ADOPTION OF AGRICULTURAL INNOVATIONS AMONG MEMBERS AND NON-MEMBERS OF WOMEN CO-OPERATIVE SOCIETIES IN OJU LOCAL GOVERNMENT AREA OF BENUE STATE

BY

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Degree of Master of Science in Agricultural Extension,
and Rural Sociology

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FEBRUARY, 1998.

DECLARATION

I hereby declare that this thesis was written by me and a record of my own research work. It has not been part of any previous work for M.Sc. degree elsewhere.

All ideas from other researchers have been acknowledged.

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The above declaration is confirmed:

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Date: May 4, 1998

CERTIFICATION

This thesis entitled **"ADOPTION OF AGRICULTURAL INNOVATIONS AMONG MEMBERS AND NON-MEMBERS OF WOMEN CO-OPERATIVE SOCIETIES IN OJU LOCAL GOVERNMENT AREA OF BENUE STATE"** by **Victoria Ada Okwoche** meets the regulations governing the degree of Master of Science of Ahmadu Bello University, Zaria and is approved for its contribution to Scientific knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to God for:-

His grace and mercy, His protection over my children, Uduma, Ogoma, Ogbu and my mother Mrs Grace O. Ogbu throughout the period of this study.

ACKNOWLEDGEMENT

First and foremost, I thank the Lord God Almighty whose grace and mercy was sufficient for me throughout the period of this work,

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ABSTRACT

This study examined the influence of selected socio-economic characteristics on awareness and adoption of agricultural innovations among women co-operators and non-cooperators in Oju Local Government Area of Benue State. Also, the extent to which some socio-economic variables of the farmers affected the awareness and adoption of agricultural innovations was stressed. The socio-economic characteristics of the women studied were age, household size, farm income, agricultural credit, possession of durable goods, membership of co-operatives, non-farm income, level of formal education, farm size, length of membership, and contact with extension..

The sample size was one hundred and twenty respondents.

The statistical methods employed in the study included frequency distribution, percentages, means, t-test, Pearson correlation and step-wise regression.

The results of the study showed that there was no significant difference in age between the two groups, but a significant difference existed in the other socio-economic characteristics at 5 % level. The study showed that 55 % of the co-operators were aware of all the innovations while none of the non-cooperators fell in this category. A tolal of 67% co-operators and 2% of non-cooperators had adopted between 5-8 innovations. The correlation analysis showed a positive correlation between most of the variables. For co-operators, the variable that were positively significant to awareness included level of formal education, farm size, farm income, non-income, agricultural credit, membership of co-operative, possession of durable goods, contact with extension and length of co-operative membership. The step-wise regression showed that all the variables affected awareness by 46%. While for non-members, the three variables

which were significantly related to awareness included household size, farm income and non-farm income. The step-wise regression showed that these variables accounted for 20% of the variable in awarenesss.

For co-operators, the findings showed that levels of formal education, farm size, farm income, non-farm, possession of durable goods, contact with extension, household size, membership of co-operative, agricultural credit were positively significantly related to adoption of innovations. The variables accounted for 49% of the variance. For non-cooperators, age, household size, farm size, farm income and non-farm-income, were significantly related to adoption. The step-wise regression analysis showed that the variables accounted for 28% of the variance in adoption.

This study showed that the adoption of innovations by co-operators and non-cooperators was hampered by lack of credit facilities, inadequate processing and storage facilities, mismanagement, lack of ownership of land, inadequate knowledge of co-operative education.

This study supports the need for the government to strengthen and provide the womens' co-operative societies with the necessary logistic support, well managed co-operative production credit and encourage co-operative formation and contact between farmers and extension agents.

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CHAPTER ONE

INTRODUCTION

1.1 Women in Co-operatives:

Nigeria's agricultural sector has seriously faltered over the past two decades. Its role as the primary source of food and raw materials, a base for industrialisation, a leader in capital formation and an employer of labour have dramatically shrunk with time. The poor performance is reflected among other things, in severe short-falls in commodity supply, correspondingly escalating import bills and decline in G.D.P. as shown on Table 1.

Table 1: Contribution of Agriculture to Nigeria's gross Domestic Product at 1984 Factor Cost (in ₦' billion)

Year	Total	Agricultural Sector GDP	Percentage Share of Agricultural Sector GDP
1970	8.01	3.91	48.81
1971	10.09	4.60	45.59
1972	10.90	4.69	43.03
1973	16.67	4.76	28.55
1974	27.76	6.96	25.07
1975	31.79	8.12	25.54
1876	40.44	9.29	22.97
1977	47.82	11.23	23.48
1978	52.40	12.19	23.26
1979	63,70	13.98	21.95
1980	75.30	15.19	20.17
1981	78.29	19.54	24.96
1982	78.91	22.88	29.00
1983	78.30	26.67	34.06
1984	70.00	27.22	38.89
1985	74.47	27.01	36.27
1986	77.90	31.21	40.06
1987	79.28	31.86	40.19
1988	85.58	32.34	39.16
1989	85.82	34.36	40.04
1990	90.34	35.28	39.05
1991	94.61	36.52	38.60
1992	97.43	37.27	38.25
1993	99.65	37.78	37.86
1994	100.98	38.69	38.31

Source: (FMANR, 1991; FOS, 1995)

In reaction to this continuing agricultural crisis, various Federal and State governments have delineated policies and executed plans for redressing the situation. Among these measures are the creation and/or encouragement to form co-operatives and co-operative farm projects. According to Reed (1978, P.I.), government in many countries of the developing world, non-socialist as well as socialist states have turned to some form of co-operative agricultural production as a means of coming to grips with the complex problems of rural and agricultural development. Arua (1981) sees a lot of possibilities for modern large scale agricultural production through farmers' co-operatives. In the opinion of Ndubuizu and Obiefuna (1979, P.3) the co-operative movement more than any other agency, is in the best position to stimulate food production through extension of credits to the co-operators as well as the financing of large-scale food production schemes in the rural areas. As a veritable avenue for promoting agricultural development, a co-operative society is a voluntary association of free and independent citizens for the improvement of their economic conditions, a business body and not a charitable association" (Ijere; 1976, p11). Strong co-operative as a united co-operative movement require both men and women to work side by side as active and equal partner was needed. Women's role in social, political and economic spheres world-wide now needs to be stressed. Women get little for their efforts and they are often over looked or excluded from development projects and programmes. It was therefore, necessary for women to adopt self-reliance principles through self and mutual help. The 1980 mid-decade conference in Coperhagen observed from the five years of information that despite the fact that dismal situations for women in developing countries were not

improving, development programmes in the past have actually worsened the problem. New technologies introduced in development programs have even increased women's workload, particularly as agricultural production methods are improved without improvement in food processing (tractors for ploughing without mills for processing). Greater participation in co-operatives has therefore been encouraged, to enable women's participation in co-operatives, the United Nation Development fund for women has allocated over $5m for co-operative development, supporting 60 projects in Africa, Asia and Pacific, Latin-America, the Carribean and the Middle-East (Yusuf et al 1990).

The role of co-operatives in bringing about the necessary socio-economic transformation has, for long, been recognised in many parts of the world. Co-operative strategy has been seen as the most inevitable system in any developing country where emphasis is laid on agriculture to improve the economy. Raising capital for big time farming by individuals, especially the rural women, is usually very difficult if not impossible. In realisation of the expected benefits in women organisation themselves into co-operatives, there is the need to know the extent of their adoption of agricultural innovations. This fact had earlier on been highlighted in the Fourth Development Plan which stated clearly the use of co-operatives as channels through which inputs could be passed to farmers. Women's role in the society in general have been attracting world-wide attention. In Nigeria, experts believe that women provide about 50% of agricultural labour (Ijere, 1991). They perform crucial and laborious activities such as land clearing, tilling, planting, threshing and winnowing, transplanting, sorting, transportation of farm produce to collecting points processing and marketing. There is no doubt

that improvement on the traditional and laborious methods of food production will go a long way in ensuring food security for the family in particularly and the nation at large.

1.2 Statement of the Problem:

Despite the recognition of important role which co-operatives play in food production through the adoption of innovation, little emphasis has been given to studying innovation adoption by women farmers' co-operatives. Most adoption studies tend to focus on individual farmers (Obibuaku, 1966; Williams, 1969; Basu, 1969; Voh, 1979; Jagne and Patel, 1981; and Monu, 1983). Furthermore, Fourth Development Plan stated clearly the use of co-operatives as channels through which inputs could be passed to farmers. No study have been carried out to know the levels of awareness and adoption of agricultural innovations among co-operators and non-cooperators in the area. Men tend to dominate co-operative organisations which work on rural development, thus limiting the participation in co-operatives and other opportunities for women. Also owing to some inherent traditional socio-cultural and legal encumberances, women do not appear to participate much in agricultural co-operatives. This is particularly true of women in Oju Local government area of Benue State. However, of recent, many co-operative societies especially women's co-operative societies in the area have started to adopt innovations in their various activities. This study, therefore, intends to find out if there are differences in the characteristics, awareness and adoption behaviour of women who are members of co-operative societies and women who are not. This study also intends to examine prospects of and constraints to women co-operatives in the area.

1. 3 Objectives of the Study:

The general objective is to examine the adoption of innovations by women co-operators and women non-cooperators.

The specific objectives include:

1 to describe the socio-economic characteristics of women co-operators and women non-cooperators;

2. to examine the levels of awareness and adoption of innovations between women co-operators and women non-cooperators;

3. to examine the factor that distinguished the awareness and adoption levels of women co-operators and non-cooperators;

4. to examine the prospects of and constraints to women co-operatives in the area;

5. based on the above findings, this study wish to explore possible areas of research, and offer relevant recommendations for better government policies and programmes to improve the lot of women in agriculture.

1.4 Justification for the Study:

Strength comes from being organised into groups and having solidarity with one's fellow members through co-operative activities and this springs power to produce changes which are to the benefit of a large group of people. The key to a greater degree of influence in one's life is co-operation with others who share the same interest and, for this purpose, it is necessary to organise people into groups which can pursue these common interests. Innovation adoption by members of co-operative organisations starts as a response to a particular problem whose solution would lead to poverty alleviation. Women co-operatives provide thrift, credit labour, marketing of mainly agricultural importance.

Co-operatives are a suitable organisational framework for accelerated rural development and are useful instruments for the mobilisation and sensitisation of women. Women all over the country embrace the idea of co-operative formation because they realise its importance in increasing their credit worthiness and placing them in a position of strength to support income-generating activities out of their pooled resources. Nigeria's Fourth Development Plan which clearly states that farmers co-operatives will be used as viable media for introducing new inputs justifies the need for the study. The need for this study lies in the current government sponsored family support programme which is aimed at assisting women co-operatives in the acquisition of farmland, distribution of improved high yielding and disease resistant crop varieties to co-operators, purchasing of fertilizers for women and formation of women co-operatives for processing marketing agricultural produce.

CHAPTER TWO

LITERATURE REVIEW

2. 1 The Concept and Principles of Co-operative Societies:

The concept of co-operative societies has been looked at by different people from different angles. Hence it has been variously defined. Ijere (1992, P,1), defined co-operative to mean "an instrument of social and economic transformation." He perceived it as an organisation voluntarily entered into and democratically managed by the people. He further stated that the impact of co-operative in a country depended on the environment and priority in the national plan of a nation.

Mijindadi (1990), perceived the term co-operative to mean a group of people who voluntarily come together to form an association with economic interest in accordance with the laid down co-operative principle. MAMSER (1989) defines co-operative societies or organisation as an association of persons who have voluntarily come together to achieve a common end through the formation of democratic contributions to the capital required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate. On the other hand, Eldon (1969) perceived co-operative societies as primarily instrumentalities for agricultural market reforms. According to Okereke (1986) co-operative farming is a set of structures, processes and linkages which are owned and managed by agricultural workers in which production inputs are collectively supplied and held and in which risk and remuneration are communally shared on a predetermined basis.

Co-operative societies have unique principles underlying their formation. These principles include:

Open Membership:

This implies that nobody should be prevented from joining the society so long it is her wish to do so. That is anyone who can benefit from the membership and who indicates interest should be accepted. This is to ensure that everybody irrespective of status in the society is eligible for membership.

Democratic Control:

This principle stipulates that members should manage and control the societies. The control is on the basis of one member, one vote irrespective of the number of shares held by a member.

Limited Returns on Capital: Co-operatives are expected to exist principally to provide services to the member at the least cost and they are not expected to generate large returns from the capital. The major benefits should therefore not be seen as resulting from returns to capital but services to the members.

Surplus Earnings Shared According to Patronage: Members of the societies share from the surplus (profits) according to the services rendered to the societies or according to how much they patronise the societies. This principles has been slightly modified to included sharing according to share contributions. This shows that although each member has only one vote and the management of the organisation does not depend on members shares, any savings or surplus generated is shared to members according to their share contributions. This is

meant to encourage members who have the ability to contribute more in terms of share to do so.

Political and Religious Neutrality: In order to ensure that the society is democratic and self-reliant, all the members are expected to keep politics and religion out of the business of the organisation. That is, politics and religion should neither be allowed to influence their discussion in the meeting nor should it be allowed to influence discussion on co-operative matters.

Cash Trading: Members of the societies are expected to buy or sell their produce strictly on cash basis. This eliminates dealing in credit and attendant problems of such transactions.

Goods Handling at Market Price: Co-operative goods are traded at market prices. That is, the commodities are sold at prevailing prices at the time the transaction is made. This eliminates the problem that may arise if goods are sold at prices that prevail later.

