three independent variables (extension visits, demonstration trials and participation in extension activities) were found to be insignificant and negatively related to the dependent variable, while three independent variables (FNT and in-house training, pre-MTRM and MTRM and workshops and seminars) were insignificant and positively related.

2. Adoption of improved technology was tested against the seven independent variables, four were found to be significant and positively related, while the other three were statistically insignificant and negatively related. The four variables found to be significant were variables that directly involve extension workers and the farmers.

3. Expansion in crop production was tested against the same seven independent variables, only participation in extension activities was found to be significant and positively related while the other six were insignificant but positively related.

4. The yield of the farmers was tested against the seven independent variables and were all found to be statistically insignificant at 0.05 level. Four independent variables were insignificant and negatively

related while the other three were also insignificant but positively related.

5.4 Conclusions

One major stumbling block embodied in the transfer of technology to a farmer is getting him to accept and practice the agricultural innovations. This can be achieved by coming up with a simple, self-explanatory technologies to farmers through the extension services.

The T&V system is a structural re-construction and development of the existing services. The old extension system had been revamped, restructured and expanded along the single line of T&V system, on which this study was based. The study had evaluated the impact of the T&V system on agricultural development in Katsina State. For the purpose of the study, several objectives and hypotheses were constructed.

For the purpose of understanding the structure, operation and management of the T&V system, two different extension systems practised before the introduction of the T&V system were all brought forward and analysed. These systems were (demonstration and visit extension system practised before the introduction of the FADP in 1975, then training, demonstration and visits extension system practised under the FADP/KADP before 1985) and then T&V system from 1985 to date.

The communication gap and long bureaucracy created under the first two extension systems before the T&V system,

brought about some modifications in the structural formation within the T&V system, some changes in the management were observed too, while the approved standard operational activities within the T&V system remain unchanged.

The modification within the system formation were done in favour of KTARDA to cut down the operational cost, shorten the bureaucratic aspects of the management, provide easier flow of extension messages and also provide easier access to management staff by extension staff.

The FADP system of extension (1975-85) divided the farming families into three categories (large-, medium- and small-scale farmers), for easier reach in the provision of farm inputs which also provided easier assessment of their awareness, adoption rate. The T&V system comes up with the division of farmers into contact and non-contact groups which is totally extension bias, without provision of any farm inputs. All the classifications were incorporated in this study in order to determine the farmers' productivity, level of awareness and adoption rate.

The most used sources of farm information within the study area were in the descending order of the extension workers, radio, friends, extension prints and neighbours. Many respondents indicated higher number of visits by the extension workers, which may have influenced the establishment of many demonstration plots in a form of SPAT, many technologies were pushed with high rate of adoption among the different categories of farmers in the study area.

Most of the farmers indicated costly inputs, non-availability of credit, late disbursement of credit, lack of

money at hand and too many recommendations at the same time (in that order) as contributing factors for non-adoption of new technologies, while majority indicated their awareness and adoption of the new varieties of seed by over one-half of the respondents, and more farmers were in production of these crops in 1984 than the 1991.

The impact of T&V system on farm production, the farmers' gross farm output for 1984 and 1991 were considered. A drop in farmers' participation in farming were observed in 1991 but the output rate was still higher than in 1984, which may not be unconnected with the considerable rate of awareness and adoption of improved variety of seeds introduced and the constant contact with the extension workers. Majority of farmers indicated the lack of necessary inputs, poor marketing system, government negligence (in that order), so due to slight differences in production and the indication mentioned above higher profit was recorded during the study period (1989-91). The respondents also indicated lack of government involvement in marketing, high cost of labour, poor transport facilities and roads, and poor marketing system as factors influencing the change in prices.

Women participation in agricultural development had been long in history, the study here looked into their relation to T&V system within the study area, data for the 1984 and 1991 were collected for comparison. The data indicated higher participation in all the extension activities in 1991 than in 1984, more extension activities were observed to be introduced with women in full participation under the T&V

system. Reaching women farmers was made easier through the reviving and formation of some organizations with the introduction of T&V system. More women were observed to have participated in organisations in 1991 than 1984 especially with the formation of better life for rural women programmes with strong government backing. Women participations in agriculture was observed to be in lighter activities like threshing, harvesting of lighter farm products e.g. (cowpeas, chillies, etc.), input applications, sowing and planting.

