THE ROLE OF FADAMA USERS ASSOCIATIONS IN KURA AND MADOBI LOCAL GOVERNMENT AREAS, KANO STATE

BY

BELLO ADO MOHAMMED

M.SC/SCI/05950/93-94

AUGUST, 1999

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A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMEN OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN RURAL DEVELOPMENT.

DEPARTMENT OF GEOGRAPHY
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AHMADU BELLO UNIVERSITY,
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THIS THESIS SUBMITTED BY

BELLO, ADO MOHAMMED

was accepted in partial fulfilment of the requirement for the Degree of M.Sc. (Rural Development) of this University.

The date of award is

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Dean, Postgraduate School Date

DECLARATION

I hereby declare that this thesis has been written by me and it is a record of my own research work. It has not been presented in any previous application for a higher degree. All quotations are indicated and sources of information are specifically acknowledge by means of references.

BELLO, ADO MOHAMMED — DATE

The above declaration is confirmed.

PROFESSOR D.O. OGBONNA — 23/08/99 DATE

CERTIFICATION

This thesis, entitled "The Role of Fadama Users Associations in Kura and Madobi Local Government Areas, Kano State" by Bello Ado Mohammed meets the regulations governing the award of the degree of Master of Science in Rural Development of Ahmadu Bello University, Zaria, and is approved for its contributions to knowledge and literacy presentation.



Chairman, Supervisory Committee — 23/08/1999 — Date

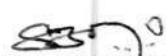


Member, Supervisory Committee — 23/08/1999 — Date

External examiner — Date



Head of Department — 23/08/1999 — Date



Dean, Postgraduate School — 30/01/01 — Date

DEDICATION

This thesis is dedicated to my parents and guardians.

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ABSTRACT

This study investigates the role of famada users Associations in Kura and Madobi Local Government Areas of Kano State. The instruments that were used for collecting the data in this study were questionniare, interview and records. Oata collected were quantified and tabulated through simple percentages. The population from which the samples was drawn, was from the three fadama sites, and 15 Fadama Users Associations. The sample was proportionally and randomly taken from the Fadama Users Association involved in the study. The study was aimed at examining the Fadam Users Associations in Kura and Madobi Local Government areas and to determine the effectiveness of irrigation agriculture through organised cooperation. It also highlights problems associatd with Fadama Users Associations. An explanatory hypothesis was used to determine the participation of Fadama Farmers in the User Association. It was revealed that the Fadama Users Associations has contirbuted to the welfare of their members. It shows that farmers who joined the Fadama Users Associations earned higher than before the coming of the Fadama Users Associations. For the benefit of the Fadama Users Associations, the study recommends funds in form of loans, and educating the Fadama Users Associations members through extension services as well as providing modern infrastructures like feeder roads.

ABBREVIATIONS

ADP	-	Agricultural Development Project/Programme.
APMEU	-	Agricultural Project Monitoring and Evaluation Unit.
DFRRI	-	Directorate of Food, Roads and Rural Infrastructure.
EIA	-	Environmental Impact Assessment
et al.	-	And Others
FACU	-	Federal Agricultural Coordinating Unit
FAO	-	Food and Agricultural Organisation.
FDID	-	Federal Department of Irrigation and Drainage.
FUA	-	Fadama Users Association
FGN	-	Federal Government of Nigeria
FMAWRRD	-	Federal Ministry of Agriculture Water Resources and Rural Development
GR	-	Green Revolution
ha	-	hectare
HRBDA	-	Hadejia River Basin Development Authority.
IIMI	-	International Irrigation Management Institute
ITCZ	-	Inter-Tropical Convergence Zone.
KASCO	-	Kano State Agricultural Supply Company.

KNARDA	-	Kano State Agricultural and Rural Development Authority.
MANR	-	Ministry of Agriculture and Natural Resources
MT	-	Tropical Maritime
NAFPP	-	National Accelerated Food Production Programme.
NALDA	-	National Agricultural Land Development Authority.
NATSP	-	National Agricultural Technology Support Programme.
NFDP	-	National Fadama Development Project/Programme.
NGOS	-	Non Governmental Organisations.
NWRI	-	National Water Resources Institute
OFN	-	Operation Feed the Nation.
RBDAS	-	River Basin Development Authorities.

CHAPTER ONE

1.1 INTRODUCTION

It is increasingly accepted that small holder irrigation development, being concerned with people and not just land, water and money, requires a human approach. Makadho (1990:5) observed that human approach; refers to maximum farmer involvement in every possible way throughout the planning, design and implementation phases.

Many projects in Nigeria have been established with very little prior involvement by the beneficiaries. These projects are managed by a structured government organisations on behalf of the settled small-holders. This approach gives rise to numerous problems that are a result of lack of commitment and responsibilities by the farmers. Farmers look on these irrigation schemes as belonging to government in which case their commitment is very superficial. Lack of farmer participation has been documented as one of the major contributory factors to poor performance (Kolawole, 1991a, 1991b).

While the large scale irrigation projects are under the control of the River Basin Development Authorities, the Fadama development programme is under the aegis of the Agricultural Development Projects. The Fadama Users Associations are strong components of the National Fadama Development Project.

The philosophy behind the Fadama Users Association (FUA) is that small-holder irrigators who were previously treated as

beneficiaries of irrigation development, should become partners in the planning, implementation and evaluation of irrigation development programme (Ferrer and Lucero 1988, p. 5). This means that all services provided to Fadama Users should be organised in such a way that it is within farmers' capacity to participate and that there is co-ordination between members of the Fadama Users Association and the staff of the State Agricultural Development Project. This is achieved by the project's sharing decision making and delegating partial or full management of irrigation systems in stages to duly organise Fadama Users' Association.

The change has two advantages. It makes fuller use of human resources and it also leads to a better level of financial viability in existing national irrigation systems. The Fadama Users Association is in principle independent of the project and government, and responsible to its members. Unlike large-scale irrigation projects which typically involve large sums of technical and financial assistance, improvements to farmer-managed irrigation systems can generally be carried out at lower cost, with greater budgetary flexibility, and primarily through local expertise (Groenfeldt et al., 1986, p. 5).

For a variety of reasons government irrigation agencies, international donors, and private voluntary organisations are becoming more interested in farmer-managed and small-scale irrigation systems. This is because donor agencies have been

disappointed with the results of investing in large-scale irrigation systems, view small-scale irrigation systems as an opportunity for rapid project implementation with the potential to realise benefits more quickly, than large-scale projects. Because of the traditional technologies used in farmer-managed systems, the assumption is often made that with minimal physical improvements to structures, significant gains in production and high economic returns on investment can be achieved (Groenfeldt et al., 1986, p. 6).

It is against this background of the importance of the small-holder irrigation vis-a-vis large scale irrigation scheme in the agricultural and rural development efforts that this thesis will examine the case of the Fadama Users Associations in Kura and Madobi Local Government Areas, Kano State.

1.2 STATEMENT OF THE PROBLEM

In recent years the government has embarked on a number of projects aimed at improving rural areas through irrigation agriculture. The impact of some of these projects have been found to be less than satisfactory. The failure of these projects and the need to ameliorate this failure has led to the formation of the Fadama Users Associations.

Some of these rural agricultural development projects include the Agricultural Development Projects (ADPs) whose idea was first muted in 1972 and pilot projects started

between November, 1974 and June, 1975. More of these projects were established in 1978, 1980, 1982 and later nation wide. In 1973, the Federal Government Promulgated decrees numbers 32 and 33 establishing two River-Basin Authorities, Sokoto Rima and Chad Basins (Salau, 1986). Nine more River Basins were further created through decree 25 of 15th June, 1976 and 31st June, 1977 totalling eleven. The number of River Basins Development Authorities was increased to eighteen in 1984 to provide for an Authority for each State of the Federation except for Ogun and Lagos States which had one jointly.

River Basin Development Authorities are responsible for the development of both surface and underground water resources for irrigated agriculture, livestock development, domestic consumption and commercial and industrial uses and fisheries (Decrees, 32, 1973; and 25, 1976).

In view of the need for an area regional approach to Water Resources Development, the River Basin Development Authorities (RBDAS), were reduced in 1987 from 18 to the original 11 with some modifications in their functions (Alabi, 1988: 4).

The performance of the River Basins Development Authorities have not been impressive. Ademehin (1988, pp. 241-253) identified the restraining forces which tend to retard achievement of goals in Benin-Owena River Basin Development Authority in particular and other River Basin and Rural Development Authorities in general and suggested

recommendations aimed at rising the level of performance and higher percentage of targeted corporate goal of the authorities.

These restraining forces includes; centralised administration at level of chief executive and personalisation of Authority's functions, lack of opportunity to act and use individual initiative, insufficient resources such as funds, equipment and vehicles, insensitivity of management to the welfare of the staff, functional delimitation and personal ego among others

Ayo (1988, P. 262) observed that Niger River Basin Development Authority have been facing a number of problem resulting in failures in many directions, and such failures seem to have over shadowed the positive achievements already registered by the authority.

Ogunnika (1988, p. 318) in his work on Chad Basin and Rural Development stated that "The Chad Basin and Rural Development Authority has not been very effective with regards to agriculture and rural development in Borno State, even though one could observe some positive results as regards to the awareness of the farmers on the importance of modern equipment and modern irrigation agriculture."

Similarly, Kolawole (1988, pp, 322-329) exhaustively discussed the yawning gap and achievement of the South Chad Irrigation Project as regards self-sufficiency in Food Production pointing that the project achieved little compared

to it's mandate and the rural farmers production and output problems are far away from being solved.

The Directorate of Food, Roads and Rural Infrastructures (DFRRI) was established under decree number 4 of 1st April, 1987 and deemed to have come into operation on 6th February, 1988 and hopes to transform the rural sector of the economy. Like the ADPs and RBDAS, the Directorate also has the following to achieve:-

- To identify areas of high production potential for the country's priority food and fibre requirement to support production of such commodities along agro-ecological zones.
- To formulate and support a National Feeder Road Programme network involving construction, rehabilitation, improvement and maintenance.
- To formulate and support a National Rural Water supply programme with emphasis on full initial involvement of local communities and local Government personnel to ensure sustained maintenance of built infrastructures.
- To encourage the implementation of physical development plans at the community level in order to increase rural production and improve rural accessibility.

The Directorate of Food, Roads and Rural Infrastructure has also not performed satisfactorily. Substantiating this, Ariyo (1991) observed that most Directorate of Food, Roads and Rural infrastructure officials gave themselves a part on the

back for a job well done while local beneficiaries complain of poor quality of DFRRI project, or the non existence of some projects which the institution claimed to have completed.

Other programmes that had earlier on existed include the National Accelerated Food Production Programmes (NAFPP) 1973, the Operation Feed the Nation (OFN) 1975, the Green Revolution (GR) 1980 and the National Agricultural Land Development Authority (NALDA) 1992 among others. All these programmes are meant to achieve similar objectives as regards food production, rural sector and the peasantry.

Until recently not much attention have been given to the assessment of the performances of these projects with a view to knowing the extent to which they have achieved their aims and objectives. Government success was simply judged by the magnitude of the sums of money allocated to the various sector (Abe, 1988). Dittoh and Akatugba (1988: 370) in their study have argued and shown that neither the World Bank assisted Agricultural Development Projects (ADPs) nor the Federal Government owned River Basin and Rural Development Authorities (RBDAS) have contributed significantly to agricultural production and development in Nigeria, mainly because donor agencies and countries are mainly seeking for political and economic power, through their initiated programmes and projects. Also local bureaucrats and technocrats are equally seeking for political and economic power over the farming, and by far the most productive,

population. They do that successfully by forming alliances with so called "progress farmer".

It is in the light of these programme failures that the Fadama Users Associations were introduced into the Country through the Agricultural Development projects. Even though much work have been done on Fadama irrigation and related activities none has addressed the issue of Fadama Users Associations, most particularly in the Northern part of the country since their establishments and to find out the extent to which these Associations are achieving their set aims and objectives. It will be useful to know how they are performing in view of the huge amounts of money being sunk into them and the lives of numerous farmers involved in them. This lack of knowledge about the performance of these Associations remains a gap that this project hopes to fill as its contribution to knowledge in rural development.

1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to determine the contributions of Fadama Users Associations in the management of small scale irrigation systems in Kura and Madobi Local Government areas of Kano State. This aim is to be achieved through the following objectives:-

1. Examining the functions of the Fadama Users Associations.
2. To determine the extent of loan recovery, that is whether farmers repayment effort have been according to schedule.

3. To explain economic return or benefits that accrue to the Fadama Users Associations' members as a result of their participation in the management of their irrigation schemes.
4. To examine marketing problems arising from the surplus crop production.
5. To asses Fadama Users Associations members' contribution to the maintenance of the physical infrastructures (boreholes, wahsbores, tube wells, roads, canals and channels) in order to make such facilities sustainable.

1.4 HYPOTHESIS

The exploratory hypothesis is that the participation of Fadama Farmers in the User Associations has not improved their welfare and standard of living.

1.5 RESEARCH METHODOLOGY

1.5.1 Source of Data

Two main sources of information were used in the course of this study viz:-

(a) Primary source of data, through questionnaires survey and field interview and
(b) Secondary source of data, through archival records.

1.5.1.1 Primary Source of Data

In this study, three Fadama area villages, Gundutse, Kauran Mata and Kanwa were selected for the purpose of this research work. This was done so as to strike a balance and avoid being biased in the course of the study. These fadama area villages were sought to provide information necessary for a successful research work. A reconnaissance survey of the area for the purpose of familiarisation was carried out. The members of the Fadama Users Associations, project extension staff, local Government staff and local leaders were involved in formal discussions.

The study covered 7 Fadama Users Associations of 25 farmers per group already formed at Gundutse with a total membership of 175 farmers in the fadama. Six fadama users associations with a total membership of 150 farmers at Kauran Mata ard two fadama users associations with membership strength of 50 farmers at Kanwa were also involved. These are the number of Fadama Users Association in the study area. From the three Fadama areas, 15 members out of 25 members of each Fadama Users Association were randomly selected through a pick of yes from a container of rolled toss papers. This gave 60% coverage of the membership of each Famada Users Association. A 60% coverage of the membership is adequate enough to provide majority views of the sampled respondents.

Data used in the study partly came from primary sources that came through questionnaires and oral interviews from the

responses of the members of the Fadama Users Associations, extension agents, agric supply company staff, local Government staff and local community leaders.

1.5.1.2 Sampling Procedure

The respondents were chosen through random sampling. A farmer's questionnaire was prepared for the purpose of gathering data and information.

Sixty percent of each Fadama Users Association membership was served with a farmer questionnaire, meaning that 15 out of 25 membership were interviewed. Thus a total of 225 farmer questionnaires were served. This formed the sample size.

Questionnaires served on farmers provided information on the following:

1. The extent of farmers participation in the management of small scale irrigation agriculture.
2. Marketing problems as regards surplus produce.
3. Impact of irrigated agriculture on economic returns or earnings arising from farmers participation in the management of the Fadama Users Associations.
4. Problems associated with small scale irrigated agriculture in the context of users associations such as farm inputs availability like fertilizer, agro-chemicals, labour etc.

The questionnaires were translated into Hausa language before direct interview. Other information sought through the

questionraire included personal data of the respondents, food crops anc cash crops grown.

1.5.1.3 Secondary Source of Data

Seccndary sources of data came from text books, past works related to the theme of the study, journals, magazines and seminar papers containing past works on the topic of the study and provided information useful in the conduct of the study.

1.5.1.4 Data Analysis

Farmers responses to the various findings were reported using descriptive statistics such as simple percentages, tables ard figures such that they reflect the objectives of the study. These are employed to allow for description and understanding of the respondents characteristics such as age, level of education, number of children, earnings etc.

1.6 SIGNIFICANCE OF THE STUDY

Kano lies in savannah region that has erratic rainfall and this necessitate the irrigation system of farming which can be better achieved in the flood plain area (Fadama). Also the formation of the Fadama Users Associations enhances a better improved output. This has proved the significance of this study in kano region and in Nigeria generally.

The main purpose for forming the Fadama Users Association (FUA) is to organise the small scale irrigators into defined membership group in order to establish a solid internal system of irrigation procedures that ensures continuity and sustainability of Fadama Development Project. The involvement of Fadama Users as beneficiaries is essential component to continue the project activities during the implementation and beyond.

The main objective of Fadama Users Association formation is to accelerate the expansion of Fadama Development and promote the sustainability of small scale irrigated agriculture production through organised group cooperative activities rather than individual production effort (Ben-Musa et al.,1994).

Fadama Users Associations are being developed on the basis of free association among farmers with defined aims and roles for servicing a common purpose of fadama farmers. These objectives can be fulfilled by working together rather than acting independently.

This study will highlight problems associated with such efforts, served the planning purpose for the future and development of existing similar associations. It is a pioneer work in this area of cooperation in Kano State and its findings will serve the purpose of other existing FUAs as well as promote further work in the area of the study.