Education for Continuous Expansion: Co-operative societies are enjoined to provide for the education of members. This include extension services for members of agricultural co-operatives. A co-operative societies is a continuous service of education for its members.

2.2.1 Historical Development of Co-operative Societies:

Co-operative societies or similar organisation have been in existence since the early days of civilisation. Historical information suggests various forms of co-operative activities since the Babylonian era and ancient China. Co-operative activities in the United States began at about the time of the founding of the

republic but gained momentum in the early years of the twentieth century. During the same period, co-operative developed in many foreign countries notably in Northern Europe. Its origin in Europe is traceable to the period of industrial revolution (FAO 1962), Olayide (1975) confirmed this claim when he stated that its origin in the United Kingdom was traced to Robert Owen and a group of Rochdale weavers commonly referred to as "Rochdale Pioneers. "By and large, most modern rural co-operatives activities arose in response to low prices for farm produce and high prices for inputs, wide marketing margins, excessive transportation costs and in general, a lack of farmer bargaining power. Underlying the establishment of co-operatives is the belief that individual farmers working together can enhance their economic position while at the same time effecting some positive influence on the marketing system.

2.2.2 Origin of Co-operatives in Nigeria:

Modern co-operative organisation started in Nigeria in the early 1930s with the enactment of the co-operative society law in 1935. The law followed the submission of the Strickland Report in April 1934. Strickland was commissioned in 1933 by the then Colonial Government of Nigeria to advise her on the feasibility of introducing co-operative societies in Nigeria. There were some attempts by indigenous groups, particularly farmers, to organise associations with similar aim prior to the Colonial attempt. The associations include the Ibadan Agricultural Society of 1904, the Agege Planters Union of 1907 and the Egba farmers Association of 1910. These associations were organised mainly in the cocoa growing areas of Nigeria. The Nigerian co-operative law was based essentially on the following:-

a. The re-organisation of cocoa farmers associations and unions.

b. To improve the quality of cocoa and other cash crops.

c To introduce some market reforms.

d. To establish a sound credit system.

e. To encourage a sound saving deposit by members of these societies.

f. To foster co-operative spirit amongst co-operative members.

As a result of the 1951 regionalisation in Nigeria, each of the three regions enacted its own co-operative society's law from the original law of 1935. This continued to be the case even when Nigeria became four regions, twelve states, nineteen states and the current thirty-six states. Hence, by 1981, as much as twelve thousand, seven hundred and forty (12,740) co-operative societies with the total membership of seven hundred and sixteen eight hundred and forty three (716, 843) had been recorded (Osuntogun, 1983).

Table 2: Number and membership of Agricultural Co-operatives in Nigeria 1981

Type	Number	Membership
Marketing	3,005	190,456
Rural Credit	5,459	266,756
Group Farming	1,916	55,374
Multipurpose	2,030	186,678
Fisheries	71	6,372
Others	259	11,207
Total	12,740	716,843

Source: Records of Chief Registrar, Co-operative Societies, (Osuntogun 1983)

2. 2.3 Co-operative Societies in Benue State:

The Northern Region Co-operative Regulations of 1956 as amended by Benue Plateau edict No. 7 of 1968 was adopted by Benue State Government. The numerous primary co-operative societies were reorganised into secondary co-operative societies based on Local Government Area levels These were thirteen. The societies were mainly credit and produce marketing societies and they formed the thirteen unions called Co-operative Credit and Marketing Unions (C.C.M.U.) In 1977, the 13 CCMU resolved to form one apex co-operative society to represent and facilitate their interest. Consequently, the body known as Benue Co-operative Federation (BCF) Limited was registered in 1977. When the civilians came to power in 1979, they laid great emphasis on agricultural production through the Green Revolution Programme. Farmers were called upon to form co-operative societies so that government assistance could easily be

passed on to them. The response was very encouraging. The agricultural co-operative Union also formed an apex known as Federation of Benue Agricultural Co-operative Union (FBACU) Ltd., to represent their interest and facilitate their effort. 1986, however, the response on the call by the Federal Government for the formation of women co-operatives was very encouraging. Within a period of one year, 300 women agricultural co-operatives were registered with a total membership of 30,000 members (Songo, 1990)

2.2.4 Organisational Structure of Co-operative Movement in Benue State Ministry of Commerce and Industries.

The co-operative movement in the state is organised into three-tiers system for effective management and performance. The tiers are:

1. Primary Societies: These are formed by individuals who come together and pool their slender resources to float a business. The responsibility of the members include:
   a. making the bye-laws of the society;
   b. electing and supporting competent committee members and their removal when necessary;
   c. recognition of the financial needs of the society and helping to seek and acquire such finances for the benefit of members;
   d. patronising the association regularly and voting on issues as well as abiding by the decisions of the majority;
2. The secondary societies or unions are made up of two or more primary societies and their responsibility are the same as the primary societies.

3. The tertiary body is the apex to which all the unions are affiliated. There are two main apex organisations in the State- Benue Co-operative Federation (B.C.F.) and Federation of Benue Agricultural Co-operative Union (F.B.A.C.U.). B.C.F co-ordinate all the co-operative credit and marketing unions while F.B.A.C.U. co-ordinate the activities of all agricultural unions in the State. Their Objectives include:

1. To develop and assist agricultural co-operative, credit and marketing unions.
2. To provide savings deposits and loans facilities for member unions.
3. To organise new unions.
4. To exercise careful and regular supervision over member unions
5. To conduct the sale of products to the best advantage of member unions.
6. To encourage members to produce the highest grade of products.
7. To arrange the purchase of any agricultural inputs needed by the unions for their operations.
8. To arrange banking facilities for its member unions.

The Benue Co-operative Movement is divided into:

i. Agricultural Co-operative Division.
ii. Accounts and Statistics.
iii. Education and Training.
iv. Multi-purpose Division.

The sections were all headed by Deputy Directors who are accountable to the Director of Co-operatives in Fig 1.

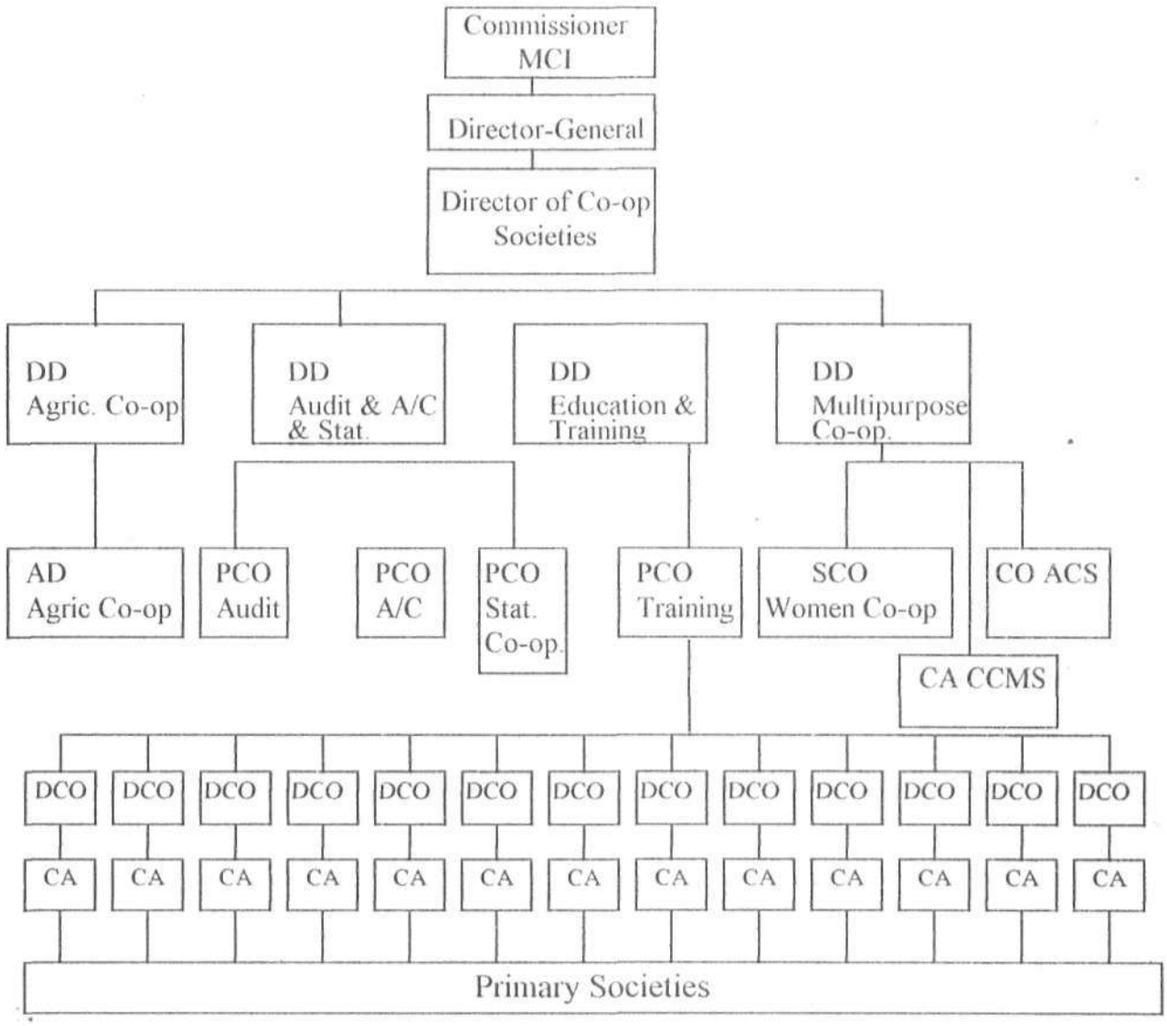


Fig. (1) Organisational chart of Benue Co-operative DIvision

Source: (Ministry of Commerce and Industries, Makurdi, 1996).

Notations:

MCI	-	Ministry of Commerce and Industries
DG	-	Director-General
DCS	-	Director of Co-operative Societies
DD	-	Deputy Director
AD	-	Assistant Director
PCO	-	Principal Co-operative Officer
SCO	-	Senior Co-operative Officer
DCO	-	Division Co-operative Officer
CA	-	Co-operative Assistant
CO	-	Co-operative Officer
CCMS	-	Co-operative Credit and Marketing Society
ACS	-	Artisan Co-operative Societies
A/C	-	Accounts
Stat.	-	Statistics

Benue Co-operative Federation (B.C.F.) Limited

Benue Co-operative Federation was established in 1977. It is made up of Marketing Unions (C.C.M.Us.). At the time of the interview, there were 24 C.C.M.Us. in the State. The executive committee has a president, vice president, a treasurer and a representative from each Local Government Area. B.C.F. is managed on a day to day basis by a General Manager who is directly accountable to the Director of co-operative societies. The mandate of the B.C.F. encompasses all its members unions. It among other things engages in such activities as acting as guarantor to member unions on loan application.

- Provision of direct financial assistance to member unions.
- Procurement and distribution of goods to member unions, as well as arranging for produce marketing.
- B.C.F. is an autonomous body.

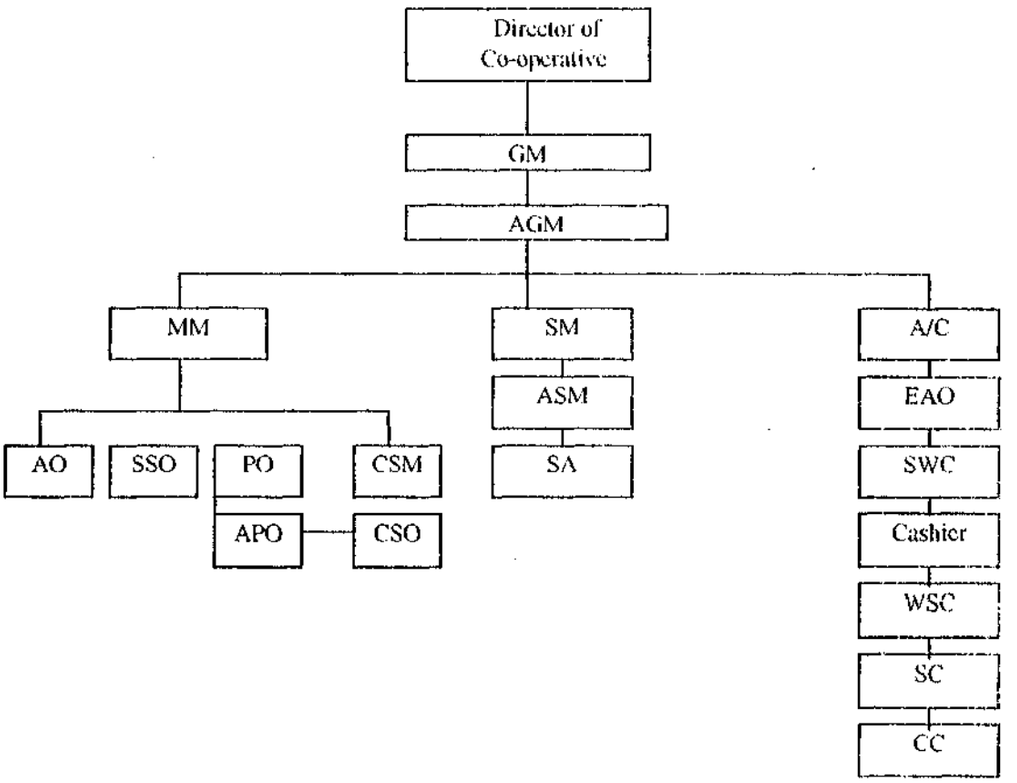


Figure (2): Organisational Structure of Benue Co-operative Federation.