The research was concluded with some formulated hypotheses relating dependent and independent variables. Four empirical hypotheses were tested using Pearson correlation analysis of the relationship between the dependent and independent variables

5.5 Recommendations

The recommendations given in this section were primarily based on the findings of the study, partly on the researcher's observations of prevailing farming and extension situations in the area during data gathering and on the researcher's personal knowledge and experiences about farming generally in the area.

1. ***Structure of the T&V system.*** The structure of the T&V system in the State was modified to suite the need of the State, which was observed to bring about a workload within the systems' operational activities, especially to sectional heads at the Headquarters and zonal level, they both acted as SMSs. This was observed to bring about a neglect in some

assigned roles either bureaucratically or extension related activities.

Some posts within the structure were observed to be vacant. This was done to reduce the cost of extension and to shorten the bureaucratic aspects for better flow of messages, while blocking the chance of employment to others especially now with a lot of university graduates from Faculty of Agriculture roaming our streets unemployed. More officers should be employed to fill up the existing vacant posts within the structure for better interactions with the agricultural experts, reduce the workload among the senior officers, and provide easy access to extension workers by the farmers.

2. Operation of the T&V system. The operation of the T&V system in the State was observed to be well performed by the key operators despite some constraints. The operational guidelines were strictly followed, according to tradition of the T&V system. Some operations like MTRM, FNT and Field Visits were observed to be monotonous and poorly attended by the officers, while pre-MTRM visits, post FNT visits were performed once a while or none at all in three months. These attitude by the officers concerned were caused by lack of strict supervision from senior officers concerned, and the lukewarm attitude of the top management of the entire authority. There should be strict supervision of the officers immediately below and an emphasis should be placed on monthly report based on problems and achievements of every officer. Workshops and seminars should be organised quarterly for the

SMSs on different disciplines and in-service for junior extension workers should be organised monthly.

3. Management of the T&V system. A necessary input for good management made available. Manpower, funds and transport facilities were all at the disposal of the extension workers, but emphasis should be placed on staff welfare as staff of the authority were left unpromoted for years. Claims, salaries and other fringe benefits were paid beyond scheduled time and other officers of state origin were not covered with any job security as officers were left on contract appointments for years and without being paid their contract gratuity, and no specification on their appointment. The relationship between the senior officers and junior officers should be improved to avoid communication gap and provide better understanding and good working relations. A forum for extension workers and farmers development should be created to provide understanding and good working relationship.

4. The awareness, adoption rate among various categories of farmers. The small- and medium-scale farmers are technologically trapped. Crude production implements, small fragmented land holdings, low yielding crops due to poor management, poorly maintained animal and low yielding, poor cultural practices and limited access to credit have all contributed to low output and productivity.

The low income of the small- and medium-scale farmers which signified their status in the society led to their being ignored in agricultural development activities, especially the credit facilities, extension activities and

some government assistance. The factors mentioned in a way affected their awareness, adoption rate, and the creation of contact and non-contact farmers among the farming families had compounded the problems, as some farmers felt being isolated or rejected; since not many farmers are involved in the contact group.

More extension workers should be provided, to be able to cover majority of the farming families. The earlier ADPs attempted to improve extension effectiveness through EA/farmer ratios to be as high as 1:600 - 1:300. Yet yield increases were negligible and the rate of adoption low (APMEPU, 1982). Reasons given for poor performance during this period (1976-80) included: (a) shortage of competent extension agents, and (b) inadequacy of technical messages for the farming systems.

The KTARDA should check on the irregularity of visits by EAs and unsystematic supervision and irregular training of EAs, and concentration of KTARDA-financed large demonstrations which were not having the expected impact should be stopped (see farms operations) and the long chain in information flow from research to ineffective utilization of available manpower and transport facilities should be seriously checked.