1.7 SCOPE AND LIMITATION

This study covered only the activities, prospects and recommendations in respect of Fadama Users Associations in Gundutse fadama area of Kura local Government, Kauran Mata and Kanwa fadama areas of Madobi Local Government council. The study involved only duly registered members of the associations.

The scope of the study is constrained by time and finance. It is intended to cover the activities of the associations right from inception to date and proffer reecommendations and suggestion for further research work in this area of association.

1.8 ORGANISATION OF THE THESIS

The research work has five main chapters. The first chapter serves as an introduction, with the statement of the problem, aim and objectives, hypothesis, research methodolcgy, significance of the study, scope and limitation.

Chapter two presents the literature review, which contained irrigation development in Nigeria, Large Scale Irrigation-River Basin Development Authorities (RBDAS), Traditional Irrigation-Fadama, the role of Agricultural Development Projects (ADPs) in Irrigation; its components, meaning, objectives and National Fadama Development Project (NFDP) with its objectives, coverage and the Fadama Users Associations (FUAs).

Chapter three discusses the setting of the study area. It describes the climate, temperatures, relief and drainage, soils and vegetation, the agro ecological zone where the study area belong to as well as the population of the area of the study.

The findings of the research and Data analysis with discussions are found in chapter four. This formed the dominant theme of the study which is derived exclusively from empirical facts of the research and observations.

Chapter five contained the summary, conclusion and recommendations proposals on how to improve on the research work results.

CHAPTER TWO

2.1 LITERATURE REVIEW

2.1.1 IRRIGATION DEVELOPMENT IN NIGERIA

Nigeria has a modest potential for irrigation development. Surface water resources, about 266 billions m^3, are adequate to irrigate between 1.60 and 1.85 million ha through storage schemes, mostly in the north, and diversions and direct pumping, mainly in the south. Associated with the surface water, and mainly in the south. Associated with the surface water, and mainly in the north and middle-belt, are the very shallow aquifers of the flood plains (fadamas) of rivers and streams that can except in ecologically sensitive areas - be exploited through low-cost fadama owned and managed shallow tube wells. The extent to which the latter resource overlaps with the former has not been determined, but ground water studies in four states, extra polated to the other seven of the north and middle-belt, indicate that possibly 940,000 ha could be irrigated from these very shallow aquifers (FAO/ World Bank, 1992).

FAO/World Bank further stated that the private sector is also active in irrigation development; most of this is through the small-scale farmer initiated motorisation of lift irrigation from rivers and shallow wells. The greater part of this has been without government assistance. The same source also reported that over 84,000 ha have been developed by lift irrigation in this way. In addition the Agricultural

Development Projects have been encouraging private farmers to use shallow tube wells (STW) using small motorised pumpsets to exploit the shallow aquifers of the fadamas. More than 17,000 ha have been developed so far and the Bank was considering a loan to Federal Government of Nigeria for expansion of this type of irrigation by 45,000 ha over the next four years.

Pradhan (1993) stated that about 90 percent of the area under irrigation in Nigeria has traditional irrigation systems while only 10 percent has modern irrigation systems defined as those with large dams or diversion weirs and head works with water control structures. They have an elaborate network of infrastructure to deliver water and are managed independently by the irrigation agency and beneficiary farmers. Some of the features of irrigated agriculture in Nigeria are shown in the Table 2.1.

TABLE 2.1

Features of irrigated agriculture in Nigeria

	1	2	3
i.	Total land area	98.3m ha	-
ii	Cultivated area	73 " "	74% of 1(i)
iii	Crop coverage	25 " "	34% of 1(ii)
iv	cereal crop coverage	13 " "	52% of 1(iii)
v	Rice coverage	01 " "	08% of 1 (iv)
vi	Irrigated area	01 " "	08% of 1 (v)
vii	Area under traditional irrigation	900,000 ha	90% of 1 (vi)
viii	Area under modern irrigation	100,000 ha	10% of 1 (vi)

Source: Pradhan, 1993

To determine the degree of incrementality of the Fadama aquifers further study is needed urgently to arrive at total potential for irrigation. FAO/World Bank estimated that about 87 billion M^3 exists as deeper ground water that is generally reserved for water supply schemes.

Given the drought-prone nature of the North of Nigeria, a situation that has worsened substantially over the last 30 years because of the steady decline in rainfall a trend whose future cannot be forecast - and estimates that soil

degradation due to population (estimated at 115 million and growing at 3.3% annually (FAO/World Bank, 1992) in excess of carrying capacity throughout most of the country is likely to worsen, the establishment of sustainable irrigated agriculture is consequently attractive. Between 18 and 20 million ha of rain fed crops are grown annually, and 2 million ha of land under high productivity modern irrigation could produce, for example, the equivalent of at least 8 and as much as 10 million ha of the former. At present prices irrigation is financially rewarding to farmers even growing basic food crops - rice and wheat and is economically sound (with the same crops) provided that investment costs are kept low, depending on type of irrigation. Further existing irrigation in Nigeria demonstrates that farmers can make good use of irrigation water and other inputs (FAO/World Bank, 1992).

FAO/World Bank highlighted further that the main problem facing the irrigation sub-sector is that, facilitated by the oil boom, Federal Government of Nigeria spent very large amounts of money (in many years as much as 60% of the budget for agriculture as a whole) in building dams, mostly in the dry north of country, for irrigation purposes. Down stream development (i.e. the building of irrigation systems) has, however, proceeded more slowly; and with the down turn in oil prices in 1982 and the subsequent and continuing years of financial stringency, funds to complete these systems have been very limited. Consequently dams now exists with water in

storage sufficient to irrigate well over one million ha (although the suitable land which they command is far less than this) but the land equipped for irrigation on public sector schemes is only about 115,000 ha. If all the plans of the 11 River Basin Development Authorities (RBDAS), that have been responsible for this work, to utilize these existing stored resources were implemented, irrigation under RBDA (and state government financed) schemes would increase substantially. The cost of completing these schemes would definitely be a huge amount.

Farmer owned lift and small tube well irrigation have low investment costs, low annual operating costs and returns are very high. The capital costs of public sector irrigation have been excessive, in several cases with a corresponding high overhead costs. Nearly none of the investments made so far in public sector irrigation have been economic, and even if past investments are taken as sunk - as would be appropriate - it will remain difficult to keep completion costs to sufficiently low levels to ensure acceptable economic returns. Should construction costs be reduced from historically high levels (better design, at least cost solution approach, competitive bidding open to public scrutiny, etc.), new investments in large storage dams and the down stream systems associated with them, as constructed in the past, will remain uneconomic. As such no further work on these should be initiated, and that work on those under

construction should be suspended except where safety considerations indicate otherwise (FAO/World Bank, 1992).

2.1.2 Water Resources and Irrigation Development Institutions

In Nigerian government terminology, water resources are on the "concurrent" list, that is, they are joint responsibility of federal, State and Local Government bodies. The practical consequence of this is that the water resources management is in the hands of a plethora of institutions, which do not always coordinate their activities, but more importantly, may not have the technical competence to plan, implement and manage water use projects or to conserve the resource. In view of the importance of water in the economic and social fabric of the country, further development and use of water resources in Nigeria must be dependent on stream lining the operational arrangements and possibly, restructing the institutions concerned. The Federal Ministry of Water Resources and Rural Development (FMWRRD) is the agency with the overall responsibilities for all aspects of water resources development, allocation and management, working through the RBDAS, State Department of irrigation and Drainage (SDID) and other local organisations (Staff Appraisal Report, Federal Republic of Nigeria, Irrigation Development Project, March 11, 1994; pp. 9 - 10). Figure I shows the organization of FMWRRD.

2.1.2.1 Federal Department of Irrigation and Drainage (FDID)

This department has a key responsibility for water resources development, and as the volume of water use is greatest in the irrigation subsector, there is a particular need to enhance the department's capacity and capability to adequately fulfill its functions. Shortage of experienced staff, poor liaison and coordination, inadequate office accommodation and lack of funds for studies and training are seriously affecting FDID's effectiveness. This has inhibited policy making, planning and monitoring and has stymied the evolution and execution of important interdisciplinary projects.

The staff appraisal report (1994) additionally stated that the major weakness within FDID appears to be a shortage of experienced staff, although the level of academic qualification is high. Most of the staff are professionally qualified irrigation engineers, but none of them with specialized training and experience in planning and policy formulation. As a result, FDID has, until now neglected its role as planner and policy maker in the irrigation subsector. Consequently, there is almost a total absence of a coherent national water resource development policy for irrigation, the adoption of appropriate water legislation is long overdue and development projects are often implemented on an adhoc basis without due consideration of the broader resources use.

In view of the expected greater planning and policy - oriented activities, there is an urgent need to build up this capacity.

Federal Department of Irrigation and Drainage also has a mandate to evaluate projects within the RBDAs. Staff skill of the department, however, are mostly limited to engineering aspects. The department neither employs officers with socio-economic training or specialist with environmental knowledge, nor does it have funds to contract out studies. These deficiencies require attention to enable the FDID to under take such expected roles more effectively.

Furthermore, the present office accommodation is clearly insufficient. It could not conveniently accommodate the headquarter's staff office needs, reference library, data center and visiting staff. Similarly, office furniture and equipment are inadequate. The department has no sufficient vehicles to effect appropriate field work it required. It has no access to funds to carry out feasibility and or design studies for selected priority projects and for Environmental Impact Assessments (EIAS). As a result, considerable delays have been encountered in project preparation and essential EIAS are not carried out. Adequate funding for proper preparation work would have to be made available (Staff Appraisal Report, 1994).

2.1.3 The National Water Resources Institute (NWRI)

The National Water Resources Institute is second to Federal Department of Irrigation and Drainage as the most important agency requiring strengthening as it present a critical link between policy making/planning and implementation by providing technical/research services and training for the entire water resources subsector. The institute has high quality staff and equipment to carry out complex technical tasks. It's function now has been restricted mainly to its training function as the lack of some crucial pieces of equipment and inadequate promotional efforts prevent NWRI from fully developing its potential as a technical support agency.

The staff appraisal report further explained that important tasks are frequently contracted out to lesser qualified and or equipped establishments with a resulting loss in quality or are executed outside the country. These problems would have to be overcome to ensure the ready availability of high quality experties, and to satisfy the needs of the water sector, including contract research for commercial users.

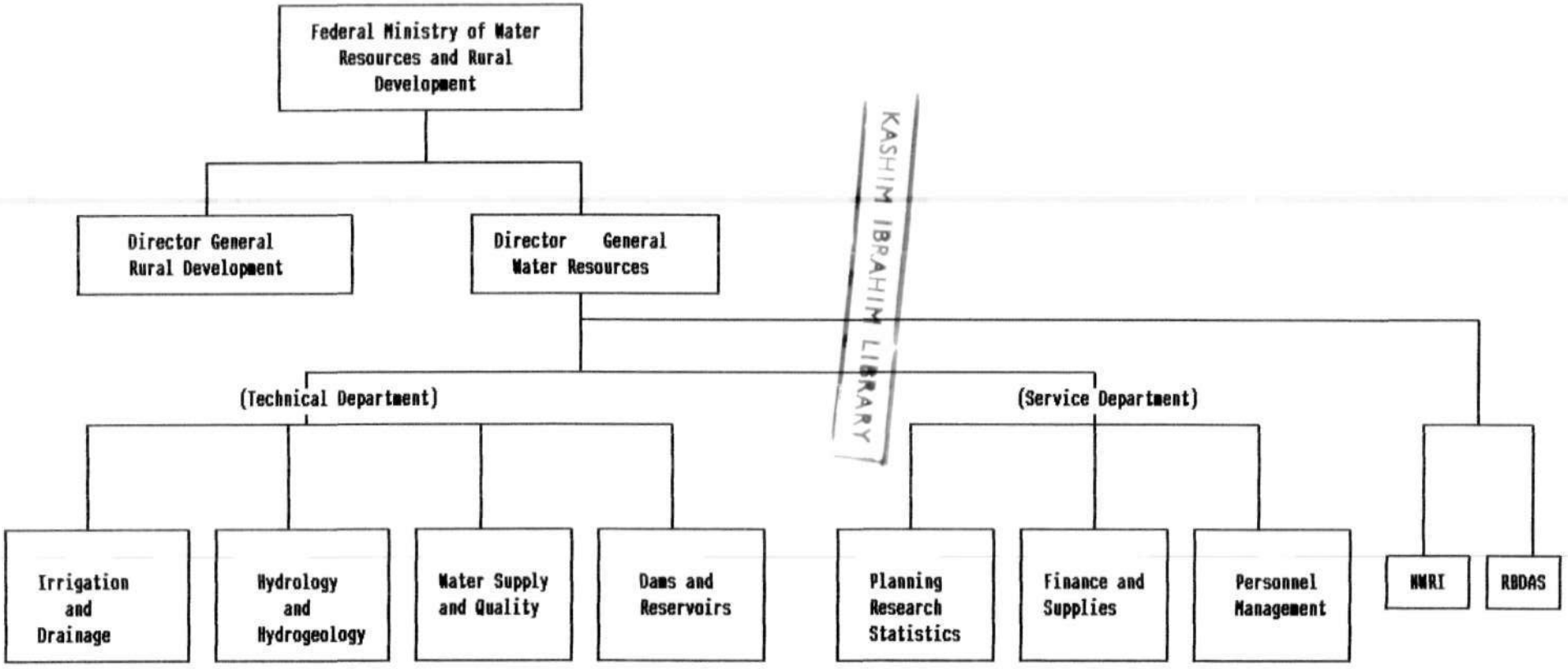
2.1.4 Large scale-River Basin Development Authorities

The development of Nigeria's water resources for irrigation, rural and urban water supply, received the first attention during the First National Development Plan 1962 -

FIGURE 2.1

NIGERIA IRRIGATION DEVELOPMENT PROJECT

ORGANOGRAM OF THE FEDERAL MINISTRY OF WATER RESOURCES AND RURAL DEVELOPMENT



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Source: Staff Appraisal Report, Federal Republic of Nigeria, Irrigation Development Project, March 11, 1994.
World Bank Agricultural Operations Division.
Western African Department

Note: In addition to the four technical departments, FMWRRD also has a Department of Special Duties on an ad hoc basis.
NWRI is the National Water Resources Institute located in Kaduna.

1968. During this period, a sum of N12.84 million was allocated to establish irrigation programmes in the country. These were: Sokoto-Rima, Yola scheme, Kware Scheme, Bunza Fadama Scheme, Duku Extension Scheme and Tunga Kawo Scheme. During the third development plan, a comprehensive review of strategies for developing the country's water resources was done. This exercise led to the establishment of 11 River Basin Development Authorities through the promulgation of the RBDA Decree of 15 June, 1976 and the Niger Delta Basin Development Authority Decree of August 1976. See p. 4 of this work for more details. The specific functions or responsibilities of these Authorities were also stated in page 4 of this work.

The funding and staffing of the RBDAs is the sole responsibility of the Federal Government of Nigeria. The Federal Ministry of Water Resources and Rural Development formed the supervisory organ of the RBDAS. The funding and staffing is fully indigenous.

The River Basins Development Authorities are capital intensive projects and are meant for the purpose of big farmers. In terms of achievements in their performance, the RBDAS has recorded increase in food production, construction of feeder roads, dykes, dams etc, inputs procurements, provision of traction equipments, increase in rural income, provision of rural employment etc. These are considered modest gains. But when considered and weighed against the

huge financial costs involved, their performance were far from being satisfactory.

Some of the problems that inhibited better performance of the RBDAS includes resource scarcity, uncompleted and half done projects, political interference and sporadic structural and administrative reforms and arrangements, lack of proper co-ordination or conflicting interest between RBDAS, ADPs and Ministry of Agriculture and Natural Resources (MANRs) project and activities within the same area they are serving. Others include lack of effective and appropriate management organisation machinery and implementation schedule. Problem of trained manpower in irrigation engineering or irrigation agronomy and civil engineering related disciplines also aided their non sufficient performance results. lack of training and expertise in project management, phased planning, targets and implementation schedules as well as monitoring and evaluation control system built into the programme at design stage, also added to the problems of the RBDAS.

However, it is believed that despite the unimpressive performance of the RBDAs, there is still room for improvement and efforts should be geared towards this not withstanding the partial privatization and commercialisation exercise that they found themselves in. The commercialisation and privatization policy of the government were as a result of the structural adjustment programme introduced into the economy as a strategy to curtail the economic downturn in an attempt to improve the

economy of the nation. The commercialisation is the selling out of Government owned companies, properties, etc to individuals or other organisations while privatization refers to the transfer of ownership of pubic holdings to the private individuals for better management and performance.

2.1.5 Traditional Irrigation - Fadama

Fadama is a Hausa word meaning the seasonally flooded or flood plains along major savanna rivers and or depressions on the adjacent low terraces. This contrasts sharply with the surrounding dry topland in terms of resources. It is the relative wetness and dryness and the seasonal and inter annual variations of the moisture level of the top and bottom land components of the system that are particularly important from the point of view of environmental resource management (Kolawole and Scoones, 1994; p. 29).