Notations:

GM - General Manager

AGM - Assistant General Manager

SM - Store Manager

AO - Allocations Officer

SSO - Sub-Supervision Officer

MM - Marketing Manager

CSO - Cost and Survey Officer

PO - Purchasing Officer

CSM - Cost and Survey Manager

ASM - Assist. Store Manager

A/C - Accountant

EOA - Executive Officer (Accounts)

APO - Assist. Purchasing Officer

WSC - Wholesale Clerk

SA - Store Assistant

SC - Shop Clerk

CC - Checking Clerk

Federation of Benue Agricultural Co-operative Unions (F.B.A.C.Us) Limited

Federation of Benue Agricultural co-operative unions was established in 1981 to co-ordinate the activities of Agricultural Co-operative Unions (A.C.Us). The executive committee comprised a president, vice president, treasurer and one member each from the various Local Government Area of the State. Administratively F.B.A.C.U. is headed by a General Manager who is the chief executive. He is accountable to the Director of Co-operative Societies in Fig 3. The activities of Federation of Benue Agricultural Co-operative Unions include:

(i) Arrangement for credit facilities for the member unions;

(ii) Education and training;

(iii) Liaison with appropriate government agencies for supply of agricultural inputs at subsidised rates.

(iv) Arrangement for marketing of members' produce.

(v) F.B.C.U. is an autonomous body, however, due to inability of member unions to fund it adequately, the body tends to rely on the government for varied degrees of assistance.

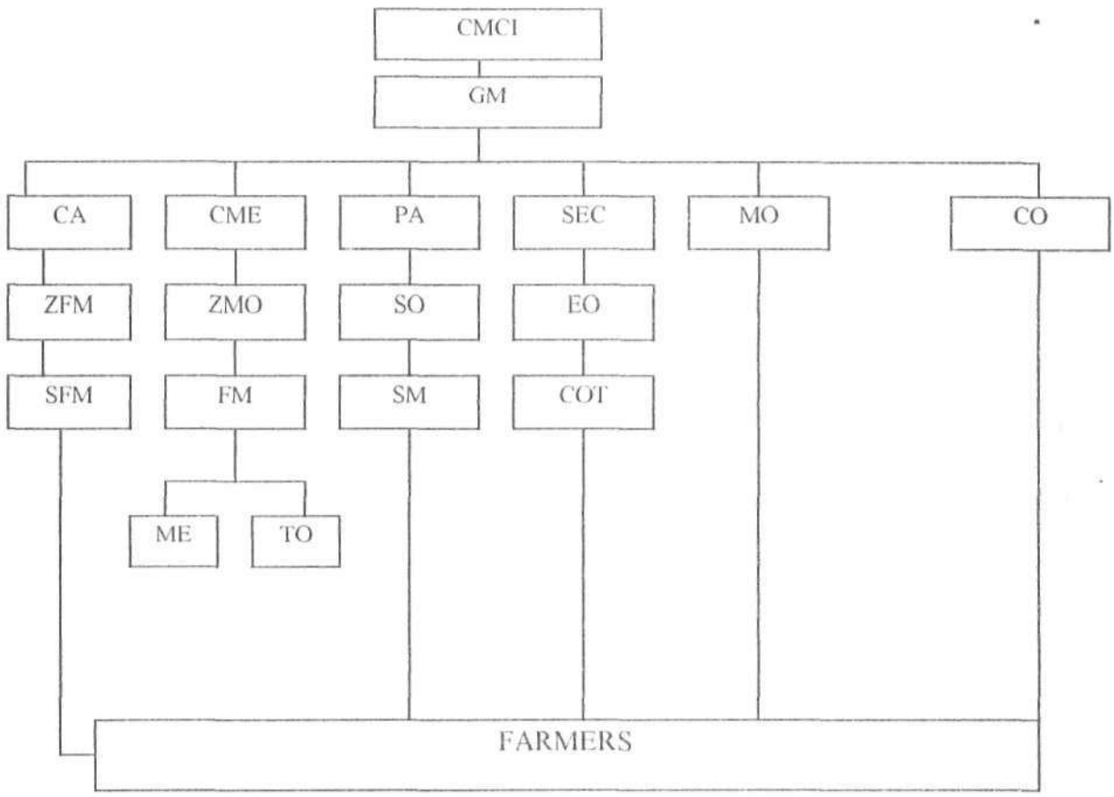


Figure (3) Organisational Chart of the Federation of Benue Agricultural Co-operative Unions (F.B.A.C.U) Limited

Source: **Federation of Benue Agricultural Co-operative Union, Makurdi 1996.**

Notations:

CMCI	-	Commissioner, Ministry of Commerce and Industry
GM	-	General Manager
CA	-	Chief Agronomist
CME	-	Chief Mechanical Engineer
PA	-	Principal Accountant
SEC	-	Secretary
MO	-	Marketing Officer
CO	-	Co-operative Officer
ZFM	-	Zonal Farm Manager
ZMO	-	Zonal Mechanical Officer
SO	-	Stores Officer
EO	-	Executive Officer
SFM	-	Site Farm Manager
FM	-	Foremen
SM	-	Storemen
COT	-	Clerical Officer/Typist
ME	-	Mechanics and Electrician
TO	-	Tractor Operators.

Table 3: Number and Membership Strength of Co-operative Societies/Unions in Benue State

S/No	Societies/Unions	Number	Membership
1.	Agricultural Co-operative Societies (Crops)	2,000	129,808
2.	Livestock Co-operative Societies	64	2,900
3.	Multipurpose Co-operative Societies	241	45,940
4.	Women Co-operative Societies	620	100,000
5.	Co-operative Credit and Marketing Societies	590	29,000
6.	Co-operative Thrift and Credit Societies	30	4,138
7.	Fishermen Co-operative Societies	36	2,574
8.	Artisan Co-operative Societies	73	6,642
9.	Agricultural Co-operative Unions	55	1,838
10.	Livestock Co-operative Unions	2	42
11.	Co-operative Credit and Marketing Unions	18	662

Source: Ministry of Commerce and Industries, Makurdi, (1996).

2. 3 Concept of Awareness and Adoption of Innovation and Adoption Process:

According to Rogers et al (1971), an idea is likely to be adopted when it is explicable in existing social symbols, when it is perceived as not complex, when its relative advantages are easily evaluated and when it can be adapted to the situation of the adopting unit. Rural sociologists view the adoption process in five successive stages.

1. Awareness - At this stage, the individual learns of the existence of the idea or practice but had little knowledge about it.

2. Interest Stage- At this stage, the individual develops interest in the idea. He seeks more information about it and considers its general merits.

3. Evaluation Stages- At this stages, the individual makes mental application of the idea and weighs its merits for his own situation. He obtains more information about the idea and decides whether or not to try it.

4. Trial Stage- At this stage, the individual actually applies the idea or practice, usually on a small scale. He is interested on how to apply the practice, in quantity, time and condition for application.

5. Adoption Stages - This is the stage of acceptance leading to continued use.

Rogers et al (1971) defined the adoption process as the mental process an individual passes from the point of hearing about an innovation to its final adoption. However, for rigorous theoretical and empirical analysis, a precise quantitative definition of adoption is needed. such a definition must distinguish between individual (farm level) adoption and aggregate adoption. Final adoption at the individual farmers level is defined as the degree of use of a new technology in long-run equilibrium when the farmer has full information about the new technology and its potentials. This definition corresponds with Schultz's (1975) contention that the introduction of new technologies results in a period of disequilibrium behaviour where resources are not utilised efficiently by the

individual farmer. New equilibrium levels are attained through a process of learning and experimentation.

Literature shows that adoption behaviour is unique, specific to particular innovation and communication plays an important part in the adoption process. Before a farmer adopts a practice, he must be aware of it and this is done through communication (Rogers and Shoemaker, 1971, Leagan, 1979). Rochin (1979) identified five general types of factors affecting adoption of improved techniques by the farmers. These included:-

1. Attitude of the Adopters- The attitude of the adopters is usually determined by the following:
   (i) the technical skill involved;
   (ii) the attitude of the farmer towards the change and risk;
   (iii) their income level;
   (iv) aspiration and confidence.
2. Aspects of Technology:
   (i) divisibility;
   (ii) economic profitability;
   (iii) complexity;
   (iv) communicability, and
   (v) technical appropriateness are some of the factors that influence the individual farmer in adopting a particular technology.
3. Government Policies- The interplay of monetary and fiscal policies of government affect to a large extent the adoption of innovations.

4. Features of the Environment- By this we mean the socio-cultural practices that no amount of effort and pressure mounted on them externally can cause them to change.

5. Risk and Uncertainty- Several farmers refuse to adopt innovations and techniques due to risk and uncertainties.

The adoption of an innovation is the actor's decision to accept the innovation as a solution to the relevant problem in his situation (Yarbrough et al 1970). He went ahead to state that innovation itself is a proposed solution to the actor's problem.

Adoption of improved farm practices may in the past be related to how farmers perceived the technologies being introduced to them. Important factors in such a perception are the difficulty inherent in using a practice, the consistency or how adaptable the practice is to the existing practices that the farmers are already familiar with and the expected returns that farmers believe are likely to accrue to them by using the practice. In the adoption model, the farmer must pass through the stages of awareness, interest, evaluation, trial and adoption stages before a new idea is adopted.

Studies carried out in Nigeria and else where have shown that there exists close relationships between socio-economic characteristics, awareness and adoption of newly recommended farm techniques and these are in the levels of education, membership of associations, household size, age, income, cosmopolitensess and social status (Akanya, 1989; and Akanya, 1990). Voh (1984), in a study of farm technology adoption among farmers in Gusau Agricultural Development Project reported a positive relationship between levels

of education, socio-economic status and adoption. Similarly, Voh (1982) reported a positive relationship between levels of education, awareness and adoption. Nweke (1981) found a positive correlation between number of years of education and agricultural progressives. He stated that an educated farmer is less skeptical of a new idea and is more able to evaluate available information on improved practices .

However, Havens (1965) found no relationship between education and adoption behaviour. Social participation is likely to increase farmers exposure to new information. Singh and Reddy (1965); Dasqupta (1966); Alao (1971); Rogers and Shoemaker (1971); Abd-Ella et al (1981) found social participation to be positively related to awareness and adoption. It has also been shown that traditional socio-economic factors such as size of farm, owners age, level of formal education, income, family size and frequency of extension agents contact among others, generally influence the adoption or create conditions that may influence the adoption of agricultural innovations (Galjart, 1968; Clark and Akinbode, 1968; Basu, 1969; Alao, 1971; Voh, 1979). Williams (1978), in a study of farmers in Western Nigeria, reveals that farmers first learn of some recommended farm practices through the extension workers before any other source. Edache (1978) and Voh (1979) independently found a highly significant and positive correlation between the frequency of extension agents visit and the adoption of improved farm practices. Osuji (1983), also noted that frequent visits by extension agents and distance from the source of information are factors which affect farmers response to innovations. Furthermore, Kidd (1968) found out that

farmers do not adopt certain agricultural innovations because they lack credit facilities.

Ogunfowora et al, (1972); D'Silva and Raza (1980); Igben (1981) identified extension contact, credit availability, delivery of inputs and sources of information to be positively related to farmers adoption of agricultural innovations.

Gana (1974) found capital, extension contact and input availability to be related to awareness and adoption of innovation. Social psychological factors such as personal beliefs, are also known to affect adoption behaviour (Ogionwo, 1972).

According to Slocum (1962), there are factors which influence the decision to adopt or to reject innovations. Such factors include values, traditional practices and other aspects of the existing culture, knowledge about the existence and the nature of new practice, personal and family goals and influence of friends etc. Effionayi (1973) in his study, observed that the adoption of farm practices is influenced by social and psychological as well as economic factors. Community standard and social relationship provide the general framework in which the process of change occurs. Participation of general farm organisation and farmer o-operatives are associated with early adoption of new farm practices. Likewise, the number of contacts which individuals have with new ideas through bulletin, farm magazines and newspapers are positively related to early adoption of practices. van den Ban (1967) identified progressive farmers as being young, trained in agriculture, having membership in farmers' organisations and modern in their mode of living. Chaffee (1968) observes that higher adopters of improved

farm practices have higher number of city relatives, are more exposed to agricultural specialists and are more committed to Mexican revolutionary ideology. In India, Bose (1971) found that those farmers who adopted more practices belonged to higher caste, were literate and had higher participation in community activities while Gaikwad et al, (1979) observed that land holding, education, contact with change agents differentiated the adopters and non-adopters of improved farm practices. Wilson and Gallup (1988) found that education, size of farm, contact with an extension agent and socio-economic status are of a great importance in African. Marsh and Coleman (1989) also found socio-economic status, education and personal contact with the agency representatives as important characteristics of farmers in relation to the adoption of new farm practices. In (Ogunfidtimi, 1981; Monu and Omole, 1984; Ewuola, 1989; Obinne and Anyanwu, 1991; Obasi et al, 1994), relative economic advantage, profitability, compatibility and complexity of innovation, appropriateness of technology, farm or herdsize, socio-economic status of communities, educational levels also affect adoption of agricultural innovation. Idachaba (1980) indicated three ways of raising the total production viz:

1. Increasing the net area under cultivation by natural expansion of cultivated land.
2. Increasing the productivity of cultivated land through six strategic approaches:
    i. Use of high yielding varieties of seeds;
    ii. Use of fertlizer in higher doses and more efficiently.
    iii. Bringing larger areas under irrigation.

iv. Arranging plant protection umbrella to save crop losses due to insect-pest disease attacks.

v. Proper agronomic practices and;

vi. Improving farm management by appropriate land reforms and consolidation of holdings.