5. Impact of T&V system on Agricultural Development. The impacts of the T&V system are hard to quantify. It is not easy to measure farmers' perception that extension advices have improved their lot, nor the increased relevance of the advances though both are readily apparent on field visits. Some ways of measuring the success of extension advice could

contradict the actual results: a major achievement of the system might be to improve efficiency in the use of inputs, which could appear as a reduction in their supply. But some indirect effects of the T&V system on production are evident like in the use of improved variety of maize, guinea corn and the use of fertilizer in the study area. There is the need to support extension with available inputs at the farm service centres, feeder roads, improved marketing system in the urban and rural markets through formation of effective co-operative societies. The government should form co-operative financing agencies and to be provided with manpower and transport facilities.

6. Women's participation under the T&V system. Reaching the women under this extension system constituted a big problem, especially when the demand was for the women to participate in agricultural production, because the young and able women are married under the Islamic laws and tradition of *purdah*, where they could only be reached except with the permission of their husbands, so the husbands need be persuaded to encourage their wives to participate.

The participation should be done through organizations and formation of farmers' groups. Dealing with the women in groups could bring about reduction in suspicion of some dealings, and will be much easier with the limited number of staff (WIA staff) by covering their large number at a time.

The women should be introduced to banking facilities and other lending bodies for effective utility. They should be exposed to small backyard production of vegetables, small

ruminants management and light treatments, poultry production and other home economics activities. Reaching the women should be done on schedule under the T&V system guidelines.

7. Hypothesis Testing. For future research of this kind, better operationalisation of variables should be looked for. For this research factors associated with T&Vs extension activities and agricultural development were considered and hypothesized in order to find their relationships, contribution between the variables and the results obtained were not encouraging as these factors contributed significantly low.

REFERENCES

Abalu, G.O.I., Yahaya, A. and Ayesha M.I. (1981). "Green Revolution in Nigeria". *A Proceedings of a Seminar Organized by Department of Agricultural Economics and Rural Sociology*, A.B.U., Zaria, Sept. 21-24.

Akanya, B.A. (1989). "Impact of agricultural extension progr ammes on farm production and standard of living of the farmers." *A case Study of BOARDA (1989)*. Unpublished M.Sc. Thesis, Department of Agricultural Economics and Rural Sociology, A.B.U., Zaria.

Akinbode, A. (1981). "Critical analysis of the management of agricultural extension in Nigeria". *Agricultural Administration*. An International Journal. Applied Science Publishers Ltd., Essex, England.

Alao, J.A. (1973). Community structure and modernization of agriculture: an analysis of factors in influencing the adoption of farm practices among Nigerian farmers. A Thesis presented to the Faculty of the Graduate School of Cornell University for the degree of Doctor of Philosphy. Ann Arbor, Univ. Microfilm. 155p.

Alifa, O.P. (1990). "The impact of T&V extension system on adoption of recommended farm practices among small-scale farmers in Soba Local Government." *An M.Sc. Agricultural Extension Research Proposal*. Department of Agricultural Economics and Rural Sociology, A.B.U., Zaria.

Aliyu-Auchan, S.M. (1977). An empirical study of the impact of institutional agricultural credit at farm level in Funtua Local Government Area of Kaduna State, Nigeria. Dept. of Agricultural Economics and Rural Sociology, Faculty of Agriculture, ABU, Zaria, M.Sc. Thesis, 96p.

Atala, T.K. (1986). *Role and impact of extension agents in Kaduna State, Nigeria."* Unpublished Ph.D Thesis, Iowa State University, U.S.A.

Atala, T.K. (1988). "Agricultural extension in Nigeria: Problems and Prospects." A paper presented at a seminar organized by the Faculty of Agriculture for visiting agricultural students from U.S.A., July 21-22, A.B.U., Zaria.

Atala, T.K. (1981). Agricultural extension in Nigeria and the green revolution programme. IAR/ABU, Zaria. Paper presented at the 1st National Seminar on the Green Revolution in Nigeria, Sept. 21-24, 1981. 19p.

Atsu, S.Y. (1974). The focus and concentrate programme in the Kpandu and Ho districts: Evaluation of an agricultural extension programme. Technical Publication Series No.34. Institute of Statistical, Social and Economic Research, Legon.

Basu, A.C. (1968). The social organizations of tabacco growers in northern Oyo division and adoption of new farming ideas and practices. Prepared for the functional literacy programme, Dept. of Adult & Education, University of Ibadan. 150p.