Irrigation was based largely on natural recycling of nutrient through annual silt addition by flooding rivers. The flood plain of the Hadejia and one of its main tributaries (River Kano) were especially noted for their dry season cultivation before the inception of dams and large scale irrigation on the interfluves. Before the era of dams two district zones of Fadama cultivation existed. These are: the zone of defined storm channels with terraces with or without narrow flood plains such as the head streams of the Hadejia; and the zone of extensive alluvial channel complexes

such as Hadejia and Yobe complexes. In the first zone the shaduf system of lifting water from dug out pits at the edge of the storm channel, or ponds on the low terrace was popular. Calabashes were used on the shaduf to irrigate plot divided into basins. In the second zone, flooding was very extensive and lasted for longer periods. Thus residual moisture utilization technique which required no water lifting derive was applied. Climatic variations determined the extent of annual floods as well as the number of hectares cultivable each year. Needless to state that the uncultivable parts of the facama provided pasture for grazing. In both zones the basin technique of irrigation was favoured (Olofin, 1993). Inputs were limited, largely, to labour and seeds usually purchasable in the local markets, or from the last harvest. labour was based largely on individual family labour (gandu or gaiya). Hired labour was not very common. The dropings of animals allowed to graze farm residues and occasional addition of household refuse (taki) supplemented the natural silt to replenish the nutrients of the land. The materials needed to construct and operate the shadouf constituted the other additional inputs. The system was no doubt labour intensive.

Rice was very popular in the extensive flood plains, while tomatoes, sugar cane, pepper (tattase), green vegetables, onions, and other market gardening crops were popular in the confined flood plains and terraces. Rice and sugar cane occupied the wetter areas while the other crops

were grown in better drained (slightly raised) sections. Also, inter-cropping of the green vegetables and relay planting were very common.

It was a sustainable, organically balanced system, although on a small scale and catering mainly for urban dwellers (Olofin, 1993).

2.1.5.1 **Ditch Irrigation**

In many areas within the Hadejia Valley, parallel sets of ditches are cut away from a river channels or pool into the flood plain. A hard pan at about 60cm depth encourages seepage side ways into the root zone, and in this way crops such as cotton are sub-irrigated and the size and spacing of ditches varies a great deal, presumably with labour availability and flood plain physical characteristics. Ditches in the Hadejia valley were 0.5m - 1m wide, upto 1.5m deep and between 3 and 7m apart, running up to 120m back from the river channels. Such channels (20cm wide and 5m apart) are used to cultivate cotton along the Burum Gana, where they are still observable (Adams, 1993).

2.1.5.2 **Shadouf Irrigation**

This type of irrigation was discussed in page 29. Shaduf can lift up to 4,500 litres per hour over a height of 2 - 3m. It's main problem together with the ditch irrigation lies in the significant labour demands involvement in both the

construction and maintenance as it was earlier stated (Adams, 1993).

On ways to develop fadama, Umar and Tyem (1994, p. 15) suggested that fadama or flood plains could be put under irrigation with high reliance on water that can be exploited from these aquifers. Use of water from aquifers has the following merits:

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(i) It is shallow

(ii) Easy to tap at affordable costs, and

(iii) Replenishable under good management

2.2 THE ROLE OF AGRICULTURAL DEVELOPMENT PROGRAMME IN IRRIGATION

2.2.1 The Agricultural Development Programme (ADP)

The approach to agricultural development in terms of agricultural development projects received much attention in the late 1960s and early 1970s. The purpose was to overcome stagnation and ease social problems among traditional farmers in a particular region, province, state or district by a concentrated and comprehensive effort (Adams, 1982; pp. 62 - 63).

The Agricultural Development Programme (ADP) concept originated in Nigeria over twenty years ago and was based on past experience in dealing with crop programmes that failed because there were a number of development components missing. The aim was to create a proper environment for growth by instituting comprehensive integrated rural

development project in a region. The ADP model which originated in Funtua, in the then North Central State in 1975, with others in Gusau and Gombe, now covers the entire Federation. The Agricultural development Programmes (ADPs) are funded through a tri-partite arrangement between the Federal Government of Nigeria (FGN), the State Government and the World Bank. The Federal Government of Nigeria (FGN is responsible for 20%, State Governments 14% and World Bank 66% of the funding (Alabi, 1988; p. 5).

Adams (1982) further explained that the system of the ADPs is based on the premise that a combination of factors comprising the right technology, effective extension, access to physical inputs, adequate market and other infrastructural facilities are essential to get agriculture moving and to improve productivity in order to raise the living standards of rural dwellers. one of the important features of ADP strategy is, therefore, its integrated approach to the supply of inputs and infrastructures. Rural roads, small dams, farm centres, seed multiplication, farm input distribution, extension etc, are all handled by the ADP management unit, demonstrating the importance of the linkages and the need for optimal sequencing of agricultural development activities.

A central feature of the ADP strategy that needs emphasis is the reliance on the small-scale farmer as the vehicle for increasing food production. The ADP management does not engage in direct crop production (except seed production)

rather they provide services which motivate the millions of farm families.

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2.2.2 Components of ADPs

There are a number of main pivotal components of the ADPs which are important to realize, and from which the farm community derives its benefits. They are listed by Alabi (1988) as follows:

- A reorganised and revitalized agricultural extension system that integrates extension worker's training and farm visits and ensures two way communication between farmers and researchers.
- An effective farm input distribution system which operating through a net work of farm centres, ensures that supplies and needed farm inputs are reliable and are available to farmers at the right time, and in close proximity to their farms;
- An autonomous ADP management unit that provides for timeliness in agricultural operations;
- A vigorous monitoring system that provides needed information to ensure that errors in one project are not perpetuated there or replicated in other projects.
- Joint State/federal responsibility both in project formulation and in implementation

2.2.3 Objectives of Agricultural Development Programmes

The main objectives of the ADPs have been to increase production of food and fibre as well as producer incomes (Idachaba, 1986; p. 93). Others are ensuring stability in food and input market and provision of basic infrastructures and purposeful extension network.

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2.2.4 Staffing and Management

Agricultural Development Programmes (ADPs) requires a team of specialists whether nationals or foreign experts, to cooperate closely with the local population and existing administration. It also needs a special executive body, with a considerable degree of local autonomy and authority, is usually necessary to ensure that the activities of a number of departments and agencies are effectively coordinated.

At the top of the management of the ADPs is the State Governor, the main overseer; followed by the executive board which is headed by a chairman, normally the commissioner of agriculture with membership comprising the managing director, representative of the Federal Government of Nigeria from the RBDA serving the State, representative of the Ministry of Works, representatives of Federal Agricultural Coordinating Unit (FACU) and Agricultural Programme Monitoring and Evaluation Unit (APMEU), representatives of the Ministry of Finance plus 2 or 3 retired agriculturalists or practising farmers.

At the project level, the Managing Director oversees all the management affairs of the ADP and serves as the chief executive officer.

The following departments and units under their directors or heads assists the office of the Managing Director in running the affairs of the ADP.

(i) Administration: Is responsible for the day-to-day running of the project in terms of general administration, personnel matters and welfare.

(ii) Finance and Supplies: Provides accounting services, procurement, payments, disbursement, budget among others.

(iii) Human Resource: Takes care of the development and training of staff as well as manpower planning.

(iv) Women in Agriculture: Involves in dealing with women farmers, home economics activities, rural women revenue generation activities. These are achieved through a net work of home economics staff.

(v) Planning, Monitoring and Evaluation: The planning, monitoring and evaluation department conducts villages surveys, markets survey, appraisals, monitoring and evaluation of field activities and compile statistics and data.

(vi) Agriculture Department: This department is in charge of research, extension and technical

services which contain mechanization units, crop protection and seed processing among others.

(vii) Engineering Department: This department takes care of infrastructural development, (roads, housing, offices and workshops/and maintenance of project vehicles, plants and equipments.

(viii) Agricultural Credit and Community Development: Agricultural credit is given to farmers through this department, marketing issues are also handled by this department, formation of farmer groups, their registration assistance and guidance to farmers as regards meeting institutional requirements for credit are taken care here.

(ix) Fadama Development Department: This department is incharge of fadama development. The fadama areas improvements activities are carried out under this department. The Fadama Users Association (FUA) section fall here which also coordinates and liaises with agric credit and community development department to execute it's activities.

(x) Zonal Management Units: The zonal management units under the Zonal Directors assists the programme management unit at the State Headquarters through zonal unit sections headed by zonal sectional heads such as zonal extension officer, zonal personnel officer, Assistant Director Human Resource, Zonal

Accountant, Zonal Workshop Manager, Zonal Engineer, Zonal Technical Officer, Zonal Adaptive Research Officer among others.

In 1997, the management and staffing of KNARDA like some other ADPs was re-organized and rationalized. The major changes being renaming Fadama Development Department to Rural Infrastructure Department consisting Fadama Development and Agricultural Credit and Community Development Departments.

A new department in the name of Technical Services where Research, Agro-forestry and Horticulture are taken care of. Similarly, Engineering Department has now moved to the Managing Director's Office. While Agriculture Department was renamed Extension Department.

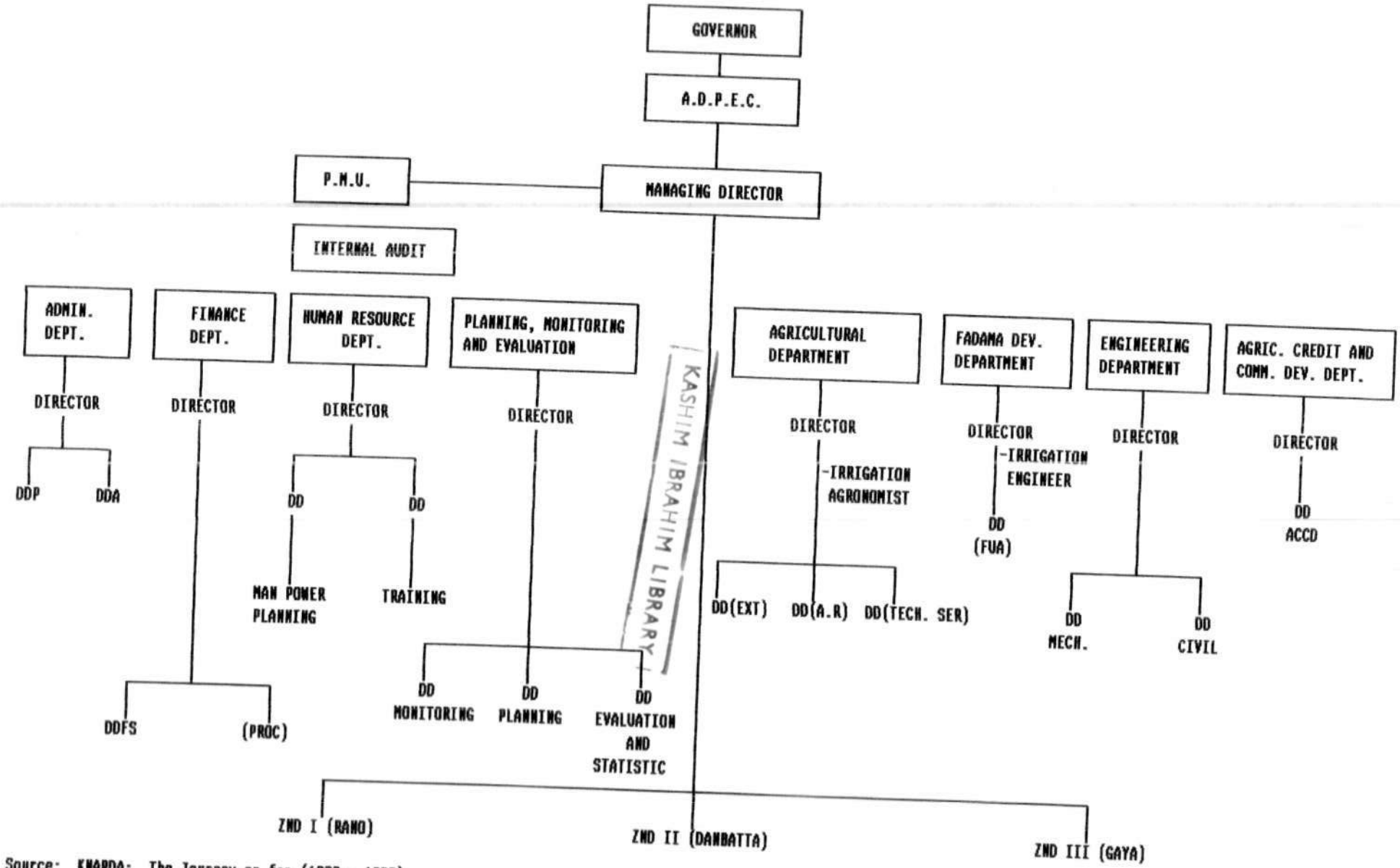
2.2.5 Performance of the ADPs

Comments on the performance of the ADPs were made earlier in the introductory chapter of this write up under the statement of the problem on page 3.

Work conducted on the evaluation/performance assessment of the ADPs showed that the ADPs have contributed little or rather unsatisfactorily compared to the large amount of fund sunk into them. In their write ups on ADPs Sanda, 1988; p. 25: Asiabaka, 1988; pp. 81-2: Mordi, 1988; pp. 89-95 among others have variously stated the problems and impediments to effective performance and contribution of the ADPs as well as

FIGURE 2.2

ORGANISATIONAL CHART OF KANO ADP



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Source: KNARDA: The Journey so far (1982 - 1995)

KEY:

ADPEC	-	Agricultural Development Project Executive Committee.
PMU	-	Programme Management Unit
DDP	-	Deputy Director Personnel
DDA	-	Deputy Director Administration
DDFS	-	Deputy Director Finance and Supply
PROC	-	Procurement
EXT	-	Extension
A.R.	-	Adaptive Research
TECH. SER.	-	Technical Services
FUA	-	Fadama Users Association
ZND	-	Zonal Director

recommendations for better performance and improvements in their operations. Thus paves way for a search of better approach to agricultural and rural development efforts in the country.

2.2.6. Agricultural Development Programme and Small Scale Irrigation

Jamil (1996, p. 5) documented that irrigation has been defined as the application of water to the soil for the purpose of supplying the moisture essential for the growth of arable plants. This process secures the plant against short term droughts through cooling the soil and the atmospheres so that plants grow under favourable conditions. Irrigation water washes out silt in the soil and prevents undesired changes in soil texture, such as hardening the surface of soil piping. Methods of irrigation are numerous and include sprinkling, irrigation through furrows, flooding and precipitation. Irrigation is often used for either reclaiming and bringing dry lands under cultivation, or for economising the use of land by increasing its productivity through watering. Jamil, further stated that in many areas irrigation enables farmers to grow more varieties of crops during two or even three cropping seasons every year.

Smout (1990) defined as small scale irrigation usually on small plots, in which farmers have the major controlling influence, and using a level of technology which the farmers can effectively operate and maintain.

The concept of small-scale irrigation thus combines small size with farmer management. It covers a wide range of complexity from the small garden of a single household, to canal and tube well systems which serve 50 farmers or more. It includes both 'traditional' irrigation schemes built from indigenous technology and new developments with external assistance.

Smout further stated that traditional schemes present numerous success stories of small-scale irrigation. Farmers have been constructing and operating these schemes successfully for centuries all over the world. In most African countries for example (except for Egypt and Sudan), the area of farmer management irrigation is much greater than the area of formal irrigation. Most traditional irrigation schemes have small command areas, but there are also some large schemes of several thousand hectares, for example the Chatis Muja in Nepal, a 150 year old system which irrigates 3000 ha. This is run by the farmers through a three tier representative structure, with rules and methods which have been developed for maintenance, and allocation and distribution of water (Chambers, 1988, the scheme has also been studied by IIMI). This scheme illustrates farmers' capability over the range of irrigation management tasks and shows that farmer management is possible even on large schemes. However there are also farmer-managed irrigation schemes of various sizes in Nepal and elsewhere which seems to

have failed or under-achieved from poor management, for example in adequate maintenance. Examples can be found in applications to government for the renovation of these schemes.

Farmer managed irrigation has been neglected in the past, and small-scale irrigation in particular may still be under-estimated in government statistics, but both its existing contribution and potential to improve agricultural production are now much better recognised.

As well as this greater recognisation, government and aid agencies are now attempting to promote and improve small-scale, farmer-manage irrigation projects. This interest in developing small-scale irrigation has resulted in the involvement of professional staff, from government, non-governmental organisations (NGOs) and consultants, in the planning and implementation of small-scale irrigation, instead of these being carried out by the farmers alone. On some projects, this process has excluded farmers participation, but this loses the benefits of small-scale irrigation and is unnecessary. Practical ways are described below for professional staff to work with farmers effectively to produce farmer-managed irrigation schemes.