3. Increasing the gross cropped area through multiple cropping which generally becomes possible due to the introduction of additional irrigation which makes it possible to take a second (or even a third or fourth crop in some cases) during non -rainy season. These three approaches may be broken into two major areas namely: Natural expansion of cultivable land and the application of material and technique technologies to lands presently under cultivation. Idachaba (1980) favours the latter approach having appraised the former approach based on the severe pressure on land due to population pressures.

2. 4 Theoretical Framework:

Social Change.

Rogers et al (1971) defined social change as the process which alteration occurs in the structure and function of a social system. Chitambar (1973) defined social change as changes in the social structure and social relationship. Moore (1963) further summed this up in his definition of social change as "the significant alteration of social structures (i.e. of patterns of social action and interaction), including consequences and manifestations of such structures embodied in norms

(rules of conduct), values and cultural products and symbols. According to sociologists, social change may therefore assume either of the following forms.

(a) Modifications in human attitudes and behaviour pattern as a result of education e.g. when farmers come to develop a more favourable attitude toward a specific innovation as a result of extension activities and therefore decide to change their farming system by incorporating that innovation.

(b) Alteration in social condition as a result of changes in the policies of a social organisation.

(c) Effecting reforms in major legal and functional system of a society.

(d) Changes in the material culture.

The process of social change consists of three sequential steps.

(1) Invention (2) Diffusion and (3) Consequences.

Invention is the process by which new ideas are created or developed. Diffusion is the process by which these new ideas are communicated to the members of a social system. Consequences are the changes that occur within a social system as a result of the adoption or rejection of the innovation.

Scholars have viewed that in any social system, people's reactions to change programme is influenced by certain forces. For instances, Lippit (1953) recognised three types of such forces: these are:-

1. Change forces that motivate people to change by creating dissatisfaction which the status quo and favourable judgement of potential future situations

2 Resistance forces, which motivate people to change, that arise from

uncertainty of the unknown and inability to change.

3. Interferance forces which obstruct change without being directly related to it.

Therefore to understand these forces, there is a need to understand farmers circumstances defined as those factors which affect farmers decisions with respect to agricultural technologies. These factors Winkheman (1968) identified as farmers natural and economic environments, their goals preferences and resources which serve as force in determing their response to social interventions meant to change their lives.

Leagans and Loomis (1971) suggested three routes to the process of modernizing agriculture. These are:-

(1) Building a body of useful technology and available requisite production inputs that feel the modernization requirement.

(2) Creating a macro environment that makes change possible and encourage the ultimate decision makers to modify farming operation.

(3) Optimising an extension education system that effectively relates these conditions and resources to each other and making them in a way that stimulates innovations which progressively overcome achievement disparities common to traditional agriculture.

Social interventions are always designed with certain goals or outcomes sought whether these goals are being achieved or not would depend on changes that are noticed among the target group. In this regards, Reynolds (1970) suggests the following as indicators that could be used to judge the success or failure of such interventions.

1. Changes in knowledge and attitudes.
2. Mediating behaviour (e.g. information seeking activities).
3. Changes in individual behaviour towards the programme activities (trial, adoption).
4. Resulting social indicators effect (e.g. indices of economic or general well-being of the recipients).

Researchers have clearly shown that awareness and adoption behaviour of farmers is a function of a number of variables which could be grouped as socio-economic, socio-cultural and institutional factors. For instance, it has also been shown that traditional socio-economic factors such as size of farm, age, level of formal education, income, household size and frequency of extension agents contacts among others, generally influence the adoption or create conditions that may influence the adoption of agricultural innovations (Galjart, 1968; Clark and Akinbode, 1968; Basu, 1969; Alao, 1971; Voh, 1979).

The foregoing definition, theories and concepts of social change have revealed that factors could interact to produce or maintain the status quo could be institutional or socio-economic characteristics of the farmers.

For the purpose of this study therefore, certain socio-economic and institutional factor were selected for analysis in relation to farmers' awareness and adoption of agricultural innovations. These innovations are :-, age, farm size, level of formal education, household size, contact with extension, agricultural credit, farm income,. non-farm income, possession of durable goods and services,

membership of co-operatives and length of membership in co-operatives. All these variables and their relationships are discussed in the next heading.

2.5 Discussions and Measurement of the Variables:

For the purpose of this study, certain socio-economic factors were selected for analysis in relation to farmers awareness and adoption of agricultural innovations. These innovations are; fertilizer, tractor for farming, improved seed varieties, pesticides, garri or cassava grating machine, herbicides, single cropping, threshing machine, maize sheller, and cassava lifter machine. The socio-economic characteristics of the (women) farmers age, farm size, level of formal education, household size, agricultural credit, farm income, contact with extension agents, non-farm income. Possession of durable goods and services, membership of co-operatives and length of co-operative membership. The variables are discussed based on the literature review.

Dependent Variables:

Awareness: This is defined as the knowledge of the existence of an innovation. Awareness is seen as the first stage in adoption process (Rogers and Shoemaker, 1971). Therefore, it is proper to start with farmers' awareness of improved farm practices before assessing farmers adoption behaviour. It was measured by the number of recommended innovations a farmer reported being aware of out of the selected 10 recommended innovations. Each of the innovations was given an equal weight. Each of the recommendations the farmer claimed knowledge of, was scored one while the one she reported not aware was scored zero. Voh (1979) also assigned equal weights.

Adoption: This means the acceptance and continuous use of agricultural innovations by farmers. In this study, the selected ten recommended agricultural innovations included:-

- Chemical fertilizer;
- Tractor for farming;
- Use of improved seed varieties;
- Use of pesticides;
- Use of garri or cassava grating machine;
- Use of herbicides;
- Single cropping;
- Use of threshing machine;
- Use of maize sheller;
- Cassava lifter machine for uprooting.

Adoption score was calculated by summing up the number of practices the respondents reported as using. Equal weight was assigned to each practice as justified by Rogers (1961), who argues that the effect of unequal weighing is negligible from a statistical point of view.

Independent Variables:

Age:

Age is an important variable that affects agricultural productivity in different perspectives. For instance, Voh (1979) Zaria (1984); and Atala, (1988) reported in their various studies that older farmers generally tend to be more risk averse then young farmers. Hence younger farmers are often more prepared to take the risk of adoption new innovations. This was measured as the number of years of the respondent from birth at the time of the study.

Farm size:

According to Lionbeger (1960) the size of the farm essentially determines the scale of operation of the farmer, hence, his/her status. The size of the farm also has a bearing on the types and levels of resources combined for productive purpose. Clark and Akinbode (1967) reported positive' significant relationship between farm size and adoption of innovation. It was measured in hectares as the total number of land under cultivation as reported by the respondents or the total accreage reported by the respondents.

Level of Formal Education:

Education is the process of imparting or acquiring skills. It is important in all human endeavours, including agriculture. Several researchers have found a

positive relationship between formal education and adoption of innovation (Voh, 1979; Nweke, 1981; Atala, 1980). This was measured by the number of years the respondents reported as being spent in formal education. Each respondent was asked to give the number of years she spent in primary school, post primary and tertiary schools. The total number of years in school constituted the farmers score.

Household size:

The size of the household is an important aspect of rural farming operation because it determines the degree to which labour is available. Alao (1971) found a positive relationship between family size and adoption of improved farm practices. It is therefore expected that household size would positively relate to farmers adoption of agricultural innovations. This was measured by adding up the total number of people that were living and feeding from the same pot with the respondents at the time data collection.

Contact with Extension Agents:

Agricultural innovations are transferred to the farmers through the extension agents. Several studies have shown that extension agents serve as effective channel through which innovations could get to farmers (D'silva and Raza, 1980). Williams (1978) found that face to face visits are the most effective means of reaching the farmers by the extension agents. Voh (1979) and Edache (1978) discovered a positive significant relationship between the frequency of extension agent's visits and the adoption of improved farm practices. This was measured as the total number of visits by the extension agents to the farmers and

the number of visits by the respondents to extension agents as reported by the respondents.

Agricultural Credit:

Lack of credit may be disincentive to farmers' adoption of agricultural innovations because in some cases, farmers are too poor to finance improved agricultural techniques (Kidd, 1968). Other studies also indicated that factors such as delivery of inputs and credit facilities (Nweke, 1981; Igben, 1981) could affect farmers to either adoption or reject agricultural innovation. This refer to borrowings done in cash or in kind for farming activities from lending agencies (co-operative credit, banks Government agencies) relatives and money-lenders as reported by the respondents.

Farm Income:

The adoption of agricultural innovations is meant to increase farmers productivity, and standard of living. Clark and Akinbode (1968) found that the value of farm products sold, significantly correlated with high adoption among Cocoa farmers and among poultry and egg farmers in Nigeria. Farm income is defined as the accruable proceeds from all the farm enterprises undertaken by the respondent. She was asked to state the amount of money, realised from the sale of all the farm produce.

Non-Farm Income:

These are income realised from other sources of livelihood other than farming. It is expected that non-farm income would be positively related to adoption of innovations. Akanya, (1989) reveals positive relationship between non-farm income and adoption of agricultural innovations. This was measured in

terms of the average income the farmer earned from non-farm activities the previous year. The total amount of what the farmer earned became her score.

Possession of Durable Goods and Services:

Ownership of durable goods and services may indicated the economic status of an individual. Indeed, it has been hypothesised that early adopters of innovations are wealthier than late adopters (Rogers, 1983). Therefore, possession of durable goods and services is expected to be positively related to farmers' awareness and adoption of agricultural innovations. It was calculated in monetary value.

Membership of Co-operatives:

Farmers come together to form co-operative societies and associations to enable them to procure loans on a collective basis. Some studies (Alao, 1971; Atala, 1980) have found farmers membership and associations to be positively related to farmers adoption behaviour. This was measured by scoring one for membership and zero for non-membership.

Length of Membership in Co-operatives:

It refers to how long, in years, a farmer has remained with the co-operatives. It is expected to be positively related to adoption of agricultural innovations.

2. 6 **Hypothesis stated were:**

Hypothesis 1:- There is no significant difference in the awareness and adoption of innovations by women co-operators and women non-cooperators

Hypothesis 2:- Socio-economic characteristics of the women (education income, age, farm size etc.) are positively related to awareness of innovations.

Hypothesis 3:- Socio-economic characteristics of the women (education, income, age, farm size etc.) are positively related to adoption of innovations.

CHAPTER THREE

METHODOLOGY

3. 1 Introduction:

This chapter focuses on the description of the area of study, population characteristics, sampling procedure and sample size, method of date collection and statistical analysis.

3. 2 Area of Study:

Oju Local Government Area is located about 110 Kilometre South of Makurdi. It is linked through both Aliade/Awajir and Otukpo axis. The Local Government Area is bounded by Enugu and Cross-River State in the South and in the North by Obi, Otukpo and Gwer Local Government Areas. The eastern part of the Local Government Area shares common boundaries with Konshisha and Vandeikya Local Government Areas, while it is bounded in the West by Ado Local Government Area.

The Local Government Area is predominantly agricultural with over 90% of the farming population operating small scale farms not exceeding 2 hectares. The predominant crops grown include yam, rice, groundnut, cassava, guinea-corn etc. Yam is virtually grown by every household as a staple. Agricultural practices in the area are largely traditional, with modern technologies playing very little role.

The climate of the area is characterised by rainfall ranging from 1,200mm-1,500mm per annum. The rainy season which starts in April ends in late October. The dry season sets in November and ends in March with harmattan wind starting

to blow from November to January. Temperatures are moderately high ranging from 17^0 C - 29^0 C. The land is generally fertile and soil types include clayloam in most places and sandyloam being predominant in others. Soil erosion appears to be the most threatening factor to agricultural production, particularly in the hilly areas which include Andibilla-Ameka-Owo range and Uwokwu. The two main rivers in the Area are Oyongo and Onwu.

Agricultural credit is a well know limiting factor in agricultural production in the area. The main source of credit is the farmers savings either from proceeds from the sale of previous harvest or as shares from mutual associations and banks both of which are grossly inadequate.

With respect to commercial activities, the Local Government Area does not enjoy much patronage as it has little to offer in terms of economic activities for except primary products for which it is highly acknowledged in the state.