Basu, A.C. (1969). "*The relationship of farmers' characteristics of the adoption of recommended farm practices in four village of Western States of Nigeria.*" Bulletin of Rural Economics and Sociology 4(1): 79-168.

Benor, B. and Baxter, M. (1984). *Training and visit extension*, The World Bank, Washington, D.C., U.S.A.

Cernea, M.M. (1981). "Sociological dimension of extension organisation." *Introduction of T&V in India*, in Crocich and Chamala (1981), Vol. 2, pp. 221-234.

Cernea, M.M., Coulter, J.K. and Russell, J.F.A. (1984). *"Agricultural extension by T&V."* The Asian experience. A World Bank U.N.D.P. symposium.

Clear, J.B. and Watts, L.H. (1983). "*Knowledge transfer in developing countries, status, constraints,*" Outlook Proceeding of a Conference on International Extension at Steamboat Spring, Colorado, U.S.A.

D'Silva, B.C., M.R. Raza, M.D. Ejiga and I.O. Bogunjoko (1981). A socio-economic and extesnion survey of Funtua Agricultural Development Project. Department of Agricultural Economics and Rural Sociology, Institute for Agricultural Research, Ahmadu Bello University, Zaria, Nigeria.

Ega, L.A. (1988). *"Government Policies and Agricultural Development in Nigeria".* A paper presented at a seminar for America Youth in Agricultural exchange visit held at Faculty of Agriculture, A.B.U., Zaria.

Ekpere, J.A. (1973). A comparative study of job performance under the two approaches to agricultural extension organisation in the Mid-Western State of Nigeria. Unpublished Ph.D Thesis, University of Wisconsin, Madison, USA.

Ekpere, J.A. (1978). "*Agricultural Extension and Research Liaison Services, Problems, Issues and Suggestions.*" Paper presented at the First National Workshop on the role of Agricultural Extension and Research Liaison Services on improved technology transfer in Agriculture, AERLS, IAR, UNIFE, 6-10 Feb.

Famoriyo, Segun (1985). "Rural development revisited." *Rural Under Development in Nigeria 1900-1980.* Department of Political Science Seminar, Vol. 2, Faculty of Arts and Social Sciences, Ahmadu Bello University, Zaria.

FAO/UNDP/FGN. "*Specialized Workshop on Extension Training Principles and Methods.*" NAERLS/ABU, Zaria. Feb. 4-9, 1991. Report/Manual Strengthening Agricultural Extension in Nigeria.

Galjart, B.F. (1968). "*Old habits and new practices in Brazilian land settlement.*" Wageningen. Netherlands Centre for Publications and Documentations.

Gashua, G.S.A. (1987). "Farmers' borrowing and repayment capacity in smallholder loan scheme. A case study of Funtua Local Government. Unpublished M.Sc. Thesis, Faculty of Agricultural Economics and Rural Sociology, A.B.U., Zaria.

Gefu, J.O. (1981). "Socio-economic factors influencing goat management practices in Kano State of Nigeria." Unpublished M.Sc. Thesis, Faculty of Agriculture, A.B.U., Zaria.

Glenn, L.J., Orlin, J.S., George, K.D., Carl, K.E. "Consortium for the study of Nigerian rural development strategies and recommendations for Nigerian rural development." 1969-89.

Hilton, E.T. and A.A. Lumsdaine (1975). "Field Trials Designs in Gauging the Impact of fertility planning programme". 319-400 in Carl Bennett and Aurthur Lumsdaine (eds.), Some Critical Issues in Assessing Social Programmes: Evaluation and Experiments. New York: Academic Press Inc.

Hobbs, D.J. (1960). Factors related to the use of agricultural chemicals in Iowa farms. Ames, Iowa: Iowa State University, Unpublished M.Sc. thesis.

Howell, J. (1988). "*Training and Visit Extension in Practice.*" Agricultural Administrative Unit, Occasional Paper No. 8. Publishers Overseas Development Institutes.

Jibowo, A.A., J.A. Alao and S.K.T. Williams (1978/79). "Characteristics of the neighbouring communities and impact of the Isoya Rural Development Project:. *Journal for Rural Economy and Development.* 12(2) 79-89.

Katz, E. 91961). "Communication research and image of society: Conveyance of two traditions". Americal Journal os Sociology 65: 35-400.