Small scale irrigation project cover both the improvement of traditional irrigational schemes and new developments to introduce small-scale irrigation on land which is not currently irrigated. Each project is assumed in this paper

to include a number of individual irrigation schemes (Smout, 1990).

The main aim of these projects is to improve farmer's production where water shortage is a major constraint, by investments in irrigation infrastructure which improve water availability at the field. In general these projects work with the existing land holdings and structure of power. However in some cases small-scale irrigation is used to bring new land under cultivation, which can then be allocated to village families. Small-scale irrigation may also be directed to benefit disadvantaged groups, for example the programmes of various non-governmental organisations in Bangladash, to provide landless groups with a tube well or low lift pumps so that they can sell irrigation water to farmers with land.

Tyem et al. (1993) explained that the introduction of irrigation in the Agricultural Development Project system dates back to the late seventies. That initial involvement of the Agricultural Development projects in Fadama development focused on upland water conservation through the controlling of surface run off in the wet season and included the provision of measures for improving the total soil infiltration and storage capacity. The Bida enclave Agricultural Development Project made very good impact on the farming community and increased production by developing and using some of the Fadama. The approach was mainly through informal irrigation systems which is cost effective and unlike formal irrigation schemes do not involve a large budget for providing extensive irrigation structures such as dams, pump houses, canals with water distribution and drainage systems.

Bida Agricultural Development Project developed simple irrigation schemes in fadama areas using controlled flooding by constructing water control structures, head dykes, two peripheral canals and a drain in the middle. Full farmers' participation was ensured in the design, construction, operation and maintenance of these schemes. Fifty percent of these schemes were constructed for year-round irrigated agriculture, with most farmers producing rice especially during the wet season.

In Kano, Bauchi and Sokoto Agricultural Development projects, irrigation in fadama started with bounding and

impounding run off, using residual moisture to produce a second crop and supplying farmers with 3" diesel pumps and hand pumps procured through the farmers' supply company. This approach effectively replaced the existing shaduf, and served areas that could not be covered by the River Basin Projects. The technical experts on these projects carried out investigations in 1982 to ascertain the existence of suitable shallow aquifers beneath the flood plains and established appropriate technologies for exploiting same. The low cost drilling technology and irrigation by small potable petrol engine pumps were thus introduced. The 3" diesel engine pumps and the low lift hand pumps were replaced by 2" and 3" petrol engine pumps keeping in view the portability, convenience, ease of operation and maintenance aspects. Provisions was then made for a similar type of development in Borno, Kaduna, Katsina States and redesign of multi State Agricultural Development project I and provision was made for pilot irrigation schemes in multi State Agricultural Development Project III States.

On potentials for Fadama Development Tyem et al. (1993) Stated that existing data, based on reports prepared by Water Resources Consultants who worked for various Agricultural Development Projects show that about 3.5 million ha of Nigeria's land mass are fadama lands out of which some 2 million ha can be put under small scale irrigation. These have been classified as irrigable Fadama. Fadama areas

classified as having potentials for full development have either perennial streams or rivers in their proximity and/or shallow ground water that can be exploited by simple technologies of drilling and wash boring. The following table provides a summary of this data.

TABLE 2.2

Potential Fadama lands in Agricultural Development Projects where studies have already been conducted.

STATE	Available Fadama land (ha.)	Potential irrigable Fadama (ha.)	Area by wash bores and tube wells (ha.)	Area by direct pumping (ha.)
Borno	489,300	439,300	277,620	211,680
Yobe	362,000	362,000	205,392	156,608
Plateau	166,000	158,000	70,000	88,000
Kwara/Kogi	255,700	255,700	218,600	37,100
Kano/Jigawa	163,000	132,700	26,000	106,000
Sokoto/Kebbi	400,000	164,000	140,000	24,000
Bauchi	235,000	181,000	71,000	110,000
Katsina	46,000	40,000	12,150	27,850
Niger	110,000	Studies are under way to classify these statistics		
Adamawa/Taraba	995,000			
Benue	298,000			
	3,520,000	1,782,000	1,020,762	761,238

Source: Tyem et al. (1993)
After
1. Staff Appraisal Report, National Fadama Development Project, 1992.

2. Ground water studies of respective States.

Note:

- Multi State Agricultural Development Project I States consist of: Abia, Akwa-Ibom, Anambra, Benue, Cross-River, Delta, Edo, Enugu, Imo, Ogun and Plateau.

- Multi State Agricultural Development Project II States are: Adamawa, Kwara, Kogi, Niger and Taraba.

- Multi State Agricultural Development Project III States are: Lagos, Ondo, Osun, Oyo and Rivers.

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The role played by the Agricultural Development Project System have made every State of this country to come to accept the fact that irrigation is potentially viable and necessary in all agro-ecological zones of Nigeria. Also, farmers' participation from all parts of the country in profit-oriented irrigated agriculture has been observed. The close liaison with the Federal Agricultural Coordinating Unit (FACU), led to a simple technology for exploiting shallow ground water by tube well drilling has been widely disseminated by the Agricultural Development Projects and adopted by the farmers. The 2" and 3" petrol engine driven pumps often used for constructing wash bores are also used in pumping water for irrigation purposes from these wells in addition to their uses in direct pumping from surface water sources.

Agricultural Development Project achievements can also be discussed in quantitative terms. It is on record that prior to the involvement of the Agricultural Development Projects in Fadama development in 1985 about 20,000 ha were under annual irrigation using the traditional system. The following table shows the hectarages developed as at the end of 1992 under different category of irrigation approaches.

TABLE 2.3

Irrigated area and washbores/Tube wells drilled in Middle and Northern zone States of Agricultural Development Systems (1985-92) Prior to the Creation of New States in 1991

STATE	Wash bores and Tube wells (ha.)	Lift Irrigation by direct pumping (ha.)	Diversion Flood control and other methods (ha.)	Total Hectare (ha.)
Bauchi	5,200	17,000	1,000	23,200
Benue	20	2,000	500	2,520
Borno	1550	17,500	3,050	22,100
Gongola	200	1,300	2,000	3,500
Kaduna	400	13,000	0*	13,400
Kano	5,700	56,000	4,000	65,700
Katsina	250	500	0	7500
Kwara	100	400	0	500
Niger	10	2,500	5,950	8,460
Plateau	290	11,800	1,000	13,090
Sokoto	6,300	19,000	500	25,800
Total	20,020	141,000	18,000	179,020

Source: Annual Report (1992)

Note:

1. Zero means the area under that particular type of irrigation is negligible.
2. These figures must have increased by now as a result of more irrigation agriculture.

2.2.7 National Fadama Development Project (NFDP)

The aim of the NFDP is to promote agricultural growth through conjunctive exploitation of surface and shallow aquifer water resources for small holder farm owned and managed small scale irrigation Development (Ayeni et al., 1993). Ayeni et al. (op. cit.) described NFDP as a programme of full cost recovery for irrigation pumps supplied to farmers and washbores and tube wells installed. The purpose is to ensure that farmers become conscious of the economics of operation and profitability of the venture. The economic rate of return from Fadama irrigation is also high (atleast 30 percent). However, the public and private sectors have not adequately responded to the demand (Bhatti, 1994).

Realising the need and importance of irrigation development in fadamas, the Federal Government of Nigeria (FGN) obtained a World Bank loan of U.S. $67.5 million equivalent to finance the National Fadama Development Project (Bhatti, 1994).

2.2.7.1 **Objectives and Coverage**

As stated by Bhatti (1994, p. 38) the broad aim of NFDP will be achieved by the following specific objectives:

(a) Improving infrastructure into and within the fadamas;

(b) Using improved but simple technology for development of shallow tube well;

(c) Privatising drilling activities and building the capacity of State and federal institutions in support of fadama development;

(d) Improving irrigation management through water users associations;

(e) Conducting aquifers studies and monitoring and upgrading irrigation technologies; and

(f) Undertaking environmental impact assessment for further expansion of irrigated agriculture.

The most interesting aspect of National Fadama Development will be undertaken through participation and financial contribution of fadama farmers. They will be paying the full cost incurred on wash boring/drilling and acquisition of pumps.

On the coverage of the National Fadama Development Project, the project would be implemented mainly in Jigawa, Kano, Kebbi, Sokoto and Bauchi States. They have pioneered fadama development under the earlier Bank funded Agricultural Development Projects under (ADPs). It would also begin fadama development in other eligible States. This effort must have

already started in those other States as they satisfy eligibility criteria and are ready for implementation.

The process of participatory irrigation management needs to be understood from the features of different management modes. Irrigation management systems fall broadly into three categories. Those in which principal management responsibility is exercised by the government or non governmental agencies with the farmers playing a subsidiary role are the agency managed systems; those in which most management activities are carried out and decisions are made by the farmers themselves with the government agencies providing periodic support are called farmer-managed system. A third category of irrigation management has just emerged and is called participatory irrigation management where both agency and farmers share the responsibility to fulfil different irrigation tasks (Ben-Musa et al., 1994: p. 2).

Irrigation management tasks are broadly grouped into

(a) Water use activities
(b) Control structure activities and
(c) Organisational activities.

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Water use activities relate to the application of water for agriculture purpose. The important water use activities are

(i) acquisition
(ii) allocation

(iii) distribution and

(iv) drainage

The control structure activities are considered to be

(i) design

(ii) construction

(iii) Operation and

(iv) maintenance

The other important area of irrigation management tasks are organisational activities which include

(i) decision-making

(ii) resource mobilization

(iii) communication and

(iv) conflict resolution.

It is the farmer-managed system of management that this work will be concerned with. The farmers are involved in day to day activities of irrigation management like water acquisition, water allocation, distribution, maintenance and operation, decision-making, resource mobilisation and conflict resolution. All these important activities are carried by the irrigators organisation. The role of the agency in such systems are regulatory activities like preserving water rights among the systems and provide assistance as and when it will be necessary.

Besides the farmer participation through Water Users associations in public sector irrigation systems under River Basin Developing Authorities, the traditional irrigation

systems were also identified for the participatory approach. The notable effort is seen in Agriculture Development Projects through Fadama Users Association (FUA) under World Bank funded Agriculture Development Project (ADPs).

As there is no legal provision regarding Fadama Users Associations to be enacted by the legislature/policy makers or the authority, there is a need for a strong lobby to convince the legislators/policy makers about the importance of the Fadama Users Association for better utilization of the irrigation infrastructure developed by the farmers and public investment.

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2.2.8 Federal Agricultural Co-ordinating Unit and Fadama Development

A major policy thrust of the Federal Agricultural Co-ordinating Unit (FACU), acting on behalf of the Federal Ministry of Agriculture, Water Resources and Rural Development (FMAWRRD), and indeed that of the ADPs which it oversees, is that of irrigation development through provision of incentives to private growers in line with government's privatization policy.

The RBDAs failure in operating large scale irrigation stemmed largely from the inadequate attention paid to user farmers in project formulation and implementation, this also formed part of the reason why the large-scale approach to irrigation development failed to make the expected impact.

Tyem and Umar (1994) stated that the following major areas of weakness in the large scale scheme approach among others led to the unsatisfactory performance of the RBDAS.

1. Lack of reasonable involvement of beneficiary farmers in project planning, design and execution;
2. The engineering complexity of the projects, requiring complex managerial skills which have been beyond the experiences and capabilities of the farmers and officials in the project areas;
3. Capital-intensive nature of the projects;
4. Little or no cost recovery after several years of operation.
5. Dependence on annual Federal subvention for project operation and maintenance.

Farmer's participation in project formulation and implementation (control over cropping, cultivation techniques, irrigation, harvesting and marketing) is vital for a successful irrigation project. In so far as farmers are expected to exercise control over their irrigated lands it is important that the types and levels of technology are appropriate; that is:

1. Techniques and equipment for water abstraction from surface and underground sources;
2. On-farm systems layout; and
3. Levels of skills or ability and capacity of farmers for operation and maintenance of the schemes.

These are the criteria used in preparing the National Fadama Development Project (NFDP).

As a policy, fadama small-scale irrigation development will be pursued through the NFDP. The project will be cost-effective and each State implementation agency shall ensure complete cost recovery to facilitate spatial coverage and economic sustainability. The scheme, though quite new in the ADPS looks promising because of the following factors.

1. Autonomy in the management - pump and land as well as tube well (if pumping is from ground water) belong to the individual farmer;
2. Simplicity of the technology;
3. Low cost of owning and operating a scheme and
4. Increased production and high returns.

2.2.8.1 The Role of FACU in Facilitating the Implementation of the National Fadama Development Project

The rapid spread of small-scale irrigation practices requires accurate assessment of the potential and appropriate exploitation techniques. It also requires property directed research and extension linkages for various types of small-scale irrigation and related farming practices, meeting tillage requirements, improved irrigation water management and upgrading of agronomic practices (Tyem and Umar, 1994).

Tyem and Umar (1994) further explained that in the past, rural roads constructed by ADPs were mainly on uplands. It has been established that one major constraint to fadama

development is accessibility from upland areas into Fadama and within fadama lands. This aspect will be tackled under provisions for fadama infrastructure (roads, drilling for ground water, marketing and storage facilities for fadama crops). Local Governments will be involved where relevant in the sustainability aspects of feeder roads in this arrangement. Given the independence of operation of these small-scale schemes (each farmer will own a pump and tube well and cultivate between 0.25 - 2 ha of Fadama land), one could easily construe disarray in farming activities, difficulty in monitoring and evaluation, socio-economic conflicts and impending risk to the environment. The following measures have been taken:

1. Formation of functional Fadama Users' Associations (FUAs) formally registered with appropriate authorities as cooperatives provides a measure of a security in issuing individual loans for equipment and working capital and in a reverse channel, is a financial organisation in managing debt repayments;
2. To deal with the possible threat to environment as a consequence of the disturbance of the ecosystems of these areas, Environmental Impact Assessment Report has been invoked as a necessary components of the project;
3. To ensure that farmers observe good production practices, linkages with relevant research institutes will be established to generate on a continuous basis, tested

improved technologies of water management, irrigation agronomy etc. For fadama farmers' adoption. This will improve farmers' output and will serve as second function of a risk management measure;

4. To ensure improved soil and water management techniques for use in irrigated fadama and appropriate cropping patterns, farmers and extension staff will be trained and NFDP will be implemented in tandem with the National Agricultural Technology Support Project (NATSP) for necessary extension support.

In preparing the project, due recognition was given to the existing constraints to Fadama development in the country. These include: (1) in adequate facilities and equipment, (2) credit, (3) Pastoralists-farmers conflict, (4) access into Fadama, and (5) applicable technologies.

Due recognition has also been accorded the anticipated impact of this project on the environment. Environmental protection is an issue that can no longer be taken for granted. The development of fadama through small-scale irrigation by ADPs is institutionally, financially and environmentally sustainable and will certainly contribute immensely to the efforts being made by the federal government to achieve the bold objectives enunciated in the nation's agricultural policy (Tyem and Umar, 1994).

2.2.9 Fadama Users Associations (FUAs)

Fadama Users Associations are being developed on the basis of free association among farmers with well defined aims and roles for servicing a common purpose of fadama farmers. These objectives can be fulfilled by working together rather than acting independently. The common purpose on which FUAs are established includes pooled purchase of drilling services; regulation of water use; maintenance of fadama infrastructure including roads, pumps and storage; and transport and marketing of outputs. They would function as independent organistions and would not receive any subvention from government (Bhatti, 1994).

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2.2.9.1 Functions of FUAs

Bhatti (1994, p. 39) further stated that the Fadama Users Associations are undertaking the following functions;

(a) Identify farmers interested in irrigation fadama land;
(b) Serve as a single contact point for services for fadama development;
(c) Recover from the users the cost of pumps and tube wells;
(d) Monitor the water resources; and
(e) Maintain Fadama infrastructure, such as roads.

The functions listed above indicate that Fadama Users Associations are going to play a pivotal role in the Fadama development project.

2.2.9.2 By-Laws of Fadama Users Associations (FUAs)

Bhatti (1994) explained that a very comprehensive set of by-laws has been developed for facilitating the smooth functioning of FUAs. These were developed after studying laws of on-going groups working in Nigeria. They also take into consideration the laws governing the general purpose cooperatives in Nigeria and also meet the criteria laid down by the Bank. FUAs are free to adopt, modify or change any of these by-laws to meet their specific needs. However, most of the FUAS prefer to follow these strictly for the purpose of uniformity.

2.2.9.3 Role of ADPs

Role of ADPs is to facilitate and provide assistance to fadama farmer in organisation and forming FUAs to implement the project in an efficient and cost effective manner. Fadama farmers do not have adequate cash to invest in small-scale irrigation and need medium to long term credit for drilling wells and buying pumps. ADPs will provide assistance in several ways. They will;

(a) finance irrigation development which involves drilling and installation of pumps and fully recover the cost from farmers and traders by using hire-purchase scheme on their own or by using banks as their agents;

(b) organise fadama farmers groups;

(c) provide credit liaison service and

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(d) contract cadastral survey of fadamas with the assistance of the State Department of Lands as a first step in the provision of a formal record of ownership (Bhatti, 1994).