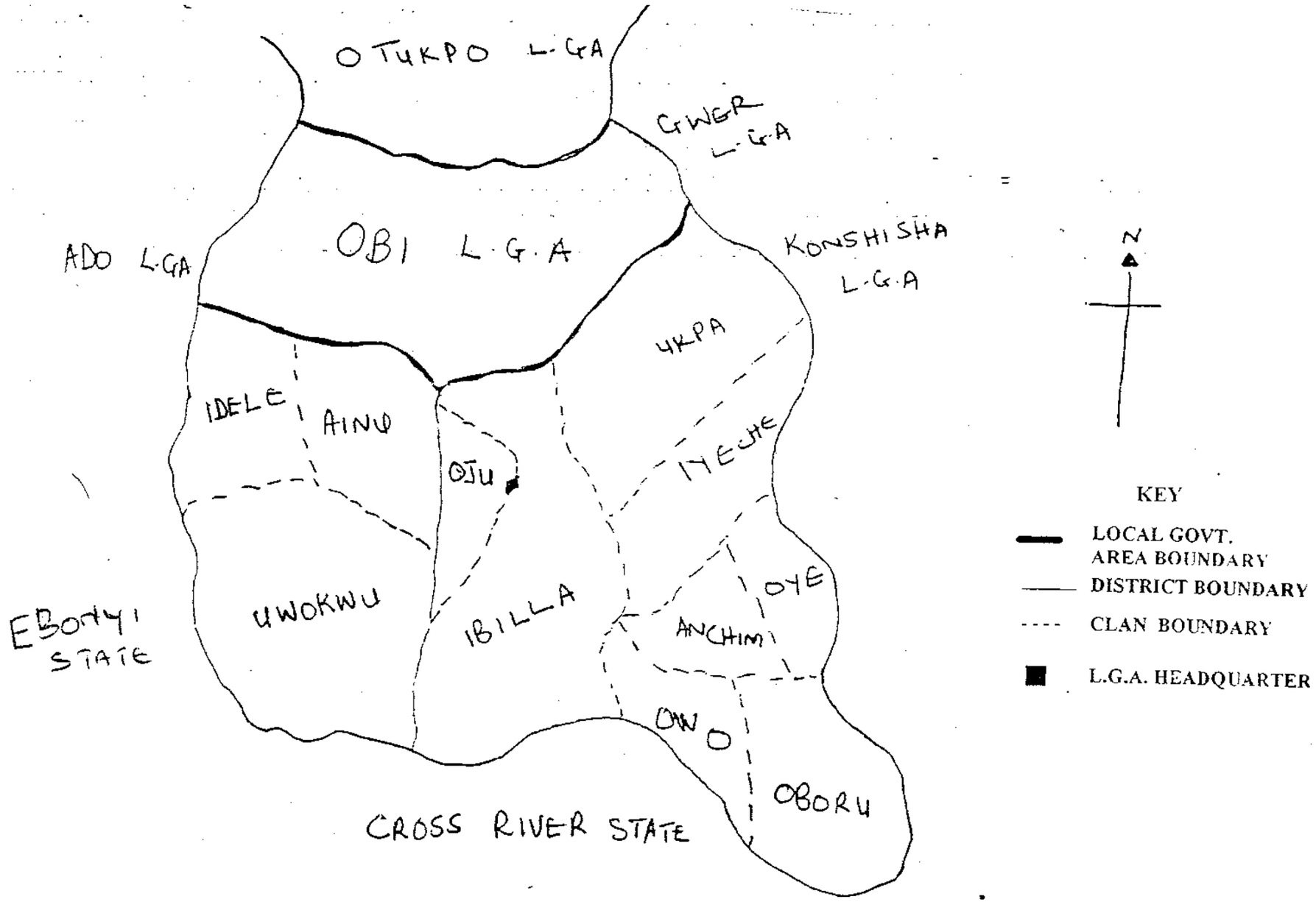


FIG. (1): MAP OF OJU L.G.A. OF BENUE STATE
SOURCE: SURVEY DEPT. OJU L.G.A.

3. 3 Population Characteristics:

There were 40 registered women co-operative societies in the area with membership strength of 2,800 women. They have an average membership of 70 women per co-operative as shown (Appendix 2). As a whole, there were 620 women co-operative societies with membership of 100,000 women in the state (Ministry of Commerce and Industries, 1996).

3. 4 Sampling Procedure and Sample Size:

Three women agricultural co-operative societies and three villages were purposively and randomly selected for this study. A total of 60 members of women co-operatives were interviewed from the three co-operatives societies (Oju women co-operative society, Ainu women co-operative society and Oboru women co-operative society). A breakdown shows that 20 members from each of the co-operatives were interviewed. Apart from the members, 60 non-members were sampled from three different villages (Oju, Ainu and Oboru). The breakdown also shows that 20 respondents were randomly interviewed from each of the villages. The randomization was adopted in order to avoid biases because it ensured that each non-member had equal chance of being chosen. The sample though small, ensured a good geographical spread in the Local Government Area. The total sample size for this study was 120.

3. 5 Method of Data Collection:

Primary and secondary data were used. A survey questionnaire(Appendix 1) was used in collecting the data for this study. The questionnaire was administered by the researcher and two trained enumerators.

3. 6 Statistical Analysis:

Tools of analysis used in this study were frequencies, percentages and means. The t-test was used for conclusion to be drawn as to whether a significant difference existed between the socio-economic characteristics of co-operators and non-cooperators. To determine the factor that may associated with adoption of innovations by co-operators and non-cooperators. Pearson correlation and stepwise regression were utilized. Pearson correlation coefficient (r) was used to describe the degree of relationship between variable (Ullman, 1978). Correlation coefficient varied from zero of no correlation to ± 1 (perfect correlation). Stepwise regression was used to determine the increase in explained variance that is achieved with the addition of a single predictor or set of predictors to an already existing set (Mueller et al, 1977). The coefficient of determination (R^2) was used to show the relative importance of each independent variable. R^2 can be interpreted as the sum of the proportion of variance in the independent variable accounted for by each predictor variable (Palumbo, 1977). The relationships between variables in this study are judged at 0.05 level of significance because of the relative low accuracy of social science data including the one obtained in this study.

CHAPTER FOUR

FINDINGS

This chapter focuses on the analysis of data in relation to the stated objectives.

4.1: The First Objective of this Study was to describe the Socio-Economic Characteristics of Co-operators and Non-cooperators.

Table 4: Distribution of Respondents According to Age.

Age Distribution (Years)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
≤ 30	11	18.4	8	13.4
31-40	36	59.9	35	58.4
41-50	13	21.7	15	25.1
51-60	-	-	2	3.4
Total	60	100	60	100
Mean	37		39	
Maximum	50		60	
Minimum	25		28	

Source: (Survey data 1996).

It was discovered that age class of 31-40 had the highest percentage for both groups, with the co-operators having 36 (60%) and non-cooperators 35 (58%), with age class of 51-60 had the lowest percentage for non-cooperators

with 2 (3%), while none of the co-operators fell in this category. For co-operators, age class of less or equal to 30 had the least respondents of 11 (18%). A large proportion (84%) of non-cooperators and (82%) of co-operators were between 31 and 50 age range. It could therefore, be inferred that there was a predominance of middle aged women among the two groups with 39 years as mean age for non-cooperators and 37 for co-operators. This could be attributed to the tendency for younger people taking to farming as a vocation in recent years. Since the computed or calculated t-value 1.33 was less than the tabulated t-value 1.960 at 0.5 level of probability, it could therefore, be concluded that there was no significant difference between the age of the two groups. Ochi (1991) also found no significant difference in the ages of cooperators and non-cooperators.

Table 5: Distribution of Respondents according to Household Size.

Household size (Class)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
3-5	3	5	11	18.3
6-8	33	55	36	60
9-11	22	36.6	11	18.4
≥12	2	3.3	2	3.3
Total	60	100	60	100
Mean	8		7	
Maximum	12		12	
Minimum	5		3	

Source: (Survey data 1996).

Table 5 showed that, household size of 6-8 members formed the highest class for both the groups with the co-operators having 33 (55%) and non-cooperators 36 (60%). Household size of 9-11 members for co-operators was 22 (37%) while that of non-cooperators was 11 (18%). The mean household size for co-operators was 8 and 7 for non-cooperators. The t-test showed that the computed or calculated t-value 2.45 was greater than the tabulated t-value 1.960 at 0.05 level of probability, which means that there was significant difference in the household of co-operators and non-cooperators.

Although, the average household size of the cooperators was larger than that of non-cooperators. However, co-operators employed more of hired labour

than family source. This confirms Buntjar (1970) report of a modern trend away from traditional labour. Hill (1972) indicated that larger households were asociated with economic success. It may be concluded that co-operative membership has enhanced economic status of co-operators.

Table 6: Distribution of Respondents according to Level of Formal Education.

Level of Formal Education (Years)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
No formal education	13	21.7	35	58.3
Primary school	12	20	16	26.7
Secondary school	11	18.3	6	10
Tertiary school	24	40	3	5
Total	60	100	60	100
Mean	11		8	
Maximum	14		14	
Minimum	6		6	

Source: **(Survey data 1996).**

Table 6, showed that for co-operators, tertiary education had the highest respondents of 24 (40%) while for non-cooperators no or zero education had the highest respondents of 35 (58%). The table showed that about 47 (78%) of co-operators and about 25 (42%) of non-cooperators had formal education. The mean years of formal education for co-operators and non-cooperators were 11

and 8 years respectively. The t-test showed that, the computed or calculated t-value 4.06 was greater than the tabulated t-value of 1.960 at 0.05 level of probability, which means that, there was difference in the level of formal education of co-operators and non-cooperators. Education which includes the process of imparting knowledge and skills is very important in all ways of human endeavours including agriculture. Differential educational background of farmers usually accounts for differential managerial ability which in turn determines to a large extent the over all success of the farm business. Therefore, managerial ability is a function of educational level. Idachaba (1981) observed that the level of a farmers education is related to the level of innovation he or she adopts.

Table 7: Distribution of Respondents according to Farm Size.

Farm size (Ha)	**Members**		**Non- Members**	
	No. of the Respondents	**%**	**No. of the Respondents**	**%**
1-3	13	21.7	53	88.3
4-6	46	75	7	11.7
7-9	2	3.3	-	-
Total	60	100	60	100
Mean	4.32 ha		2.63 ha	
Maximum	7		4	
Minimum	2		1	

Source: (Survey data 1996).

Table 7, showed that farm size class of 4-6 hectares had the highest number of respondents 46 (75%) of the co-operators while farm size class of 1-3 hectares had the highest number of respondents 53 (88%) of non-cooperators. Co-operators also cultivated up to farm size class of 7-9 hectares which had 2 (3%) respondents. None of the non-cooperators fell in this category. The average farm size for co-operators and non-cooperators were 4.32 hectares and 2.63 hectares respectively. The t-test showed that, the computed or calculated t-value 9.43 was greater than the tabulated t-value 1.960 at 0.05 level of probability, which means that there was significant difference in the farm size of co-operators and non-cooperators. It agrees with the criterion of Olayide et al (1980) that all the farmers operate on a small-scale since their farms are less than 10 hectares. The small size of the farmer for non-cooperator may resulted from lack of capital or absence of modern innovations. According to Lionberger (1960) the size of the farm essentially determines the scale of operation of the farmer, hence, his/her status. The size of farm also has a bearing on the types and level of resources combined for productive purposes. The relevance of farm size in this study stems from the fact that studies by Williams et al (1984) found that the larger the farm business in terms of accreage or labour requirement, the earlier the farmer tends to adopt new practices applicable to his or her farm enterprise.

Table 8: Distribution of Respondents according to Amount of Agricultural Credit granted:

Agricultural Credit granted (N)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
0	5	8.3	8	13.3
≤600	-	-	9	15.1
601-1,100	5	8.3	24	40
1,101-1,600	5	8.4	4	6.7
1,601-2,100	31	51.7	8	13.3
2,101-2,600	-	-	-	-
2,601-3,100	13	21.7	7	11.7
3,101-3,600	-	-	-	-
3,601-4,100	1	1.7	-	-
Total	60	100	60	100
Mean	N 2,138.00		N 1,366.00	
Maximum	N 4,000.00		N 3,000.00	
Minimum	N 1,000.00		N 250.00	

Source: (Survey data 1996)

Table 8, showed that the majority of co-operators, 31 (52%), fell witin the agricultural credit class of N1,601 - N2,100.00, while the majority of non-cooperators, 24 (40%) fell within the credit class of N601.00 - N1,100.00 About 5 (8%) of cooperators and 8 (13%) of the non-cooperators did not take any

and N1,366.00 respectively. The t-test showed that the calculated t-value 5.51 was greater than the tabulated t-value 1.960 at 0.05 level of probability. Therefore, the difference between the agricultural credit of co-operators and non-cooperators was significant. This could be as a result of easy acess to banks and availability of co-operative credit for co-operators. Osuntagun (1981) indicates tat co-operative credit was also becoming the most important source of agricultural credit.

Table 9: Distribution of Respondents according to Farm income.

Farm Income (N)	**Members**		**Non- Members**	
	No. of the Respondents	**%**	**No. of the Respondents**	**%**
≤ 5,000.00	13	21.7	53	88.5
5,001-10,000	26	43.4	7	11.7
10,001-15,000	15	25	-	-
15,001-20,000	6	10	-	-
Total	60	100	60	100
Mean	N 9,858.33		N 3,360.00	
Maximum	N 20,000.00		N 10,000.00	
Minimum	N 1,500.00		N 500.00	

Source: (Survey data 1996).

Table 9, showed that farm-income of less than or equal to N5,000.00 formed the highest income class for non-cooperators who had 53 (89%) while the

farm-income class of N5,001.00 - N10,000.00 formed the highest 26 (43%) for the co-operators. Farm income class of between N10,001.00- N15,000.00 had 15 (25%) of the co-operators. None of the non-cooperators fell into this category. The farm income mean for co-operators and non-cooperators were N9,858.and N3,360.00 respectively. The t-test showed that, the calculated t-value 9.25 was greater than the tabulated t-value 1.960 at .05 level of probability, which means that there was significant difference in the farm income of co-operators and non-cooperators.

Table 10: Distribution of Respondents according to Non-Farm income.

Non-Farm Income (N)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
≤ 5,000.00	31	51.8	56	93.4
5,001-10,000	5	8.3	1	1.7
10,001-15,000	3	5.1	-	-
15,001-20,000	19	31.8	3	5
20,001-25,000	2	3.4	-	-
Total	60	100	60	100
Mean	N 9,707.80		N 2,433.90	
Maximum	N 25,000.00		N 19,000.00	
Minimum	N 1,000.00		N 300.00	

Source: (Survey data 1996).