KTARDA, "Annual Reports and Quarterly reports for the 1985 to 1992 periods."

Kumar, K. (1989). Methodologies for assessing the impact of agricultural development projects; A dialogue. Programme designed and evaluation methodology report. No. 11, A.I.D., June, 1989.

Langbein, L.I. (1980). Discovering whether programs work: A Guide of Statistical Methods for Program Evaluation. Santa Monica, California: Good Year Publishing.

Leagans, J.P. (1963). "Guide to extension teaching in developing countries." *Cornell International Agricultural Development Bulletin 5.* New York State College of Agriculture. A Contact College of the State University of Cornell, Ithaca, New York.

Ilebani, B. C. (1983). The impact of credit on small scale food producing farmers in Akoko South and Akoko North Local Government Areas of Ondo State. Dept. of Agric. Econs. and Rural Sociology, A.B.U., Zaria, M.Sc. Thesis. 121p.

Mijindadi, N.B. and Arokoyo, J.O. (1984). A review of the agricultural extension services of the savannah area minus ADP's involvement. Paper presented at the Agricultural Development Project Technical Co-ordination Meeting on Agricultural Extension, Bauchi, Nov. 10-11, 1984.

Mosher, A.T. (1976). *"Thinking about rural development."* Agricultural Development Council, Inc. New York.

Oluwasanmi, H.A. and J.A. Alao (1965). "The role of credit in the transformation of traditional agriculture." The Western Nigerian experience. *Nigerian Journal of Economic and Social Studies* 7(1).

Onazi, O.C. (1978). "The role of agricultural education in national development." *Text of a Public Lectures* at A.B.U., Zaria.

Parson, Talcott (1961). *"Age and set in the social structure of United State."* 365-375 in Clyde Klucholhn and Henry A. Murry (eds.) personality in nature, society and culture. New York.

Rogers, E. (1962). "Diffusion of innovation". New York, Free Press.

Rogers, E.M. and F.F. Shoemaker (1971). Communication of innovations: A cross-cultural approach, New York: The free Press.

Rogers, E.M. and Shoemaker, F.F. (1971). Communication of innovations: A cross-cultural approach. 2nd edition, Collier-Macmillan. 496p.

Schouherr S. and Mbugua E.S. (1974). *"New Extension Methods to speed diffusion of Agricultural Innovation."* Discussion Paper No. 200 (IDS/DP200), University of Nairobi, Kenya.

Seers, D. (1969). "The meaning of development." *International Development Review No. 3*, December.

Seers, D. (1977). The meaning of development." *International Development Review No.3*, December.

Sheikh, M.A.A. (1986). *"An empirical study of institutional agricultural credit at farm level in Funtua local government area of Kaduna State, Nigeria."* Unpublished M.Sc. Thesis, Department of Agricultural Economics and Rural Sociology, A.B.U., Zaria.

Smith, D.M. (1977). Human geography: A welfare approach. London: Edward Arnold Publisher Ltd.

Tissot, P.C. and Wilson, F.B. (1964). *"Agricultural education in African countries*, with reference to FAO special programme for education and training in Africa." FAO, Rome, 1964.

Voh, J.P. (1979). "An explanatory study of factors associated with adoption of recommended farm practices among Giwa farmers." *Samaru Miscellaneous Paper No. 73*, Institute for Agricultural Research, A.B.U., Zaria.

Voh, J.P. (1982). A study of factors associated with the adoption of recommended farm practices in a Nigerian village. *Agricultural Administration*, 1982, 9:17-27.

Voh, J.P. (1984). Socio-economic factors affecting the dissemination of farm information. IAR/ABU, Zaria. Paper presented at the 1984 Agricultural Information Workshop, organized by the AERLS/ABU, Zaria, September 11-21, 1984, 18p.

Williams, S.K.T. (1973). Rural poverty to rural prosperity: A strategy for development in Nigeria. Inaugural Lecture, Ile Ife: University of Ife Press.

Williams, S.K.T. (1974). *"Rural development in Nigeria."* University of Ife Press, Ile-Ife, Nigeria.

Williams, S.K.T. (1984). *Rural development in Nigeria.* University of Ife Press, Ile-Ife, Nigeria.