2.2.9.4 Institutional Capacity of ADPs to Develop FUAs

The institutional set-up of the ADPs in the project States has been re-organised to establish fadama development units. These units have the qualified and experienced staff who were previously engaged in fadama development activities. The ADPs would involve the private sector, NGOs and cooperative departments with the objective of creating such capacity in them so that the ADPs could eventually phase out from this role. Fadama staff of ADPs are presently carrying out the following functions.

- Collecting a list of fadama farmers, along with a list of their landholdings.
- Conducting household surveys to find non-loan potential fadama farmers;
- Compiling data and presenting the results to Fadama farmers;
- Identifying problems and discussing them with fadama farmers to find solutions to identified problems;
- Testing the idea of forming FUA/Fadama farmers' cooperatives as a means of solving problems together;
- Adopting resolutions to form the society;
- Assisting in formulating the bye-laws;

- Determining demand, along with down payments from the members of the fadama farmers' cooperatives;
- Assisting with opening records books;
- Introducing pass books for members of FUAs;
- Opening bank accounts;
- Assisting in depositing shares, members' contribution savings and other money into the bank;
- Assisting with the preparation of individual and group loan plans;
- Planning for long-term and short-term credit to be available from the ADPs and the Bank;
- Disbursing loans in collaboration with the CFA (Cooperative Farmers Account), where it exists;
- Preparing repayment schedules and circulating at the time of disbursement;
- Attending weekly/Fortnightly and monthly meetings discuss problems and ensuring loan collection;
- Assisting members of the Fadama Farmers Cooperative Society (FFCS) to act as book keepers; and Registering the FUAs.

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2.2.9.5 **Progress Made in the Formation of FUAs**

The following table shows the progress so far made in the formation of FUAs and registering them as legal entities in the ADPs of the project States falling under FACU Regional Office, Kaduna as at October, 1993.

TABLE 2.4

Progress Made in the Formation of FUAs as at October, 1993

STATE	Number of FUAs Formed (October, 1993)
Kano	130
Jigawa	105
Sokoto	196
Kebbi	150
Katsina	30
Kaduna	15

Source: Bhatti, 1994

Katsina and Kaduna States were not initially part of the project but the progress made in forming FUAs will allow them become part of the project. These figures must have increased as more FUAs were created in the various States between October, 1993 and now.

CHAPTER THREE

THE SETTING OF THE STUDY AREA

3.1 LOCATION OF THE STUDY AREA

Kano State stretches from Latitude $10^{0}30'$N 00'N. Thus, sharing a common border with Katsina State to the West, Kaduna State to the South, Jigawa State to the North and Bauchi State to the east (See figure 3.1).

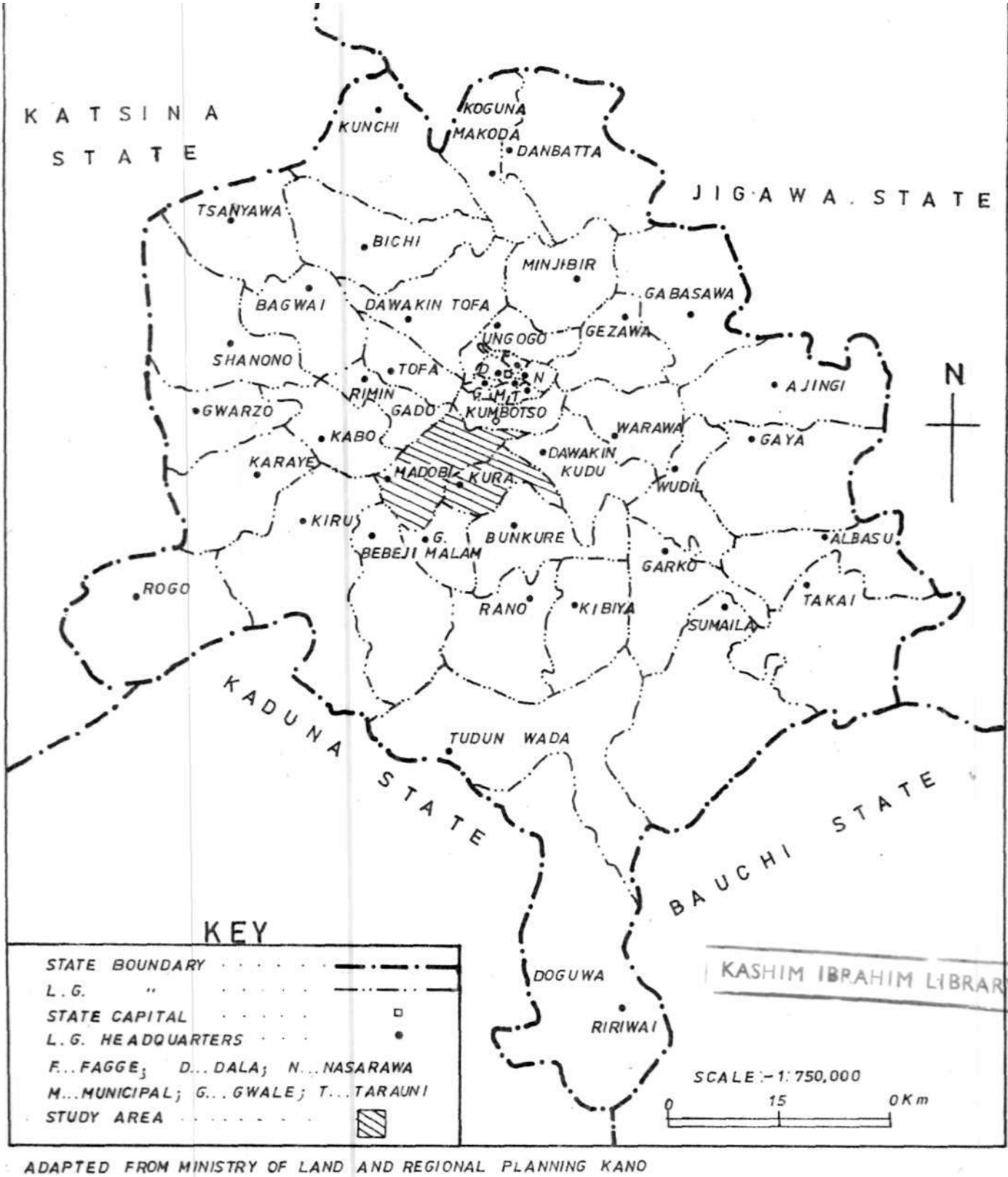
Kano State is divided into forty four local government areas. Kura local government area which is one of the local government areas where this thesis is about was created in 1987.

Kura Local Government Area is bounded by Dawakin Kudu Local Government Area to the South, Madobi Local Government Area to the West and Bunkure Local Government Area to the East.

Kura Local Government Council headquarters is located some 36km South of Kano along Kano - Kaduna dual carriage express way. Kura is one of the fourteen councils constituting an agro ecological block, classified under the Kano State Agricultural and Rural Development Authority (KNARDA) nomenclature as zone one. The local government area is the heart of irrigated agriculture in the State. It has an area of 330Km^2, of which 45 percent is covered with irrigation scheme (Hadejia River Basin Development Authority - HRBDA) and almost 15 percent covered by rivers and valleys. The people of the area are predominantly peasant farmers and apart from

irrigation farming they also embarked on rainfed farming. Some of them engages in some retail businesses in addition to farm activities.

On the other hand, Madobi Local Government Area was created out of the former Kura local Government Area in 1991. It is bounded by Kumbotso Local Government Area to the North, Garun Mallam Local Government Area to the South, Kabo and Rimin Gado Local Government Areas to the West. It also belong to KNARDA agro ecological block, classified under nomenclature zone one. The local government headquarters is situated about thirty two kilometers North West of Kano City. The people are mainly peasant farmers who engages in rain fed farming and irrigated agriculture with few of them transacting retail businesses in addition to their farm work activities.



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FIG. 3·1 KANO STATE SHOWING THE STUDY AREA

TABLE 3.1

KNARDA Agro Ecological Zones

Zone	Local Government Area
ONE	Rano, Kibiya, Bunkure, Kura, Madobi, Garun Malam, Karaye, Rogo, Gwarzo, Kiru, Bebeji, Tudun Wada, Doguwa, Kumbotso.
TWO	Danbatta, Minjibir, Ungogo, Tofa, Dala, Municipal, Nasarawa, Gwale, Fagge, Tarauni, Dawakin Tofa, Rimin Gado, Bagwai, Bichi, Tsanyawa, Kunchi, Kabo, Shanono, Makoda.
THREE	Gaya, Albasu, Ajingi, Takai, Sumaila, Wudil, Garko, Dawakin Kudu, Warawa, Gezawa, Gabasawa.

Similarly Figure 3.2 contained the details of KNARDA Agro ecological zones as shown in the map.



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FIG. 3·2 KNARDA AGRO ECOLOGICAL ZONES, KANO STATE

3.2 PHYSICAL SETTING

3.2.1 Relief and Drainage

The relief of the area is relatively simple, comprising gently undulating plains on broad convex interfluves whose general heights are between 431.3 metres (1,415 feet) and 503 metres (1,650 feet) above sea level. The direction of slope is averagely north - east wards, implying that the highest portions of the district lie in the South West where the relief is generally above 488 metres (1,600 feet) Baba, 1975; p. 52). Steep gradients occur along the river banks where the effect of gullying is felt most, and where resistant granitic outcrops are occasionally truncated.

Drainage-wise, the area belongs to the Chad -inland drainage system. The two major rivers are the Kano and the Chalawa. Both rivers are the major tributaries of the Hadejia River in turn a major river of the Chad-inland drainage system. Drainage into these major rivers at various points are numerous seasonal streams of relatively local origins and with characteristically narrow, shallow channels. The regime of the rivers is almost completely dependent on the rainfall regime.

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3.2.2 Climate

The research environment is a sudanic eco climatic zone. This is transitional belt between the sahelian region to the North and the humid savannah to the south. The zone generally

has only one rainy season of two and half to about five months.

The climate is influenced by the continental tropical dry air masses and the tropical Maritime (MT) equatorial air-masses. The two air masses converge in the inter-tropical convergence zone (ITCZ) which moves along a South - North axis over the year. A humid condition prevails South of the ITCZ and a dry season north of it.

The dry season is relatively long stretching from September to May in a normal year; November - February (sometimes up to March) is the harmattan period when a cool, and dusty wind blows over the zone from the Sahara Desert. The rainy season (May - September), is relatively short. Rain fall is not only scanty but varies markedly from the south to the north of the zone. The rains increases from the beginning until a single maximum is attained in the August which is followed with a decline in September and abrupt end in October. The peak period is therefore more towards the end of the season.

For agriculture, the most significant aspects of the rainfall in this region are its yearly and monthly variations. The climatic conditions presents an agricultural system which is completely dependent on meteoric water supply. Sometimes irregular rains on set led farmers to replant the first crops once or twice before the rains become effective and reliable.

Such replanting amounts to wastage of seeds which should have otherwise been consumed at a time most needed; wastage of labour, which should have been invested in profitable off farm activities; and, in some cases, enhancing of rural indebtedness either because the farmers have to borrow money or purchase seeds for replanting, or because they have used up all their personal food reserves as seeds and must now subsist longer on borrowed money.

3.2.3 **Vegetation**

The vegetation of this environment that described the area of the study lies in the Sudan savanna zone, a designation characterised by the presence of short hairs covered trees with a well developed grass layer of andropogoneae.

Auta et al. (1987) observed that this zone could contain other types of vegetation. That the long history of farming occupation in the area has led to a major impact upon the plant communities which has hardly any natural vegetation anymore.

The Fadama Vegetation of the Sudan zone indicates that even the most favourable sites do not carry true forest species but the vegetation along water courses and in moist depressions is much denser than the surrounding savannah, some times forming a closed canopy with many woody climbers. Else where, tall grasses separate large trees and thickets. There

is very little relatively undisturbed vegetation in the Sudan zone, particularly on the river terrace sites.

Vetiveria nigritana grassland occupies the spill plains and fossil river channels and is the main source of pasture for the cattle in the dry season. A narrow zone of Andropogon spp. grassland separates this from the Ziziphus mucronata scrub of this fossile sand dunes and high point bars. Oryza barthii replaces vetiveria on clayey soils which are deeply flooded. Echinochloa stagnina swamp occurs round the lakes and in the perennial swamps, often as a floating mat. Scattered stands of dum palm and Dicspyros mespiliformis occur (Turner, 1977).

On the value of plant indicators, certain plants can be used to distinguish areas best suited to particular crops and to indicate the most suitable sites for sinking wells. That for example, Terminalia macroptera with occasional Nauclea latifolia and Gardenia erubescens indicated soils which became water logged in the wet season and on which yields of cotton and guinea corn are low. An association of Tamarindus indica, Pseudocedrala Kotshyi, Gardenia erubescens, and G. ternifolia, found in depressions or on flat ground, and with similar soils to the first association, indicated partial pan beneath the surface. These areas are also water logged in the wet season but could be successfully farmed once the hard work of initial hoeing was completed. Ficus gnaphalocarpa indicates that water will be found 6 - 9m below the surface, and Boswellia

dalziellii shows that there is no hope of finding water as it always grows above rock. The presence of Syzigium guineense in the stream bed usually indicates the presence of permanent water.

This suggests that certain plant species or communities which only tolerate a fairly narrow range of conditions can be very valuable indicators of soil and hydrological conditions in the Fadamas and that development of these ideas may lead to a considerable saving in time and expenditures. Such knowledge could only otherwise be obtained by careful measurement of water table heights throughout the year.

Adams and Hollis (1993) explained that the flood plain also supports grazing of very large numbers of Fulani livestock, particularly cattle, which are brought in from North and South in the dry season. The importance of the fadamas as a source of dry season grazing was well documented by Turner, indicating that they are one of the main sources of fodder, together with crop residues and browing of trees and shrubs.

The main grass species used for fodder in the fadamas are Echinochloa spp., Orya barthii and Vetiveria nigritana in the wettest parts, Byparrhenia spp. in the intermediate areas and Andropogon gayanus on the leaves, although only the young shoots of the latter are palatable to cattle. The leaves of Elephant grass (Tennisetum purpurcum) are good fodder but not

the stalks, and Andropogon canaticulatus and Brachiari spp. which are found in clay areas are useful fodder.

The nutritive value of grasses is much less in the tropics than in temperate areas and is greatest in the early stages of growth. In the upland grasses it declines rapidly after the first two months of the rainy season and the perennial fadama grasses are therefore particularly valuable in providing nutrition during the rest of the year. In the wet season the fadamas which are flooded cannot be used for grazing.

The extent of irrigation has greatly increased over the 1980s, largely as a result of the advent of small petrol-powered pumps and the ban on the importation of wheat in 1988. As the use of small pumps spreads, conflicts began to emerge between farmers and pastoralists, and between small and large farmers for access to land.

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3.2.4 Temperatures

Baba (1975, pp. 50 - 51) observed that periods of peak temperatures do not correspond with the period of maximum rainfall. That as from the onset of the rains in May, the mean monthly temperatures tend to decline, reaching the wet season minimum in August. This decline can be attributed to the increasing interference of the atmosphere with isolation as cloudiness increases. The annual range of 19^0F is

consistent with the conditions which generally operate at this latitude and continental location.

The relatively low temperatures between November and March are attributed to the cool, dry harmattan winds which are the prevailing winds during these months. High diurnal ranges are, never the less, maintained throughout these dry months due to the low heat retentivity of the atmosphere then.

The contribution of temperature to agricultural problems in this environment is more indirect than direct, for example the rapid rate of evapotranspiration through which water is soon lost to the atmosphere either by evaporation or through the biotic process of transpiration. The effect of this is repeatedly seen in Kano area each year at the beginning of the wet season when high temperatures, in collaboration with intense insolation, frequent winds and low Relative Humidity quickly reduce the soil moisture to beyond or almost beyond wilting point unless rainfalls in quick succession, which rarely happens.

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3.2.5 Soils

The area falls within the zone of inceptisols (Brown and Reddish Brown) soils and Lithosols of Arid and Semi Arid Regions. This zone stretches south eastward, astrides Kano, from Katsina in the north-west.

Baba (1975) explained further that formed under arid and semi-arid conditions, the soils of this zone are believed to

have been developed on wind transported sand tunes, although derived from the granitic basement complex which underlies the whole region. Due to the relative sparsity of vegetation the organic contents of the soils are generally low, but well distributed throughout the profiles. There is a high proportion of clay and silt, resulting probably from the relatively low rate of leaching. This general description conceals a wide range of micro soil variations which can be observed at local level. This variability often has its impact to make on agriculture, since naturally soils vary in their suitability for agriculture and for specific crops. Thus the variable nature of the soils carries with it the consequence of variable land productivity.