Table 10, showed that non-farm income class of less or equal to N5,000.00 was the highest percentage for both groups with co-operators having 31 (52%) and non-cooperators 56 (93%). Non-farm income class of N15,001.00-N20,000.00 was the second highest for both co-operators with 19 (32%) and non-cooperators having 3 (5%). Therefore, the majority of the respondents in both the groups fell within non-farm income class of less or equal to N5,000.00 The mean of non-farm income for co-operators was N9,707.80 while that of non-cooperators was N2,433.90. The t-test showed that the calculated or computed t-value 6.29 was greater than the tabulated t-value 1.960 at. 05 level of probability. Therefore it could be concluded that the difference between the non-farm income of the two groups was significant.

Table 11: Distribution of Respondents According to the value of Durable goods and Services:

Value of Durable Goods (N)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
0	-	-	29	48.3
≤15,000	16	26.7	17	28.3
15,001-50,000			2	3.3
50,001-85,000	20	33.5	9	15.1
85,001-120,000	13	21.8	3	5
120,001-155,000	11	18.4	-	-
Total	60	100	60	100
Mean	N 69,301.70		N 3,296.74	
Maximum	N 140,000.00		N 112,000.00	
Minimum	N 600.00		N 600.00	

Source: (Survey data 1996)

Table 11, showed that the majority of co-operators 20 (34%) fell within the value of durable goods class of N50,001 - N85,000.00, while the majority of non-cooperators 29 (48%) did not have any of these durable goods. The second highest for non-cooperators 17(28%) fell within the class of less or equal to N15,000.00. About 11 (18%) of co-operators were found within the class of N120,001.00 - N155,000.00. None of the non-cooperators fell within this category. The mean value of durable goods and services for co-operators and non-cooperators were N69,301.70 and N3,296.74 respectively. The durable goods considered, using minimum estimate included wrist-watches, motorcycles, zinc-roofed houses, cupboards for storing dishes, bicycles, sewing machines and

radio sets. The t-test showed that the calculated t-value 4.10 was greater than the tabulated t-value 1.960 at .05 level of probability. Therefore, the difference between the value of durable goods and services between the two groups was significant.

Farm income, non-farm income, value of durable goods and services of co-operators were higher than non-cooperators. It may also be explained that the economic status of co-operators were higher than that of non-cooperators. Clark and Akinbode (1968) found that the value of farm products sold significantly correlated with high adoption among cocoa farmers, poultry and eggs farmers in Nigeria. Indeed, it has been hypothesised that earlier adopters of innovations are wealthier than later adopters (Rogers, 1983). For the purpose of this discussion, farm-income, non-farm income, value of durable goods and services was used as indicators of economic status or levels of livings which could have partial reflections of the actual state of living of the farmers. The indicators however, could indicate the farmers current state of living in several ways. For example Olukosi (1979) believes that households which possess more items are less likely to fall below the subsistence level during hardtimes. It could be explained that, since the mean of these variables were higher for co-operators (N176,169.80) than non-cooperators (N9,090.64), co-operators have higher economic statues or level of living than non-cooperators. For example, farmers access to agricultural innovations have led to wide spread adoption and increased productivity which inturn led to higher family income and ability to purchase more durable goods and services which are indicators of high level of living. It could therefore be concluded that women co-operators have higher socio-economic characteristics by adopting more innovations than non-cooperators. The t-test shows that, the

calculated t-value for non-farm income (6.29), farm income (9.52) and value of durable goods and services (4.10) of which were all greater than the tabulated t-value 1.960 at .05 level of probability. Hence significant difference existed between these variables of the two groups.

Table 12: Distribution of Respondents According to Number of Contacts with Extension:

Number of Contacts (N)	Members		Non- Members	
	No. of the Respondents	%	No. of the Respondents	%
0	0	0	50	83.3
1	1	1.7	7	11.7
2	1	1.7	3	5
3	41	68.3	-	-
4	17	28.3	-	-
Total	60	100	60	100
Mean	3	-	1	-
Maximum	4	-	2	-
Minimum	1	-	1	-

Source: **(Survey data 1996).**

The highest number of contact by the extension agents to co-operators was 3, with 41 (68%) respondents followed by 4 contacts having 17 (28%) respondents. About 50 (83%) of non-cooperators fell within the category of no contact. The mean number of contacts for co-operators and non-cooperators were 3 and 1, respectively. The t-test showed that the calculated t-value 2.55

was greater than tabulated t-value 1.960 at 0.05 level of probability. Hence, there was significant difference on the number of visits by the agents to the two groups.

4.2 The second objective of this study was to examine the level of awareness, and adoption of agricultural innovations by co-operators and Non-cooperators

Table 13: Distribution of Respondents According to Levels of Awareness of Individual Innovations

Practices/ Innovations	Members		Non- Members	
	No. of those aware	%	No. of those aware	%
Application of fertilizer	60	100	60	100
Tractors for Farming	60	100	50	83
Improved Seed Varieties	58	96.7	4	6.7
Use of Pesticides	9	15	-	-
Garri Grating Machine	60	100	42	70
Use of Herbicides	46	76.7	-	-
Single Cropping	55	91.7	10	16.7
Use of Threshing Machine	12	20	-	-
Maize Sheller	21	35	4	6.7
Cassava Lifter Machine	25	41.7	-	-

Source: **(Survey data 1996).**

Table 13, showed that every co-operator was aware of the existence of fertilizer 60 (100%), tractor for farming 60 (100%). Other innovations that equally had high awareness included improved seed varieties 58 (97%), use of herbicides 46 (77%) and single cropping 55 (92%). The remaining four innovations were below (50%). On the other hand, 60 (100%) of non-

cooperators were aware of fertilizer, tractor for farming having 50 (83%), garri grating machine 42 (70%). Three other innovations like improved seed varieties, single cropping and maize sheller were below (20%) and none was aware of pesticides, herbicides threshing machine and cassava lifter. For co-operators, therefore was no innovation that has no awareness. Eventhough, the awareness level of the two groups were low, co-operators had higher awareness than non-cooperators.

Table 14: Distribution of Respondents According to the Levels of Adoption of Individual Innovations:

Practices/ Innovations	Members		Non- Members	
	Adopters	%	Adopters	%
Application of fertilizer	60	100	60	100
Tractors for Farming	52	86.7	6	10
Improved Seed Varieties	51	85	2	3.4
Use of Pesticides	-	-	-	-
Garri Grating Machine	48	80	20	33.3
Use of Herbicides	13	21.7	-	-
Single Cropping	53	88.3	5	8.3
Use of Threshing Machine	-	-	-	-
Maize Sheller	21	35	-	-
Cassava Lifter Machine	5	8.3	-	-

Source: (Survey data 1996).

Table 14, showed that every co-operator adopted 60 (100%) fertilizer, other innovations that had high adoption included tractor for farming 52 (87%), improved seed varieties 51 (85%), garri grating machine 48 (80%) and single cropping 53 (88%). Innovations like herbicides, maize sheller and cassava lifter adoption were less than (30%). Only two innovations like pesticides and threshing machine were not adopted by co-operators. On the other hand, every non-cooperator adopted fertilizer 60 (100%), garri grating machine 20 (33%), tractor for farming, improved seed varieties and single cropping were less than (10%) while none adopted pesticides, threshing machine, herbicides, maize sheller and cassava lifter machine. Based on the percentage of individual innovations and the number of innovations adopted, co-operators had adopted more innovations than non-cooperators.

Fertilizer recorded the highest rate of (100%) adoption among the groups. This finding is consistent with the results of adoption studies by Gana (1974), Zaria (1984), Akanya (1989) and Akanya (1990) in which the adoption of fertilizer was higher than the adoption of other innovations they studied. Other innovations found to record high among co-operators are in descending order, single cropping, tractor for farming, improved seed varieties, garri grating machine, maize sheller, use of pesticides and threshing machine. For co-operators, the use of pesticides and threshing machine had no adoption. Out of 15 percent that claimed knowledge of pesticides and 20 percent that claimed knowledge of threshing machine, none adopted them. Their expensive nature, complexity and non-availability in local markets could be responsible for lack of

adoption by co-operators. Cassava lifter machine recorded the third lowest, followed by herbicides.

For non-cooperators, adoption of fertilizer recorded 100 percent. The high rate of adoption of fertilizer for both the women could be due to government subsidies on fertilizer and availability in local markets. Apart from fertilizer, the adoption of other innovations were very low. Even though 83 percent were aware of tractor for farming only 10% adopted it and 70 percent were aware of cassava grating machine, only 33 percent adopted it. The adoption levels were generally too low for non-cooperators. This could be as a result of high cost of these innovations, the complexity involved and the absence of extension contact among non-cooperators. The relatively high level or rate of adoption among co-operators when compared to non-cooperators could be as a result of co-operative membership and the ease of having access to extension agents.

4.3 Hypothesis Testing:

The hypothesis for this study were tested using t-test to show the difference in the awareness and adoption of innovations among co-operators and non-cooperators. The Pearson correlation coefficient was used to test the relationship between socio-economic variables of women co-operators and non-cooperators to awareness and adoption.

HYPOTHESIS 1 - There is no significant difference in the awareness, adoption of innovations by women co-operators and non-cooperators.

Table 15: Distribution of Respondents According to Awareness of Agricultural Innovations

Awareness Score	Members		Non- Members	
	No of those aware	%	No of those aware	%
0	-	-	-	-
1	-	-	6	10
2	-	-	14	23.3
3	1	1.7	32	53.3
4	1	1.7	5	8.3
5	2	3.3	2	3.3
6	4	6.6	1	1.7
7	3	5.0	-	-
8	6	10	-	-
9	10	16.6	-	-
10	33	55	-	-
TOTAL	60	100	60	100

Source: (Survey data 1996).

Table 15, showed that 1 (2%) of co-operators and 52 (87%) of non-cooperators were aware of 3 or less innovations. About 19 (32%) of co-operators and 0 (0%) of non-cooperators were aware of 7-9 innovations, the table showed that more than fifty percent i.e. 33 (55%) of co-operators and (0%) of non-cooperators were aware of all the 10 innovations. The t-test showed that, the calculated t-value 17.65 was greater than the tabulated t-value 1.960 at .05 level of probability. Hence, the null hypothesis was rejected. It means that the

difference between the awareness of co-operators and non-cooperators was significant.

Table 16: Distribution of Respondents According to Adoption of Agricultural Innovations

Adopters Score	Members		Non- Members	
	Adopters	%	Adopters	%
0	-	-	-	-
1	1	1.7	38	63.3
2	3	5	17	28.3
3	5	8.3	3	5
4	11	18.3	1	1.7
5	17	28.3	1	1.7
6	15	25	-	-
7	3	5	-	-
8	5	8.3	-	-
9	-	-	-	-
10	-	-	-	-
TOTAL	60	100	60	100

Source: (Survey data 1996)

Table 16, showed that 9 (15%) co-operators and 58 (97%) non-cooperators adopted 3 or less innovations. Forty-three (72%) of co-operators and 2 (3%) of non-cooperators adopted 4 - 6 innovations. Eight (13%) co-operators and (0%) non-cooperators adopted up to 7-8 innovations. For both

groups, none adopted up to 9-10 innovations. In other words, it could be explained that 40 (67%) co-operator and 1 (2%) non-cooperators adopted 5-8 innovations. Most co-operators have not adopted up to 9-10 innovations, while most non-cooperators have not adopted up to 4-10 innovations. The t-test showed that, the calculated t-value 16.22 was greater than the tabulated t-value 1.960 at .05 level of probability. Hence, the null hypothesis was rejected. It means that the difference between the adoption of co-operators and non-cooperators was significant.

HYPOTHESIS II - The second hypothesis for this study was socio-economic characteristics of the women (co-operators and non-cooperators) are positively related to awareness of agricultural innovations.

Table 17 Pearson Correlation Analysis of Relationship between Selected Variables and Awareness of Agricultural Innovations Among Women Co-operators and Non-cooperators.

Variable Cross Classified	**Correlation Coefficient (r)**	**Correlation Coefficient (r)**
	Co-operators	Non-cooperators
Age	-.100	.112
Household Size	.120	.304*
Level of Format Education	.270*	.190
Farm Size	.396*	.173
Farm Income	.631*	.200*
Non-Farm Income	.462*	.213*
Agricultural Credit	.310*	.123
Membership of Co-operatives	.502*	.000
Possession of Durable Goods	.418*	.114
Contact with Extension	.261*	.128
Length of Membership	.334*	000

*** Significant at 0.5 level of probability**

Table 17, showed that nine of the variables were positively related to awareness of agricultural innovations by women co-operators. The variables were level of education, farm size, farm income, non-farm income, agricultural credit, membership of co-operative, possession of durable goods and services, contact with extension and length of membership. It is concluded therefore that there was a significant relationship between those variables and awareness. However, in household size though positively related to awareness, was insignificant. Age was negative and insignificantly related to awareness. The negative relationship between age and awareness among women co-operators may be due to the fact that the younger generation are more likely to imbibe the concept of co-operation than the older generation.

Table 18: Stepwise Regression Analysis of the relationship between Co-operators' Socio-Economic Characteristics and Awareness of Agricultural Innovation.