The soils of the Fadama are hydromorphic, mostly dark grey clay with poor drainage which have been formed in alluvial material and some variation in texture can therefore be expected. The soil here is fairly rich in nutrients and have a good water supply which persists in the dry season. Many parts of the Fadama are used for the cultivation of sugar cane and vegetables.

Turner (1977, p. 139) stated that the Fadamas have several uses. That a few fadamas remain completely unused, and others are used only occasionally for hunting, gathering and fishing, but the majority are used for grazing or for growing crops at varying levels of technology. This indicates

that Fadama is as well very important for livestock development.

3.3 HUMAN SETTING

3.3.1 Traditional Occupation

The main traditional occupation in Kura and Madobi Local Government Areas is agriculture in forms of crop production and animal husbandry. Farming is dominated by a grain economy, Sorghum, Millet, maize, cowpeas and upland and lowland rice are mainly planted for food. Groundnuts, sugar cane, vegetables and fruits among other are grown for commercial purposes.

There is a broad ethnic specialisation in this region, with farming dominated by the Hausas, while cattle rearing is largely in the hands of the Fulanis. Many Hausa peasants also own cattles for rearing and draught work while some Fulanis began to become sedentary. The cattle are fed with stalks of Sorghum, Millet, maize as well as cowpeas bran in the drier months of November to April or May. In the rainy season the cattle are well reared such that, the farmers are not disturb. The dominant types of cattle here are white and Red Fulani and some Bokoloji with some Gudali. Gudali is not commonly transhumance to and from the south as such they are fed on dry stalks and bran in the dry months. The cattle beef is sold and eaten. The milk produced from the cows is sold by the

Fulani women and the proceeds are used to purchase household needs such as salts, sugar, vegetable oil etc.

Other livestock, such as goat and sheep also exists in the area of the study. These livestock wander freely in the field for feed/fodder and their skins as well as that of the cattle are used for leather works and the rams' skin is also used as a prayer mat. The rams are of high value for sacrifice purposes during the Id-El-Kabir festival. The bulk of these livestock engage in cattle, sheep, ram and goat trade with the southern part of Nigeria.

Other form of occupation of the people of this areas is retail trading which a portion of the population engages in, in addition to their farming activities as earlier mentioned.

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3.3.2 Population

Figures from 1991 census shows that Kano State has a population of 5,632,040 people (National Population Commission, 1991). Former Kura Local Government area which now comprise present Kura, Madobi and Garun Mallam Local Government areas have a population of 229,548.00 people. The greater part of this population reside in the rural areas of the Local Government areas especially near the Fadama areas and along Kano river tributaries. The adults formed the working population which caters for the children meaning the population of those between the ages of one to fifteen years group and the aged who are over 60 years, the group that

formed the lowest population. Immigrant farmers who are attracted by better condition of living in this area formed another important aspect of the population. They mostly cluster around the villages near the fadama areas. Male migrants move out seasonally to bigger towns to work as labourers. This is caused mainly by poor-harvest at home and excessive flooding which normally lead to destruction and losses of crops, livestock and farmlands. Table 3.2, gives the details of the population of Kano State as at 1991.

TABLE 3.2
1991 Population of Kano State by Sex

Local Government	Male	Female	Total
Albasu	55,428	56,080	111,508
Bagwai	48,902	51,922	100,824
Bebeji	132,637	132,131	264,768
Bichi	84,484	87,566	172,050
Bunkure	57,695	61,156	118,851
Dala	271,863	224,534	496,397
Danbatta	98,564	106,167	204,731
Dawakin Kudu	116,022	121,514	237,536
Dawakin Tofa	71,958	75,850	147,808
Gabasawa	72,058	75,321	147,377
Gaya	112,044	115,388	227,432
Gezawa	75,785	76,407	149,192
Gwarzo	60,374	61,039	121,413
Kabo	41,449	44,750	86,199
Kano	218,363	185,315	403,678
Karaye	115,707	115,535	231,242
Kumbotso	85,174	78,105	163,279
Kura	112,284	115,264	229,548
Minjibir	62,950	66,956	129,906
Nassarawa	259,741	204,484	464,225
Rano	75,868	76,464	154,332
Rimin Gado	58,450	62,889	121,339
Shanono	40,843	42,429	83,277
Sumaila	79,886	79,762	159,648
Takai	68,723	68,236	136,959
Tsanyawa	73,868	60,794	154,662
Tudun Wada	114,163	109,457	223,620
Ungogo	81,956	80,631	162,587
Wudil	114,487	115,170	229,657
Total	2,858,724	2,773,316	5,632,040

Source: Annual Abstract of Statistics, 1996 Edition, Federal Office of Statistics, Lagos.

Note: Figures are not available for the new Local Governments created in 1996.

3.3.3 Social Organisation

Like in any other parts of Kano State, the head of the household is called Maigida. The right to land is entrusted to the family. This family land is called Gandu. The population is predominantly moslem, having the same language and cultural values and norms. The mode of production is mainly subsistence with little room for commercial farming which employs the use of crude implements still. The head of the ward is called Mai Unguwa and he is ably assisted by his deputies in performing such functions like tax collection, information bearing customary court hearings. The head of the village is called Dagaci and he is assisted by the ward heads (Mai Unguwas) in running the affairs of the community.

3.4 FADAMA SITES

The fadama sites where this study is being carried out are located in the following villages: Gundutse, Kauran Mata and Kanwa. Each of these sites are described briefly.

3.4.1 Gundutse

Gundutse is a village under Kura Local Government Council. It is situated along the bank of Kano River stretching to a distance of almost two kilometres. Therefore, the adjacent flood plain coupled with vast area of high water table (almost 300 hectares) provide the inhabitants with fertile land and sufficient supply of water for farming all

year round (rainfed and irrigated production). Thus depending on the experience of farmer in the area, cropping intensity is increased to 200 - 300 percent. The estimated farming population of the village as at 1991 National census was 4,228 (National Population Commission, Lagos). Farmers grow different types of cash crops (sugar cane, vegetables, maize for cobs, garlic and rice) in the Fadama, while at its periphery particularly near their settlements, food crop (mainly sorghum) is grown under rainfed condition only. From random interviews with farmers, it was gathered that Fadama has been progressively cultivated for over 70 years. Unprecedented expansion in cropping area was seen from 1983 - 1996. The expansion in cropping area was, facilitated with the introduction of tube well/wash bore technology, improved crop varieties, agro-chemicals, agricultural extension advice and farmer group approach under both the erstwhile KNARDA agricultural programmes and National Fadama Development Project/National Agricultural Technology Support projects.

3.4.2 Kauran Mata

Kauran Mata Fadama is one of the most extensive flood plain adjacent to river Chalawa in Madobi Local Government area. The size of the Fadama is 180 hectares and has an average holding size of 0.5 hectares, it is cultivated all the year round with cash crops grown during dry season. The

estimated farming population as at 1991 National census stood at 2,092 (Nationation Population Commission, Lagos)

3.4.3 Kanwa

The Fadama at Kanwa is also located in Madobi Local Government area. It is situated near Kauran Mata Fadama area. It has been under cultivation all year round with cash crops being predominantly grown in the fadama area. The estimated farming population of Kanwa village as at 1991 census stood at 2,832 (National Population Commission, Lagos).

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

4.1.1 Sex Distribution

Field study results have shown that all the respondents were males. Women were not considered in this work because the target group were male fadama farmers involved in the Fadama Users Associations, although, they (women) assist their husbands on the farm through family labour jobs particularly at harvesting and threshing operations.

4.1.2 Age Distribution

Age distribution in most rural economies determines to a large extent the sharing of responsibilities. Children within the 8 - 18 years category are engaged mostly in sowing, weeding, watering, harvesting, bird scaring and so on. The older men fell between the 19 - 60 years and are mostly household men owning farm lands. Their responsibilities include caring for the young and then very old ones who most probably are 60 years and above.

Additionally, age distribution also determines agricultural productivity. This is because physical fitness apart, experience gained overtime by men in the older category determines the level of understanding the economics, social and climatic parameters governing farming activities than

relatively younger farmer. Such qualities are often manifested in their managerial ability on the farm.

The age dsitribution of the sampled respondents was explained in table 4.1 below.

TABLE 4.1

AGE DISTRIBUTION OF SAMPLED RESPONDENTS

Age Group	No. of Respondents	Percentage
15 - 20	0	0.00
21 - 25	6	2.67
26 - 30	47	20.89
31 - 35	36	16.00
36 - 40	70	31.11
41 - 45	21	9.33
46 - 50	18	8.00
51 - 55	3	1.34
56 - 60	8	3.56
61 - 65	10	4.44
66 - 70	4	1.78
71 - 75	1	0.44
76 - 80	1	0.44
Total	225	100.00

Source: Field Work, 1998.

Average age of the respondents was 38.85 years.

Table 4.1 showed that 31.11% of the sampled respondents belonged to 36 - 40 years age group and are the majority followed by 20.89% which represented 26 - 30 years age group. Similarly 9.33% representing 41 - 45 years age group came next while 8.00% for 46 - 50 years age group follow. Additionally, 4.44% of the sampled respondents belonged to 61 - 65 years while 3.56% of the respondents represented 56 - 60 years old and was followed by 2.67% for 21 - 25 year old. Another 1.78% of the respondents belonged to 66 - 70 year age group while 1.34% of the respondents fell within 51 - 55 years old. Lastly 0.44% of the respondents belonged to 71 - 75 year age group and another 0.44% of the sampled respondents represented 76 - 80 years sage group. With an average age of 38.85 years, this showed that the youths dominated the sampled respondents.

4.1.3 Marital Status

The marital status of the respondents in the 15 Fadama Users Associations showed that 92.89% of them were married and only 7.11% are single. This indicated the importance attached to marriage institution in the area of the study which also is in conformity with the culture, tradition and religion of the people there.

4.1.4 Household Size

In most rural economy of third world countries, especially Nigeria, size of family plays important role in determining household sizes. This is because, the family constitutes the basis of labour supply for most rural farmers. The size of family is also some times used to determine the wealthy farmer.

In this research work, the size of family was examined to determine wealth differentials and the number of persons available for farm labour in the fifteen Fadama User Associations. The average household size in the area of the study is 3.63 person per household ranging from 1 to 7 and above. This showed that the members of the Fadama Users Associations are able to supplement their work force with hired labour as a result of improved earnings and insufficient family labour and this indicates that the farmers in the Fadama Users Associations are some how better off.

TABLE 4.2

HOUSEHOLD SIZE OF THE SAMPLED RESPONDENTS

Household Size	No. of Respondents	Percentage
1 - 3	125	55.56
4 - 7	89	39.56
Above 7	11	4.88
Total	225	100.00

Source: Field Work, 1998

Table 4.2 shows that 55.56% of the respondents have household sizes of 1 - 3, while 39.56% of the respondents have household sizes ranging from 4 - 7 and only 4.89% of them have household size of over 7.

4.1.5 **Literacy Level**

Literacy level is often used as one of the many social and economic indicator to ascertain the state of development in an economy. It is undoubtly agreed that it is the human resources of a nation which is largely responsible for its overall economic and social development. To make effective use of these human resources, it is very necessary to use education to broaden the knowledge, scope and understanding of the people. This is only possible through orienting the educational system towards the real and actual requirement and aspirations of the people.

In rural areas, education can to a large extent enhance the farmers' ability to make sound management decision. Most research works often use educational attainment of farmers to quantify their managerial ability, as a good farm manager could be able to predict or forecast future yields, prices and costs to a certain degree of accuracy.

In developing countries like Nigeria, literacy level is very low and this often have a negative effect on the productive capacity of the people.

TABLE 4.3

LITERACY LEVEL OF SAMPLED RESPONDENTS

Literacy Level	No. of Respondents	Percentage
No formal Education (Koranic and Adult)	88	39.11
Primary Education	81	36.00
Secondary Education	30	13.33
Technical/Tertiary Education	22	9.78
University Education	4	1.78
Total	225	100.00

Source: Field Work, 1998

Table 4.3 shows that 39.11% of the respondents have no formal education. Some 36.00% of the respondents have primary school eduction while 13.33% have secondary school

education. Those who have Technical Education accounted for 9.78% of the literacy level of the sampled respondents. Only 1.78 percent of the respondents have university education. The implication of the rsult of literacy level is a general low level of education of the sampled respondents which could effect their farming and associations activities.

4.1.6 Land Acquisition

The Fadama Users Associations members practise both irrigated and rainfed farming and land is of great importance to them. This research explores the various means through which the sampled respondents acquired their land for fadama farming. The following table, that is table 4.4 gives details of the mode of land acquisition of the sampled respondents.

TABLE 4.4

FORM OF LAND ACQUISITION

Type of Acquisition	No. of Respondents	Percentage
Inheritance	168	74.67
Purchase	42	18.66
Rentage	15	6.67
Total	225	100.00

Source: Field Work, 1998

Table 4.4 showed that there are 3 main types of land acquisition of which inheritance recorded 74.67 percent while

purchase has 18.66% and rentage scored only 6.67%. This showed that majority of the sampled respondents farm on inherited farm land fadama. Those who work on purchased land recorded 18.66% indicating that, this is not a common practice but could be due to either death of the original land owners or current hard economic situation. The mere scoring of only 6.67% by rentage explained the non dominance of this practice in the area of the study.

4.1.7 Land Holding

Land holding is also referred to as farm size and is defined as "unit agricultural production comprising all the land used completely or partly for agricultural purposes and all livestock kept and operated under the management of an individual or group without regard to ownership" (Casley and Lury, 1982: 201 - 205).

In a typical rural Nigeria, size of farm holding depends on the population of the areas. Previous research findings on farm size, have shown that in the Eastern part of Nigeria and Kano close settled zone, holdings are small when compared with the North Eastern and North Western parts of the country with exception of the Sokoto closed settled zone simply because these areas have high population density. Other determinant of size of farm is financial background and availability of labour to maintain the holdings.

TABLE 4.5

LAND HOLDINGS OF SAMPLED RESPONDENTS

Farm Size (ha.)	No. of Respondents	Percentage
0.1 - 0.4	109	48.44
0.5 - 0.9	62	27.56
1.0 - 1.4	30	13.33
1.5 - 1.9	17	7.56
2.0 and above	7	3.11
Total	225	100.00

Source: Field Work, 1998

Average = 0.66 hectares.

In the study area, the average farm size is 0.66 ha while farm holdings ranges from 0.1ha to over 2 ha. Family labour and hired labour are predominantly used to work these farm holdings. This seems to be acceptable especially the average farm size of 0.66 ha as previous research work on fadama indicated 0.56 ha as the average fadama farm holding (Kolawole, 1990). Possession of over 2 ha land holding in fadama area is normally rare due to it's value and distribution pattern.

Field results have shown that 48.44% of the respondents possessed 0.1 - 0.4 ha holding while 27.56% had 0.5 - 0.9 ha and 13.33% owned 1.0 - 1.4 ha. The remaining 7.56% of the respondents accounted for 2.0 and above ha holding.

4.1.8 Crops Planted by the Respondents in Fadama Dry Season Farming

The types of crops planted by the sampled respondents during dry season irrigation farming period includes maize, wheat, rice, sugar cane, onion, garlic, tomatoes, peppers and vegetables. This is explained in the following table.

TABLE 4.6

TYPES OF CROPS PLANTED BY SAMPLED RESPONDENTS

Crops	No. of Respondents	Percentage
Peppers	160	71.11
Onion	158	70.22
Sugar cane	149	66.22
Tomatoes	127	56.44
Vegetables	109	48.44
Maize	88	39.11
Rice	26	11.56
Garlic	24	10.67
Wheat	4	1.78
Total		

Source: Field Work, 1998

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Field results have shown that 71.11% of the respondents planted peppers while 70.22% sampled respondents planted onion. This indicated that more than two-thirds of the respondents either planted peppers or onion. The situation may

be due to earnings realised from these crops in the previous seasons. Sugar cane and tomatoes recorded 66.22% and 56.44% respectively. They were followed by vegetables which score 48.44%. The implication here is that two-third of the sampled respondents planted sugar cane while about half of them planted either tomatoes or vegetables. Maize recorded 39.11% while rice and garlic scored 11.56% and 10.67% respectively thus, that, not less than one-third of the sampled respondents planted maize. About one-tenth of the respondents have planted either rice or garlic. Wheat only scored 1.78%. This indicate that wheat is no more a major grown crop in the area of the study. Reasons that could be adduced to this includes high cost of production, fuel scarcity and shortage of farm inputs particularly improved seeds and fertilizers.

4.1.9 **Reasons for Producing These Crops**

Fadama crops are generally grown for profitability or rather commercial purpose rather than due to easy and cheap production as well as higher output per unit area and use for food only. Table 4.7 summarises the reasons given for growing crops in table 4.6.