Variable	Coefficient of Determination R^2	Change in R^2
Contact with extension	.15235	.15235
Farm size	.24348	.09113
Membership of Co-operative	.31999	.07651
Level of Formal Education	.37581	.05582
Agricultural Credit	.40744	.03163
Non-Farm Income	.42870	.02126
Farm Income	.44790	.01920
Possession of Durable Goods	.45701	.00911
Length of Co-operative Membership	.45918	.00217
Household Size	.45939	.00021
Age	.45949	.00010

The stepwise regression analysis for co-operators on table 18, showed that the independent variables all together affected awareness by about 46%. Out of these, contact with extension agents, membership of co-operatives, level of formal education, farm size and agricultural credit, accounted for 40% of the variance. Contact with the extension ranked highest with 15% of the variance. Among the variables considered in the regression analysis, age, household size and length of co-operative membership made the least contribution. The low contribution made by length of co-operative membership is surprising as one would expect that the longer one stays in the society, the more she would have access to sources of information. The low contribution may be explained by the leadership inability to source for agricultural information for its members.

Table 17, also showed that only three variables were significantly related to awareness by women non-cooperators, these were household size, farm income, and non-farm income. Other variable like age, level of education, farm size, agricultural credit, possession of durable goods and contact with extension agents though positive, were not significantly related to awareness of agricultural innovations by non-cooperators.

Table 19: Stepwise Regression Analysis of the Relationship between Non-cooperators' Socio-economic Characteristics and Awareness of Agricultural Innovations.

Variable	Co-efficient of Determination R^2	Change in R^2
Household size	.09207	.09207
Level of Formal Education	.14888	.05681
Age	.17561	.02673
Non-farm Income	.18696	.01135
Possession of Durable Goods	.19342	.00646
Farm Income	.19733	.00391
Farm Size	.19950	.00217
Agricultural Credit	.20031	.00081
Contact with Extension	.20074	.00043
Length of Co-operative Membership	.20074	.00000
Membership of Co-operative	.20074	.00000

The stepwise regression on table 19, showed the degree of relationship between non-cooperators socio-economic characteristics and awareness of agricultural innovations. The selected variables accounted for about 20% of the

variance in awareness. Out of this household size, level of formal education, age and non-farm income accounted for 18%. Length of co-operative membership and membership of co-operative make no contribution at all. This is not surprising as non-cooperators are not members. Contact with extension agents is surprisingly not making significant contribution. This may be explained by availability of informal source of information like friends, relatives, traders etc. and the fact that non-cooperators may not be able to arrange for extension agents for visits. The hypothesis that socio-economic characteristics of the women (co-operators and non-cooperators) are positively related to awareness of agricultural innovations is accepted.

HYPOTHESIS III: The third hypothesis for this study is socio-economic characteristics of the women (co-operators and non-cooperators) are positively related to adoption of agricultural innovations.

Table 20: Pearson Correlation Analysis of the Relationship between Socio-Economic Characteristics and Adoption of Agricultural Innovations among Women Co-operators and Non-cooperators.

Variable Cross Classified	Correlation of Coefficient (r)	Correlation Coefficient (r)
	Co-operators	Non-Cooperators
Age	-.173	.218*
Household Size	.213*	.266*
Level of Formal Education	.382*	.173
Farm Size	.371*	.202*
Farm Income	.598*	.369*
Non-Farm Income	.458*	.558*
Agricultural Credit	417*	.165
Membership of Co-operative	.480*	.000
Possession of Durable Goods	.296*	.181
Contact with Extension	.316*	.167
Length of Co-operative Membership	.128	000

***Significant at 0.05 level of Probability.**

The findings on table 20, showed that nine out of eleven variables were positively related to adoption of agricultural innovations by women co-operators and the nine variables were significant at .05 level of probability. Length of co-operative membership was positively related but insignificant while age was negative and have insignificant relationship with adoption. The negative relationship of age with adoption agrees for instance with Voh (1979); Zaria (1984) and Atala (1988) who reported in their studies in the Zaria area that older farmers are risk averse. It is not surprising that age was negative as this could be explained that the younger ones are often more prepared to take the risk of adopting innovations than the older ones.

The correlation analysis on socio-economic characteristics of women non-cooperators and adoption of agricultural innovations on table 20, showed that five out of nine variables were positively and significantly related to adoption at 0.05 level of probability. The variables were age, household size, farm size, farm income and non-farm income. Others like level of formal education, agricultural credit, possession of durable goods and extension contact were insignificant, though positive relationship was indicated too.

Based on the two correlation analysis for both co-operators and non co-operators, one can conclude that the hypothesis which states that there is positive relationship between socio-economic characteristics and women adoption of innovations stands.

Table 21: Stepwise Regression Analysis of the Relationship between Women Co-operators Socio-Economic Characteristics and Adoption of Agricultural Innovations.

Variable	Coefficient of Determination (R^2)	Change in R^2
Membership of Co-operative	.13342	.13342
Contact with Extension	.23599	.10257
Farm Size	.32957	.09358
Farm Income	.39167	.06210
Non-Farm Income	.44848	.05681
Agricultural Credit	.47099	.02251
Household Size	.48315	.01216
Level of Education	.48746	.00431
Level of Co-operative Membership	.48989	.00243
Possession of Durable Goods	.49004	.00015
Age	.49014	.00010

The results of the stepwise regression analysis on table 21, showed that independent variables accounted for 49% of the variance in adoption of agricultural innovations by women co-operators. Six of these variables accounted for 47% of the variance. The variables are membership of co-operative society (13%), contact with extension (10%), farm size (9%), farm income (6%), non-farm income (5%) and agriculture credit (2%). The least contributions were made by age, possession of durable goods and services, and length of co-operative membership. These variables may be assumed not to be too critical in women co-operator adoption behaviour.

The correlation analysis on socio-economic characteristics of women non-cooperators and adoption of agricultural innovations on table 20, showed that five out of nine variables were positively and significantly related to adoption at 0.05 level of probability. The variables were age, household size, farm size, farm income and non-farm income. Others like level of formal education, agricultural credit, possession of durable goods and extension contact were in significant, though positive relationship was indicated too.

Based on the two correlation analysis for both co-operators and non co-operators, one can conclude that the hypothesis which states that there is positive relationship between socio-economic characteristics and women adoption of innovations stands.

Table 22: Stepwise Regression Analysis of the Relationship between Women Non-coperators Socio-Economic Characteristics and Adoption of Agricultural Innovations.

Variable	Coefficient of Determination (R^2)	Change in R^2
Household Size	.10357	.10357
Farm Income	.18608	.08251
Non-Farm Income	.23064	.04456
Age	.25180	.02116
Farm Size	.26539	.01359
Possession of Durable Goods	.27097	.00558
Contact with Extension	.27408	.00311
Agricultural Credit	.27540	.00132
Level of Formal Education	.27618	.00078
Membership of Co-operative	.27618	.00000
Length of Co-operative Membership	.27618	.00000

The stepwise regression analysis indicated that the independent variables accounted for about 28% of the variance in adoption. Household size accounted

for (10%), farm-income (8%), non-farm income (4%) and age (2%). These variables put together accounted for (25%) the most important being household size. This may mean that women non-cooperators still rely on family as their source of farm labour as against women co-operators who can pool their labour together and work on members farms on rotational basis. Although most of the examples given to support this studies were studies carried out on men socio-economics characteristics and adoption behaviour. These socio-economic characteristics and adoption behaviour also affects women farmers as there is no known research that confirmed otherwise.

Table 23: **Pearson correlation matrix of variance for women co-operators : (Correlation between selected Variables)**

Variable	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}	V_{12}	V_{13}
Age V_1	1.00												
Household Size V_2	0.610	1.00											
Level of Formal Education V_3	-.115	.247*	1.00										
Farm Size V_4	.178	.345	.251*	1.00									
Farm-Income V_5	.060	.231*	.225*	.733*	1.00								
Non-Farm income V_6	-.186	.308*	.712*	.382*	.448	1.00							
Agricultural Credit V_7	.061	.164	.193	.451*	.466*	.167	1.00						
Membership of Co-operators V_8	0.21	.426*	.164	.126	.392*	.157	.251*	1.00					
Possession of Durable Goods V_9	.345*	.614*	.352*	.616*	.549*	.651*	.270*	.165	1.00				
Contact with Extension V_{10}	.052	.135	.004	.135	.228*	.110	-.131	.284*	.275*	1.00			
Length of Co-op membership V_{11}	.578*	.645*	.231*	.355*	.372*	.256*	.238*	.128	.614*	.172	1.00		
Awareness V_{12}	-.100	.120	270*	.396*	.631*	.462*	.310*	.502*	418*	.261*	.334*	1.00	
Adoption V_{13}	-.173	.213*	.382*	.371*	.598*	.458*	.417*	.480*	.296*	.316*	.128	.685*	1.00

***Significant at .05 level of probability.**

Table 24: Pearson correlation matrix of variance for women non co-operators : Correlation between selected Variables

Variable	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}	V_{12}	V_{13}
Age V_1	1.00												
Household Size V_2	.508*	1.00											
Level of Formal Education V_3	.524*	..565	1.00										
Farm Size V_4	-.069	.097	.437*	1.00									
Farm-Income V_5	.520*	.405*	.845*	.258*	1.00								
Non-Farm Income V_6	.165	.149	.773*	.260	.589*	1.00							
Agricultural Credit V_7	.445*	.342*	.849*	.243*	.587*	.508*	1.00						
Membership of Co-operators V_8	-	-	-	-	-	-	-	1.00					
Possession of Durable Goods V_9	159	..278*	.749	.324*	.514*	.488*	.536*	-	1.00				
Contact with Extension V_{10}	.114	..241*	.164	.301*	.238*	.175*	.202*	-	.208	1.00			
Length of Co-op Membership V_{11}	-	-	-	-	-	-	-	-	-	-	1.00		
Awareness V_{12}	.112	.304*	.190	.173	.200*	.213*	.123	-	.144	.128	-	1.00	
Adoption V_{13}	.218*	.266*	173	.202*	.369*	.558*	.165	-	.181	.167	-	.674*	1.00

*** Significant at 0.05 level of Probability.**

4. 4 Constraints to Women Co-operative Societies in Oju:

1. Lack of credit facilities- This is the greatest problem identified by one hundred percent co-operators in area. To them, even where available, it is too meagre to take care of farming costs. Experience has shown among other things, that credit services of commercial banks in Nigeria are generally not accessible to co-operative societies and their members on the excuse of non-credit worthiness. Co-operative organisations have failed to receive adequate financing even from co-operative banks as a result of limits imposed upon their borrowing powers by state co-operative legislations.

   Also, government on lending schemes are grossly ineffective due partly to unfavourable lending schemes, political interferences, high interest rates structure and bureaucratic red tape etc. Moreso, existing policies of co-operative banks do not favour co-operative organisations at the primary and secondary levels. The lending requirements fail to consider the poor capital positions of most of these organisations. These co-operative banks are hardly different from other commercial banks. In most cases, most of their loans go to big time businessmen and women and not necessarily to co-operative societies, even though they were asked to form co-operative societies for easy access to such credits by the government.

2 Inadequate supply of inputs- Most reasons the co-operators gave for joining co-operative societies was easy access to inputs, but, unfortunately, provision of inputs by government to co-operative societies

is grossly inadequate. Not only that, the supply is also untimely. They also complained of lack of easy access to Government facilities like tractor hiring service etc. They argued that most often, it is easier for individual farmers with influence to obtain these facilities much faster than the co-operatives who may be completely neglected.

3. Inadequacy of appropriate processing and storage facilities aggravate the problem of unsold stocks. This was as a result of being cut-off from the main-stream of economic activities as a result of no good access roads, inadequate transportation and storage system etc. Given such facilities, produce could be converted into storable forms for sale at a later stage.

4. They also complained of mismanagement where officers of co-operatives embezzle co-operative funds and fraudulently convert co-operative property to personal use.

5. Lack of ownership of land - There is a legal constraint in this Local Government Area whereby women are normally prevented from any right over land. they can neither inherit nor sell land. The idea of access to land is a veritable handicap to women, since this rules them out of the economic power to own property or to borrow on its basis, let alone meet their commitments from co-operative membership.

6. Another problem is inadequate knowledge of co-operative education: It is generally believe that the co-operative movement lacks adequate professionals in the field to disseminate co-operate news. The

aim of co-operative is to enlighten on their roles and responsibilities in their respective societies. It also aims at equipping members to meet the challenges of the co-operative enterprise as well as acquire skill and proficiency vital to the society.

4.5 Prospects for Women Co-operatives in the Area:

Despite the various constraints that have plague women co-operatives societies in this Local Government areas for long, the prospect for improvement are many and bright. This is because more women will seek membership as they become aware of the roles and potentialities of co-operatives. As the membership grows, so will the calibre of co-operators within the societies. Also, the increased participation will have a salutary effect on the financial base of co-operatives as subscriptions will become large both in size and sum total. This will place women co-operatives in a better financial position which would permit them to attract qualified and skill personnel to their management systems.

As for the small-scale farmers, the co-operatives present are just about the only avenue for collective bargaining for their products and perhaps, for higher incomes. The more we get acquainted with the problems and prospects of women co-operatives, the more we are convinced that their salvation lies in the adoption of innovations, improvement of their business performances and ability to compete on favourable grounds with non-cooperative businesses. I am sure that women co-operative posses the potentials for these. They need the support, guidance of the government and all well meaning people.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Three hypothesis were tested, and the findings showed that 55 percent of co-operators and zero percent of non-cooperators are aware of all the 10 innovations. Also, about 67 percent co-operators and 2 percent non-ooperators adopted 5 to 8 innovations. Most co-operators have not adopted up to 9 to 10 innovations, while most non-cooperators have not adopted up to 4 to 10 innovations. The t-test showed that the difference between awareness and adoption of innovations by co-operators and non-cooperators was significant at .05 level of probability. Therefore the hypothesis- There is no significant difference in the awareness, adoption of innovations by women co-operators and non-cooperators was rejected. For women co-operators, nine out of eleven variable were significantly related to awareness while for non-cooperators, three variables out of nine variables were significantly related, six variables were positive but insignificantly related to awareness.