TABLE 4.7

REASONS FOR PRODUCING THESE CROPS

Reasons	No. of Respondents	Percentage
It is more profitable	170	75.56
Easy and cheap to produce	35	15.56
Give higher output per unit area	15	6.66
Used only for food	5	2.22
Total	225	100.00

Source: Field Work, 1998

Reasons given by the sampled respondents for planting the crops in table 4.6 showed that 75.56% of the sampled respondents gave profitability as their reasons for planting these crops while 15.56% gave easy and cheap production costs as their reason and just 2.22% indicated their reason as used only for food.

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4.1.10 **Source and Types of Seed Variety**

The closure of many government sales outlets controlled by the Kano State Agriculutral supply company with the remaining few ones giving skeletal services to the farmers led to a situation where sampled respondents used mainly previous harvests as their source of seeds.

TABLE 4.8

SOURCE AND TYPES OF SEEDS VARIETIES

Source of Seeds and Varieties	No. of Respondents	Percentage
Previous harvest	182	80.89
Market-improved varieties	43	19.11
Government sales outlets	0	00.00
Total	225	100.00

Source: Field Work, 1998

Field results shown in table 4.8 indicated that 80.89% of the sampled respondents used previous harvests as their main source of seeds while 19.11% used improved market source variety of seeds.

4.1.11 **Fertilizer Usage**

A great number of the Fadama Users Associations' members are familiar with the use of both organic and chemical fertilizers and have recognised their value and importance. Only few of them used organic or chemical fertilizers alone which could be due to scarcity or high cost of chemical fertilizers or both.

TABLE 4.9

FERTILIZER USE

Fertilizer Type	No. of Respondents	Percentage
Organic fertilizer	14	6.22
Chemical/inorganic fertilizer	26	11.56
Both organic and inorganic fertilizer	160	71.11
No response	25	11.11
Total	225	100.00

Source: Field Work, 1998

The sampled respondents' responses on fertilizer use indicated that 71.11% of them use both organic/natural fertilizer and artificial/chemical fertilizer in their farming activities while 11.56 and 11.11 percents rspondended in favour of using chemical/artificial fertilizer only and no response respectively. Only 6.22% of the sampled respondents used only organic manure/fertilizer.

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4.2 PRODUCTION OPERATIONS

4.2.1 Stage of Fertilizer Application and it's Effectiveness

On fertilizer application majority of the sampled respondents applied fertilizer before and after planting while some of them applied fertilizer after planting with remaining respondents applying it before planting.

Fertilizer application and effectiveness is discussed in tables 4.10a and 4.10b below.

TABLE 4.10a

STAGES OF FERTILIZER APPLICATION

Stage of Application	No. of Respondents	Percentage
Before planting	14	6.22
After planting	84	37.33
Before and After planting	127	56.45
Total	225	100.00

Source: Field Work, 1998

Field results showed that 56.45% of the sampled respondents applied fertilizer before and after planting while 37.33% applied fertilizer after planting only and 6.22% applied fertilizer before planting only. This showed that most of the respondents applied fertilizer before and after planting, thus indicating the importance of this practice.

TABLE 4.10b

EFFECTIVENESS OF FERTILIZER APPLICATION

Effectiveness	No. of Respondents	Percentage
Very effective	165	73.34
Effective	59	26.22
Not effective	1	0.44
Total	225	100.00

Source: Field Work, 1998

On fertilizer application effectiveness, 73.34% said it was very effective while 26.22% said it was effective and only 0.44% said it was not effective which may be due to quality or composition of the type of fertilizer used.

4.2.2 **Source of Fertilizer**

Fertilizer from Government sales outlet is hard to come by. Therefore the respondents resorted to purchase from the open market. Table 4.11 below provide information on source of fertilizer.

TABLE 4.11

SOURCE OF FERTILIZER

Fertilizer Source	No. of Respondents	Percentage
Market	215	95.55
Government Sales outlet	10	4.45
Total	225	100.00

Source: Field Work, 1998

Findings on the source of fertilizer has shown that 95.55% of the sampled respondents purchased their fertilizer from the open market while only 4.45% bought their fertilizer from the government sales outlet.

4.2.3 **Knowledge of Fertilizer Use**

The agricultural extension agents have contributed much to the knowledge of use of fertilizer to the Fadama Users Associations members. Results on first knowledge of fertilizer use showed that agricultural extension agents played a major role in educating the respondents on fertilizer use. Detaills on respondents first knowledge of fertilizer use are discussed in table 4.12 below.

TABLE 4.12

RESPONDENTS' FIRST KNOWLEDGE OF FERTILIZER USE

First knowledge of Fertilizer Use	No. of Respondents	Percentage
Agric Extension Agent	188	83.66
Neigbour	22	9.78
Relatives	12	5.33
Friends	3	1.33
Total	225	100.00

Source: Field Work, 1998

Results on first knowledge of fertilizer use indicated that 83.66% of the sampled respondents first know about fertilizer use through agricultural extension agents. Results further revealed that 9.78% of the respondents know how to use fertilizer through Neighbours. Another 5.33% of the sampled respondents know of fertilizer use through relatives and 1.33% of the respondents learnt of fertilizer use through friends.

4.2.4 **Problems Associated with Fertilizer Use**

Three major problems were indenfied with fertilizer usage. They include inadequacy, high cost and toxicity. This was discussed in the preceeding table i.e. table 4.13.

TABLE 4.13

PROBLEMS AFFECTING FERTILIZER USAGE

Problem	No. of Respondents	Percentage
Scarcity	135	60.00
High cost	63	28.00
Toxicity	27	12.00
Total	225	100.00

Source: Field Work, 1998

Inadequacy or scarcity recorded 60.00% of the sampled respondents' replies indicating that nearly two third of the sampled respondents had problem of fertilizer shortage. This was followed by high cost of fertilizer scoring 28.00% while toxicity recorded 12.00%. The implication here is that about one-third of the sampled respondents complained of fertilizer high cost while about one-tenth of them had problem with toxicity.

4.2.5 **Disease and Pest Control Measures**

In an effort to find ways of boosting Fadama Users Associations food crops production capacity, diseases and pests control measures taken against diseases and pest menances were also looked into. Control measures taken in combating diseases and pests menances inncluded chemical control and cultural control. Responses in respect of

diseases and pests problems and control measures are discussed in tables 4.14a and 4.14b.

TABLE 4.14a

DISEASES AND PEST PROBLEMS

Disease-Pest incidence	No. of Respondents	Percentage
There is problem	160	71.11
No problem	65	28.89
Total	225	100.00

Source: Field Work, 1998

Investigation has shown that 71.11% of the sampled respondents have had either disease or pest problem while 28.89% of the sampled respondents showed that they have no problem with diseases or pests.

TABLE 4.14b

DISEASES AND PEST CONTROL MEASURES

Control measure	No. of Respondents	Percentage
Chemical control	170	75.56
Cultural control	55	24.44
Others	00.00	00.00
Total	225	100.00

Source: Field Work, 1998

Field results have shown that chemical control accounted for 75.56% of the responses while cultural control recorded 24.44% of the responses of the sampled respondents on diseases and pest control measures.

4.2.6 **Harvesting of Fadama Crops**

Fadama crops, unlike upland crops do not have the same stage of harvesting. They are harvested either when fresh or green or when they are ripe. Details on stages of harvesting Fadama crops are provided in the following table.

TABLE 4.15

STAGES OF HARVESTING FADAMA CROPS

Stage	No. of Respondents	Percentage
When ripe	170	75.56
When green/Fresh	55	24.44
Total	225	100.00

Source: Field Work, 1998

Field work results have shown that 75.56% of the sampled respondents harvest their fadama crops when ripe while 24.44% of them harvest their crops when fresh or green. This indicated that about three quarter of the sampled respondents harvested at ripening stage. Under this category falls rice, maize, tomatoes and peppers among others. Crops harvested

when green includes maize when fresh, maize on cobs and vegetables among others.

4.2.7 **Storage Problems**

Research findings have shown that Fadama Users Associations members have storage problems partly due to the perishable nature of the crops grown in fadama areas and partly due to inadequate storage facilities. This was explained in the following table below.

TABLE 4.16

STORAGE PROBLEMS

Problem	No. of Respondents	Percentage
Rotenning/spoilage	135	60.00
Lack of storage facilities	90	40.00
Total	225	100.00

Source: Field Work, 1998

Sampled respondents have shown that 60.00% of them had problem with rotenning and spoilage while 40.00% showed that lack of storage facility was their main problem with fadama crops storage.

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4.2.8 **Type of Labour**

Findings on the types of labour used by the sampled respondents has shown that family provided the largest labour

compared to hired and community types of labour. This is explained in the following.

TABLE 4.17

TYPE OF LABOUR

Labour Type	No. of Respondents	Percentage
Family	135	60.00
Hired	72	32.00
Communal	18	8.00
Total	225	100.00

Source: Field Work, 1998

Field results have shown that the family provided 60.00% of the labour used by the Fadama Users Associations members in their irrigation farming activities while 32.00% of the labour force came from hired labour and 8.00% of the labour force was from the community (gayya). The implication of the results was that a greater part of the labour was from the family contrary to the expectation of the researcher that the community or rather members of the Fadama Users Associations contribution to the labour force will be higher. This may not be far from the truth that members of the associations are rather busy with their individual work than group work. This signified the importance of family labour.

4.2.9 **Marketing of Fadama Crops**

The marketing aspect of this research work looked into selling points of the sampled respondents' crops produced, pricing, transportation and marketing problems. Table 4.18a explains further.

TABLE 4.18a

MARKETING OUTLETS

Selling Point	No. of Respondents	Percentage
Open market	180	80.00
Neighbours	36	16.00
Cooperatives	6	2.67
Government sales outlet	3	1.33
Total	225	100.00

Source: Field Work, 1998

Responses on sales outlet showed that 80.00% of the Fadama Users Associations sampled respondents sold their produce at the open market while 16.00% sold their farm produce to their neighbours and 2.67% of the sampled respondents dispose off their produce with the cooperatives. Government sales outlets accounted for the purchase of 1.33% of the sampled respondents' produce. This showed that open market is the most popular sales outlet followed by the neighbours, this has to do with the shortage of fertilizer in cooperatives and government sales outlet and removal of

subsidy on fertilizer as such neighbours come into the matter. Neighbours participation in market outlet did not necessarily hike the fertilizer prices as only a token fee is surcharged on top of the normal price to cover for transport and loading-off loading cost.

Price received on fadama crops is briefly explained below.

TABLE 4.18b

PRICING OF FADAMA CROPS

Pricing	No. of Respondents	Percentage
Sometimes good	115	51.11
Good	99	44.00
Not good	11	4.89
Total	225	100.00

Source: Field Work, 1998

Results on the price received on fadama crops showed that 51.11% of the sampled respondents had sometimes good price while 44.00% usually got good price for their produce and 4.89% indicated not receiving good price from their produce. This indicated that 95% of the sampled respondents have indicated some degree of satisfaction with the pricing of their crops produced and just 4.89% of the sampled respondents indicated not having good price for their produce.

On how fadama crops are being transported after harvest to the homes and markets, table 4.18c explains.

TABLE 4.18c

MEANS OF TRANSPORTING FADAMA CROPS

Means of Transport	No. of Respondents	Percentage
Lorry/Pick-Up	102	45.33
Donkey	72	32.00
Bicycle	22	9.78
Foot	18	8.00
Rail	11	4.89
Total	225	100.00

Source: Field Work, 1998

Field results have shown that 45.33% of the sampled respondents used lorries or pick-ups while 32.00% of them used donkeys and 9.78% used bicycles. Another 8.00% transport their produce to homes and markets on foot. A remaining 4.89% of the sampled respondents uses rail to convey home and transport to the market their produce.

Marketing problems issues are explained below in the following table.

TABLE 4.18d

MARKETING PROBLEMS OF FADAMA CROPS

Problem	No. of Respondents	Percentage
Poor road network	113	50.22
Price fluctuation	65	28.89
Surplus produce	35	15.56
Means of transport	12	5.33
Total	225	100.00

Source: Field Work, 1998

On marketing problems poor road network recorded 50.22% of the sampled respondents while 28.89% of them have price fluctuation as their marketing problem and 15.56% of the sampled respondents have surplus produce as their main marketing problem. Similarly 5.33% of them gave means of transport as their problem. The implication here is that there is need for goood road network as well as price stabilization which if solved or improved will upset problems of surplus produce and means of transport with time.

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4.3 ASSOCIATION ACTIVITIES

To determine the progress, contributions as well as prospects and problems of the Fadama Users Associations, associations' activities were discussed. Details on this are provided in the next subsection.

4.3.1 Form of Assistance Received from Government

The sampled respondents of the Fadama Users Associations administered questionnaire gave the followings as the forms of assistance they received from the government as a result of their joining Fadama Users Associations. This is explained in the following table.

TABLE 4.19

FORMS OF ASSISTANCE FROM GOVERNMENT

Form of Assistance	No. of Respondents	Percentage
Washbore	200	88.89
Water pump	166	73.78
Loan facility	165	73.33
Feeder road	81	36.00
Drying store	81	36.00
Extension services	61	27.11
Tube well	36	16.00
Credit facility	18	8.00
Input subsidy	3	1.30
Total		

Source: Field Work, 1998

Field results have shown that 88.89% of the sampled respondents benefitted from washbores installations while 73.78% of the them indicated that they enjoyed water pumps and

another 73.33% got loan facilities while 36.00% said they weere able to enjoy feeder road construction. Another 36.00% of the sampled respondents benefitted from a drying store and 27.11% enjoyed extension services and 16.00% got tube well installation while 8.00% got access to credit facilities and 1.30% enjoyed input subsidy.

4.3.2 Other Areas Requiring Government Assistance

In exploring other areas requiring government assistance vis-a-vis Fadama Users Associatioons, the sampled respondents indicated the following requirements as was in the following table.

TABLE 4.20

AREAS REQUIRING GOVERNMENT ASSISTANCE

Assistance Required	No. of Respondents	Percentage
Road/Bridge construction	72	32.00
Farm inputs (especially fertilizer)	63	28.00
Fuel	45	20.00
Credit/loan facility	36	16.00
FUA formation	9	4.00
Total	225	100.00

Source: Field Work, 1998

Sampled respondents indicated that 32.00% of them requires road and bridge construction while 28.00% requires farm input particularly fertilizer and another 20.00% have shown concern for fuel need. Similarly 16.00% showed interest in acquiring more loan/credit facillity while 4.00% of the sampled respondents requires more Fadama Users Associations formation. The emphacy placed in infrastructure particularly road accounts for the free movement of farm products, labour and personnel to and from farm, home and market. Farm inputs especially fertilizer issue need to be addressed as well as fuel scarcity and credit/loan facility problems warrants special care from the government. The request for more formation of Fadama Users Associations arose from the fact of the seen contributions of these associations.

4.3.3 First Source of Information About Fadama Users Associations

In an effort to find the source of first information about Fadama Users Associations to the sampled respondents, questions as regards possible sources were posed. The following table explains further.

TABLE 4.21

FIRST SOURCE OF INFORMATION ABOUT FADAMA USERS ASSOCIATIONS

Source	No. of Respondents	Percentage
Fadama Farmer Colleagues	77	34.22
Friends/Relatives	56	24.89
Radio	46	20.45
Project	30	13.33
Publication	16	7.11
Total	225	100.00

Source: Field Work, 1998

Field result have shown that 34.22% of the sampled respondents had their first source as fadama farmer colleagues while 24.89% first heard of Fadama Users Assocaitions through their friends and relatives and 20.45% of the sampled respondents became aware first through radio. Another 13.33% of the sampled respondents heard first of the Fadama Users Associations through the project and 7.11% sampled respondents became aware of Fadama Users Associations via publication.

4.3.4 **Stages of Joining Fadama Users Associations**

On stages of joining the Fadama Users Associations; the following table explains.

TABLE 4.22

STAGES OF JOINING THE FADAMA USERS ASSOCIATIONS

Stage	No. of Respondents	Percentage
Identification	136	60.44
Inception	55	24.45
Implementation	28	12.44
Maintenance	6	2.67
Total	225	100.00

Source: Field Work, 1998

It was revealed that 60.44% of the sampled respondents joined the associations at identification stage and 24.45% joined at inception stage while 12.44% joined at implementation stage and 2.67% joined at maintenance stage. This showed that two third of the sampled respondents joined at identification stage alone and was due to the awareness the farmers received on the programme.

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4.3.5 **Problems of Fadama Irrigation Farming**

Members of the Fadama Users Associations face a number of problems in the course of executing their fadama irrigation farming activities. The main problems identified are discussed below.

TABLE 4.23

PROBLEMS FACING FADAMA USERS ASSOCIATIONS IN FADAMA IRRIGATION FARMING

Problem	No. of Respondents	Percentage
Fuel scarcity	99	44.00
Lack of fund	54	24.00
Shortage of equipment	36	16.00
shortage of spare parts	36	16.00
Total	225	100.00

Source: Field Work, 1998

The problems of fuel scarcity recorded 44.00% of the sampled respondents' responses while lack of fund accounted for 24.00% of the responses. Shortages of equipment accounted for 16.00% of the sampled respondents answers as regards this question and another 16.00% stated shortage of spare parts as their problem. The implication here is that fuel scarcity is the main problem facing the associations followed by lack of fund and then shortage of equipment and spare parts.