For co-operators, nine out of eleven variables were significantly related to adoption of agricultural innovations while for non-cooperators, five out of nine variables were significantly related to adoption of innovations. It was therefore concluded, that the hypothesis - socio-economic characteristics of the women

(education, income, age, farm size etc.) are positively related to awareness and adoption of agricultural innovations was supported.

Conclusion:

This study was conducted to find out if there were any differences in the characteristics, awareness and adoption behaviour towards agricultural innovations by women co-operators and women non-cooperators. The results have shown that awareness and adoption levels of women co-operators were relatively higher while that of non-cooperators were lower. The gap may be as a result of using co-operative societies as channels through which innovations were disseminated to the women and the process to adopting them. The results have also shown that co-operators' higher levels of awareness and adoption of agricultural innovations resulted into higher socio-economic characteristics than those of non-cooperators.

Women agricultural co-operatives is unquestionable an agent of social and economic change. It advocates positive changes in the socio-economic status of the less privileged by means of pooling resources together and working for the mutual interest of all. Such an organisation having "change" as its watch word, is more disposed to accepting positive changes as envisaged in the process of technology transfer. Agricultural development in Oju in particular and Nigeria as a whole depends to a great extent, on the willingness and ability of farmers to make use of innovations. New farm practices are of little value until they can be put to some practical use for the economic and social well-being of the people involved.

Recommendations

1. Efforts should be made by the Government to effectively supply credit to women farmers since lack of it may inhibit adoption of agricultural innovations. A well manage co-operative production credit can give agricultural development a strong boost by accelerating the rate of adoption of modern and improved technologies by women.

2. For extensive awareness and adoption of agricultural innovations, extension services should be extended equally to both organisational members and non-members through the progressive farmers.

3. To achieve the purpose for which these women agricultural co-operatives were formed, co-operatives should be strengthened and provided with the necessary logistic support, trained manpower and infrastructure. The co-operatives are thus the hope of the women in inputs supplies and it is by using these inputs that very large number of both large and small-scale farmers can be actively involved in the adoption of agricultural innovation, thereby having a higher standard of living.

4. In view of the fact that not many people including Government technocrats who handle agricultural and co-operative matters are aware of that co-operatives stand for, it is recommended that intensification of co-operative education be carried out at all levels of the society. Also in order to broaden the financial base and ownership of co-operatives, efforts should be made to increase their number and size distribution through rigorous mass enlightenment campaigns in order to impress the crucial importance of co-operatives in the process of economic development upon the

generality of the people. With increased membership, they will stand a better chance of generating their own funds rather than relying heavily upon government financial support thereby exhibiting a posture of helplessness which tends to alienate well to do people who consider the co-operative movement as an organisation meant only for the poor and the helpless.

Limitations :

1. This study was limited to time and money, thereby restricting the study to only three women agricultural co-operative societies.
2. Lack of farm records keeping by the women and problem of memory lapses pose limitations to the study.

Regardless of these limitations, the findings of this study have provided relevant information regarding awareness and adoption of innovations by women co-operators and non-cooperators.

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APPENDIX I

QUESTIONNAIRE ON ADOPTION OF AGRICULTURAL INNOVATIONS AMONG MEMBERS AND NON-MEMBERS OF WOMEN CO-OPERATIVE SOCIETIES: A CASE OF OJU LOCAL GOVERNMENT OF BENUE STATE:

Please indicate your answers by filing in the blank space or by an x ( ) in the boxes that best describe your feelings. I undertake to use your responses for purely academic purpose and to treat them as absolutely confidential. Thanks.

1. Age of respondent: ----------

2. Level of literacy:

   (a) ---------- Illiterate ☐

   (b) ---------- Primary School ☐

   (c) ---------- Post primary ☐

   (d) ---------- Tertiary ☐

   (e) ---------- Others ☐

3. Marital Status:

   (a) ---------- Married ☐

   (b) ---------- Single ☐

   (c) ---------- Widow ☐

4. Household size ---------- How many people live and eat from the same pot with you?----------

5. Are you aware of the existence of any co-operative society in your town or area?

   (a) ---------- Yes ☐

   (b) ---------- No ☐

If yes, for how long has the co-operative been in existence? ----------

---

6. Are you a member of co-operative society?

(a) ---------- Yes ☐

(b) ---------- No ☐

If yes, what is the name of the co-operative society and how long have you been a member?

Name of co-operative ----------

Duration of membership ----------

7. What was your source of knowledge about the co-operative society: -------

---

8. If your are a member of a co-operative society, what were your main reasons for joining?

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

9. If you do not belong to a co-operative society, give reasons for not joining any?

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

10. List the benefits of co-operative society to you

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

11. How many times have you attended training by co-operative officials?

---

12. If you did, what did you learn during the training?

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

13. If you did not attend, give reasons

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

14. List the basic problems that you face in the co-operative society?

(a) ----------

(b) ----------

(c) ----------

(d) ----------

(e) ----------

15. Did you obtain any credit for farming last year?

(a) ---------- Yes ☐

(b) ---------- No ☐

16. If yes in what form ?

(a) ---------- Cash

(b) ---------- Kind

17. From which of these sources did you obtain your credit

(a)	Co-operative credit	☐	Amount ₦	☐
(b)	Bank loans	☐	Amount ₦	☐
(c)	Federal & State Govt.	☐	Amount ₦	☐
(d)	Sales of produce	☐	Amount ₦	☐
(e)	Others specify	☐	Amount ₦	☐

18. If it was in kind state the source and quantity

	Source	Items	Quantity
Fertilizer	----------	----------	----------
Tractor hiring	----------	----------	----------
Improved Seeds varieties	----------	----------	----------
Pesticides	----------	----------	----------
Others (specify)	----------	----------	----------

19. Give an estimate of amount of money you earn from the sale of your crop

in the last cropping season ₦ ----------

20. Give an estimate of amount of money you earn from non-farm source of income in the last year N ----------

21. Which of these is your non-farming occupations?

(a) Trading ☐

(b) Teaching ☐

(c) Civil Service ☐

(d) Tailoring ☐

(e) Processing ☐

(f) Others ☐

(g) None ☐

22. Which of these Properties do you own and how many?

Properties		Number
Sewing machine	☐	----------
Bicycle	☐	----------
Motor cycle	☐	----------
Zinc roof house(s)	☐	----------
Wrist watch (s)	☐	----------
Radio set	☐	----------
Television	☐	----------
Cupboards (s)	☐	----------
Others	☐	----------
None	☐	----------

23. Are you aware of improved agricultural practices?

(a) ---------- Yes ☐

(b) ---------- No ☐

If yes, please list them

---

24. Which of these is the main source of your awareness

(a) Mass media ☐

(b) Extension agent ☐

(c) Friends & relation ☐

(d) All of the above ☐

25. Tick any of the underlisted innovations you are aware of:

(a) Fertilizer ☐

(b) Tractor for farming ☐

(c) Improved seeds ☐

(d) Herbicides ☐

(e) Pesticides ☐

(f) Garri grating machine ☐

(g) Threshing machines ☐

(h) Cassava lifter machines ☐

(I) Maize sheller ☐

(J) Single Cropping ☐

(k) None of the above ☐

26. What is your level of awareness of innovations

(a) High (b) Average (c) Low

27. How many times were you visited by an extension agent last farming season?

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28. What type of technologies did he introduce to you? Please name the technologies:

---

29. Which if these did you adopt, list them

---

30. What problems did encounter in adopting this innovations?

Practices adoption	Problems encountered
---	---
---	---

31. How much do feel you have benefited from the extension visits?

(a) Very much ☐

(b) Much ☐

(c) Very little ☐

(d) Not at all ☐

32. Tick any of the underlisted innovations you have adopted.

Improved Technologies		From what Source	Quantity
(a)	I apply fertilizer to my crops	---	---
(b)	Tractors are used on my farm	---	---
(c)	I plant improved crop varieties	---	---
(d)	I applied herbicides	---	---

(e) I applied pesticides ---------- ----------

(f) I used garri granting machine ---------- ----------

(g) I use d threshing machine ---------- ----------

(h) I engaged in single cropping ---------- ----------

(i) Maize shellers ---------- ----------

(j) I used cassava lifter for cropping ---------- ----------

(k) None of the above ---------- ----------

33. How long does it take you to adopt the innovations that you now practices since that time of awareness?

List of innovations	Time taken to adopt
----------	----------
----------	----------
----------	----------

34. List of crops you currently cultivated and six in hectares (ha)

Crops	Six (ha)
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----------	----------
----------	----------

APPENDIX 11

WOMEN CO-OPERATIVE SOCIETIES IN OJU L.G.A. 1996

Name of Co-operative society	Registered or Not	No of women	Location	List of Projects(a)
- Oju Rural women Multipurpose Co-op. society.	Regd.	70	Oju centre	Cassava and citrus farm.
- Oju women co-operative society.	Regd.	85	Oju centre	groundnut farming.
- Ukpa rural women Co-operative society.	Regd.	60	Ohuma Ukpa	Cassava, soyabeans, benniseed & cassava
- Ada Rural women Co-operative society.	Regd.	80	Ugbode	farms
- Owo Rural women Co-operative society	Regd.	75	Ohuhu	Cassava farm
- Ibilla 'lukpo multi-purpose women Co-op. society.	Regd.	70	Ibilla 'lukpo	Cassava farm and garri processing
- Ibilla-Okwukwu women Co-operative society.	Regd.	65	Ibilla-Okwukwu	Pottery.
- Oboru multi-purpose Rural women Co-op. society	Regd.	61	Ihulem	Cassava
				Cassava farm and garri processing.

Name of Co-operative society	Registered or Not	No of women	Location	List of Projects(a)
- Oboru women Co-operative. society	Regd.	80	Oboru	Cassava.
- Ibilla multi-purpose rural women Co-op. society	Regd.	70	Ega	Cassava and cassava flour.
- Anchim ---------- do ----------	Regd.	70	Otunche	Groundnuts & soyabean.
- Ainu Ette ---------- do ----------	Regd.	65	Obachita	Benniseed & groundnut farm.
- Egbede ---------- do ----------	Regd.	80	Anyuwogbu-Ibilla	Trading & retail marketing.
- Owolawule ---------- do ----------	Regd.	70	Onyike	Trading & retail marketing.
- Ohuhu ---------- do ----------	Regd.	60	Ohuhu	Cassava & yam farms.
- Alikpa multi-purpose rural women Co-op. society.	Regd.	70	Anyuwogbu	Trading & yam farm
- Okileme ---------- do ----------	Regd.	72	Okileme	Trading & yam farm
- Obohu ---------- do ----------	Regd.	67	Obohu, Oju	Cassava & groundnuts
- Ojenya ---------- do ----------	Regd.	70	Ojenga	Groundnut & cassava farms & retail trading

Co-operative	Regd. or Not	No of Women	Location	List of Project(s)
- Igede Central widows rural women multipurpose Co-operative society.	Regd.	75	Obohu	Cassava & groundnut farming.
- Ihigile multi-purpose Co-operative society	Regd.	65	Igede central Barracks	Oil retail & rice marketing.
- Idelle ---------- do ----------	Regd.	80	Ogege	Garri processing, groundnut & Benniseed farms
- Okwudu ---------- do ----------	Regd.	60	Ikwokwu	Cassava farm & oil processing
- Ebi Idelle multi-purpose Co-operative society	Regd.	63	Idelle	Garri processing & groundnut farm
- Adokpa ---------- do ----------	Regd.	70	Ohuregbe	Palm oil processing, cassava & groundnut farms

Co-operative	Regd. or Not	No of Women	Location	List of Project(s)
- Okpokpo ---------- do ----------	Regd.	75	Ebenta	Cassava, yam farms & oil processing.
- Okeke ---------- do ----------	Regd.	75	Okeke	Rice & cassava farms
- Aboguda ---------- do ----------	Regd.	70	Okpoma	-------- do ---------
- Okpunyi ---------- do ----------	Regd.	68	Ainu Central	Garri processing & cassava farms
- Ocheri ---------- do ----------	Regd.	70	Ojokwe	Groundnut, benniseed & cassava
- Uwokwu widows ---------- do ----------	Regd.	70	Obusa	--------- do ---------
- Uwokwu basket weavers' multi-purpose Co-operative society	Regd.	70	Obusa	Basket weaving & farming.

Co-op	Regd.	No. of Women	Location	List Projects(s)
- Ainu women Co-op. society	Regd.	60	Uchuo	Rice
- Ichila ---------- do ----------	Regd.	60	Obotu	Guinea corn & yam farm
- Uwokwu ---------- do ----------	Regd.	90	Ebenta	Oil processing
- Idella women Co-op. society	Regd.	70	Ogege	Yam farm
- Idella ---------- do ----------	Regd.	70	Idelle	Benniseed farming
- Aguala ---------- do ----------	Regd.	60	Aguala	Groundnut farming
- Ijegwu ---------- do ----------	Regd.	70	Ijegwu	Groundnut & yam farming
- Uwokwu multi-purpose Co-op. society.	Regd.	70	Uwokwu	Oil processing guinea corn farm.