4.3.6 **Performance Rating of Fadama Users Associations**

Performance rating of the Fadama Users Associations in terms of provision of infrastructural facilties, solving marketing problems and extent to which loan package is being recovered is discussed as contained in table 4.24.

TABLE 4.24

PERFORMANCE RATING OF THE FADAMA USERS ASSOCIATIONS

Rating	No. of Respondents	Percentage
Excellent	154	68.44
Good	63	28.00
Average	8	3.56
Poor	0	0.00
Total	225	100.00

Source: Field Work, 1998

The sampled respondents indicated that 68.44% of them rated the performance as excellent while 28.00% said the performance was good and the remaining 3.56% of them stated that the performance was average.

4.3.7 **Frequency of Holding Meetings**

The Fadama Users Associations like any other association holds meeting to discuss issues concerning their association. The following table gives details on the frequency of holding meetings.

TABLE 4.25

FREQUENCY OF HOLDING MEETINGS

Frequency	No. of Respondents	Percentage
Weekly	105	46.67
Monthly	74	32.89
Fortnightly	46	20.44
Total	225	100.00

Source: Field Work, 1998

The meeting is being attended by all the members of the Fadama Users Associations. They all participates in the discussion and decision making during the meetings. All the members have equal status at the meetings. On frequency of holding meetings, it was observed that 46.67% of the sampled respondents said that they hold meetings weekly while 32.89% hold meetings monthly and 20.44% of the sampled respondents hold their meetings fortnightly.

4.3.8 **Contributions of Fadama Users Associations**

On the contributions of the Fadama Users Associations, the sampled respondents have indicated their reasons for joining the Fadama Users Associations as was explained in table 4.26 below.

TABLE 4.26

CONTRIBUTIONS OF FADAMA USERS ASSOCIATIONS

Contribution	No. of Respondents	Percentage
Progress in farming development	90	40.00
Provision of farm inputs	60	26.67
Stimulating cooperative spirit	40	17.78
Provision of credit and loan facilities	35	15.55
Total	225	100.00

Source: Field Work, 1998

The sampled respondents showed that 40.00% of their responses indicated progress in farming development as the main contributioon of the Fadama Users Associations followed by provision of farm inputs which recorded 26.67% and stimulating cooperative spirit scored 17.78% while provision of credit and loan facilities recorded 15.55%. The implication here is that an average respondent has known the reasons for the formation of the Fadama Users Associations and has clearly indicated the need for the non member Fadama farmers to join and form this type of associations.

4.4 INCOME EARNING AND STANDARD OF LIVING

4.4.1 Level of Income

Collecting data on rural income is a difficult task. Questions on income attracts a high refusal to comment, and where respondents finally decided to do so, precision is difficult to obtain (Honville, Jowel and Associates, 1978, cited by Kolawole 1986: 218).

In the area of the study, there was difficulty in obtaining data on income. In theory, "total family income should include net income from farming, incomes from secondary occupations, and income in the form of regular gifts from other relatives" (Upton, 1967, cited by Kolawole 1986: 218). But because information on income from secondary occupations (petty trading, shoe making etc.) and assistance rendered to or received from relatives are practically difficult to obtain, it was therefore decided to measure real income by monetary value of farm output.

All of the sampled respondents are solely fadama farmers, so the bulk of their income comes from fadama irrigation farming activities. Even though secondary occupations are also done, but income from this sector is very minimal and not consistent. Increased earning improves purchasing power which subsequently raises the standard of living and consequently stimulate economic activities through increased purchasing power. Improved standard of living in rural area will curb

rural - urban migration with possibility of exerting a pull on other surrounding rural and urban settlements.

Table 4.27 was used in analysing the levels of income of the sampled respondents from 1994/95 Fadama dry season to 1997/98 Fadama dry season period.

TABLE 4.27

LEVEL OF INCOME OF SAMPLED RESPONDENTS FROM 1994/95 - 1997/98 FADAMA DRY SEASON

Income Group	Cropping Season			
	1994/95	1995/96	1996/97	1997/98
Less than N5,000.00	1(0.44)**	-(0.0)	-(0.0)	-(0.0)
N5,001.00 - 10,000.00	39(15.56)	7(3.11)	26(11.55)	-
N10,001.00 - 15,000.00	25(11.11)	35(15.55)	21(9.34)	30(13.33)
N15,001.00 - 20,000.00	75(33.33)	50(22.24)	40(17.78)	35(15.56
N20,001.00 - 25,000.00	34(15.11)	30(13.33)	25(11.11)	-
N25,001.00 - 30,000.00	19(8.44)	43(19.11)	43(19.11)	20(11.11)
N30,001.00 - 35,000.00	5(2.22)	6(2.67)	10(4.44)	12(5.33)
N35,001.00 - 40,000.00	12(5.33)	-	8(3.56)	10(4.44)
N40,001.00 - 45,000.00	-	16(7.11)	-	8(3.56)
N45,001.00 - 50,000.00	-	12(5.33)	16(7.11)	10(4.44)
N50,001.00 - 55,000.00	-	4(1.78)	-	-
N55,001.00 - 60,000.00	6(2.67)	-	14(6.22)	18(8.00)
N60,001.00 - 65,000.00	-	-	-	-
N65,001.00 - 70,000.00	2(0.88)	10(4.44)	-	15(6.67)
N70,001.00 - 75,000.00	-	-	8(3.56)	-
N75,001.00 - 80,000.00	7(3.11)	7(3.11)	-	16(7.11)
N80,001.00 - 85,000.00	-	-	-	-
N85,001.00 - 90,000.00	-	-	-	-
N90,001.00 - 95,000.00	-	-	4(1.78)	-
N95,001.00 - 100,000.00	-	-	10(4.44)	11(4.88)
Over N100,000	-	-	-	15(6.66)

** Percentages in parenthesis

Source: Field work, 1998

In 1994/95 fadama dry season only one respondent earned less than N5,000.00 and nobody earned this sum between 1995/96 to 1997/98 dry season cropping periods. While 15.56% of the sampled respondents earned N5,001.00 to N10,000.00 in 1994/95 dry cropping season, only 3.11% earned this in 1995/96 and 11.55% of the respondents earned this income group in 1996/97 dry season and nil was recorded for 1997/98 fadama cropping season. Just 11.11% of the respondents earned N10,001.00 - 15,000.00 in 1994/95 dry cropping season, 15.55% of the respondents earned this income in 1995/96 dry season and 9.34% of the respondents and 13.33% of the respondents earned this same income in 1996/97 and 1997/98 dry season cropping period respectively. For N15,001.00 - 20,000.00 income group, 33.33% and 22.24% of the respondents earned this income group in 1994/95 and 1995/96 dry cropping season respectively. This has shown an improvement in percentage over the same period in the previous years. Similarly 17.78% and 15.56% of the sampled respondents earned N15,001.00 - 20,000.00 in 1996/97 and 1997/98 dry cropping seasons respectively. In 1994/95 dry cropping season, 15.11% of the respondents earned N20,001.00 - 25,000.00 while 13.33% and 11.11% of the respondents earned this same income group in 1995/96 and 1996/97 fadama dry season. As regards N25,001.00 - 30,000.00 income group, 8.44% and 19.11% of the respondents as well as 19.11% and 11.11% of the respondents earned this income group for 1994/95,

1995/96, 1996/97 and 1997/98 dry cropping season periods respectively.

In 1994/95 fadama dry season, only 2.22% earned N30,001.00 - 35,000.00 while 2.67% of the respondents earned this in 1995/96 dry cropping season and 4.44% as well as 5.33% of the respondents fell within this income group for 1996/97 and 1997/98 fadama dry season periods respectively. Similarly in 1994/95 and 1995/96 fadama dry cropping season, 5.33% and 3.56% of the sampled respondents earned N35,001.00 - 40,000>00 income group respectively and 4.44% of the respondents earned this income group in 1997/98 dry cropping seasons. It was only in 1995/96 and 1997/98 when 7.11% and 3.56% of the sampled respondents earned N40,001.00 - N45,000.00.

Similarly, 5.33% of the respondents in 1995/96 and 7.11% of the respondents in 1996/97 as well as 4.44% of the respondents in 1997/98 earned N45,001.00 - 50,000.00. Only 1.78% of the respondents in 1995/96 dry cropping season earned N50,001.00 - 55,000.00. In 1994/95 dry season cropping period 2.67% of the respondents and 6.22% of the respondents in 1996/97 as well as 8.00% of the respondents in 1997/98 fadama dry season eanred N55,001.00 - 60,000.00. Only 0.88% of the respondents in 1994/95 and 4.44% of the respondents in 1995/96 and 6.67% of the respondents in 1997/98 earned N65,001.00 - 70,000.00. Again only 3.56% of the sampled respondents earned N70,001.00 - 75,000.00 in 1996/97. In 1994/95, 3.11% of the respondents and another 3.11% of the respondents in

1995/96 earned N75,001.00 - 80,000.00 while 7.11% of the respondents in 1997/98 also earned N75,001.00 - 80,000.00. As for N90,001.00 - 95,000.00 income group, only 1.78% of the respondents in 1996/97 earned this . In 1996/97 and 1997/98 fadama dry season period 4.44% and 4.88% of the sampled respondents earned N95,001.00 - 100,000.00 income group respectively.

Also 6.66% of the respondents in 1997/98 earned over N100,000.00.

By implication results have shown that there was a steady rise in level of income of the sampled respondents in general. This could be due to increase in the quantity of produce and price of what was sold and increase of cultivable land as a result of increase in earnings.

In the final analysis it was observed that farmers who joined the Fadama Users Associations earned high earnings as the Fadama Users Associations activities progresses.

4.4.2 Loan Recovery

The loan package which members of the Fadama Users Associations benefitted from includes a water pump and a well after a 25% down payment of the total loan package of N32,000.00 and this is to be repaid in three years at two instalments each year. It was discovered that majority of the members of the Fadama Users Associations were able to repay their loans according schedule. Loan repayment effort was discussed in table 4.28 below.

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TABLE 4.28

LOAN REPAYMENT EFFORT

Repayment Effort	No. of Respondents	Percentage
Able to repay	200	88.89
Not able to repay	25	11.11
Total	225	100.00

Source: Field Work, 1998

Results showed that 88.89% of the respondents could be able to repay their loan on instalmental basis while 11.11% could not. This indicated a low level of default in the loan repayment. Those unable to repay stated that fuel scarcity, storage facility and produce market price as the problems that could not allow them settle their loan on schedule.

4.4.3 **Quality of Residence**

In determining the quality of residence, the sampled respondents's houses before and after joining the Fadama Users Associations were assessed. This serves as useful index in determining the respondents' quality of residence. Table 4.29 below gives details of quality of residence.

TABLE 4.29

TYPES OF HOUSING OWNED BY THE RESPONDENTS BEFORE AND AFTER JOINING THE FADAMA USERS ASSOCIATIONS

Type of Housing	Before Fadama Users Associations	After coming of the Fadama Users Associations
Thatch	95 *(42.22)	39 (17.33)
Mud	115 (51.11)	140 (62.22)
Brick	15 (6.67)	46 (20.46)
Total	225 (100.00)	225 (100.00)

** Percentages in parenthesis

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Source: Field Work, 1998

Field results on quality of residence showed that 42.22% of the sampled respondents possessed thatch houses before the Fadama Users Association while 17.33% of the same respondents owned thatch houses after coming of the Fadama Users Associations. This showed a reduction in the possession of thatched houses thus indicating improvement in the type of housing of the respondents. Similarly 51.11% of the

respondents owned mud houses before the Fadama Users Associations and 62.22% of the same respondents possessed mud houses after the coming of the Fadama Users Associations. This implied that the respondents' quality of residence has improved as mud housing is considered better than thatched housing vis-a-vis standard of living. Like wise 6.67% of the sampled respondents had brick houses before the coming of the Fadama Users Associations and 20.46% of the same respondents possessed brick houses after the coming of the Fadama Users Associations. This has shown that there was improvement in the possession of brick houses after the coming of the Fadama Users Associations thus explaining an improvement in the quality of residence owned by the respondents. This also reflects improvement in the quality of life of the respondents considering their background, social and economic position.

4.4.4 Ownership of Durable Property

Another index used to determine the wealth and quality of life of the respondents was examining some selected personal items that are essential particularly in the village level. Items examined are bicycle, motor cycle, car, truck/Pick-up, wheel barrow, radio/cassette recorders, television and electric generator.

This was explained in table 4.30 below.

TABLE 4.30

POSSESSION OF DURABLE ITEMS

Item	No. of Respondents	Percentage
Bicycle	89	49.56
Radio/Cassette Recorder	49	21.78
Motor cycle	29	12.89
Wheel barrow	12	5.33
Electric Generator	8	3.5
Pick-up/truck	4	1.77
Car	3	1.33
Television	3	1.33
None of the above	32	14.2
Total		

Source: Field Work, 1998

It was discovered that 39.56% of the respondents possessed bicycles, 21.78% had radio/cassette recorder while 12.89% owned motor cycles another 5.33% had wheel barrows. Also 3.5% possessed electric generators and 1.77% owned pick-ups/truck. Similarly 1.33% of the respondents were able to have cars and other 1.33% owned televisions. This indicated a fairly enjoyed and improved standard of living as regards the respondents. There was however, some 14.2% of the respondents

who did not possess any of these durable items and no reason could be given for that.

The null hypothesis that the Assocaitions has not contributed to the welfare of the members is rejected because by implication result have shown that there was a rise in level of earnings as well as standard of living reflected in the improvement of types of housing and possession of durable items which were possible due to rise in production. As an exploratory and pioneer study, test of hypothesis is not considered necessary.

CHAPTER FIVE

5.1 SUMMARY OF FINDINGS

This evaluative study on the progress achieved through the contributions of the Fadama Users Associations by the Fadama farmers and other farmers and their immediate surroundings as a result of joining the introduced Fadama Users Associations by registered members showed appreciable contributions towards the improved welfare and standard of living of the beneficiaries. Results have shown increases in crops yields, earnings, working capital as well as improved literacy levels, quality of life interms of provision of infrastructural facilties such as feeder road, accessibility to loan and credit facilities, improved awareness on the need for farmer associations, better housing, possession of durable items. Farmers's improved management skills as regards maintenance of physical infrastructures (wash bores, tube wells, roads, canals/channels) such that these facilities were sustained was achieved through Fadama Users Associations. Marketing and productioon costs as well as storage problems and prospects were identified and discussed and recommendation was proferred for the remedy of the situation. Loan recovery effort was particularly encouraging and need for more government assistance in form of infrastructure, provision of farm inputs such as fertilizer and chemicals on subsidy were also discussed. Other assistance needed are that of loan and credit facilites and provision of

storage facilities and sourcing markets for surplus produce among others. The need to develop and encourage formal functional co-operative societies was also proffered.

In conclusion the Fadama Users Associations have contributed meaningful improvements which resulted into improved quality of life and standard of living of the Fadama farmers both registered and unregistered in the Fadama Users Associations inthe area of the study within their four years of existence. Nevertheless, respondents problems of high cost of inputs, scarcity of chemicals, storage, credit and loan requirement, literacy rate, marketing, transport means and road infrastructure could not be solved by the Fadama Users Associations alone.

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5.2 RECOMMENDATIONS

The following recommendations are proposed for a programme of this nature for better performance and sustainability.

1. There is need for more funding in form of loan and credit to cover more fadama areas, maintain and sustain the progress so far made. This alleviates the problem of capital and investment and enhance expansion of fadama irrigation farming.
2. Provides more education and enlightenment to the Fadama Users Associations through the associations and agric extension services.

3. Provision of more basic infrastructures such as extension of feeder roads, construction of small bridges and culverts should be extended to the fadama areas of these associations.
4. Government should provide the Fadama Users Associations with marketing assistance be it in form of marketing outlets or sourcing markets or buyers for their produce.
5. Subsidies on inputs such as fertilizers, chemicals, seeds, etc should be re-introduced, encouraged and timely provided to the Fadama Users Associations.

5.3 SUGGESTION FOR FURTHER RESEARCH

Not too many studies have been conducted on the performance evaluation of some rural development programmes in the country particularly the Fadama Users Associations been a recent innovation. There is therefore need for more researches on them.

In this particular research, it was discovered that the performance of these associations is commendable but further studies may reveal otherwise or shades more light particularly on loan recovery, maintenance and sustainability of the programme.

Also suggested is a detailed study into the effects of the introduction of the Fadama Users Associations as it will be very useful for future rural development programmes formulation.

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APPENDIX I

Dear Mallam/Alh./Malama,

I am conducting a research on the "The role of Fadama Users Association in Kura and Madobi Local Government Areas, Kano State". The exercise is a purely academic one and form part of my Post Graduate training at Ahmadu Bello University, Zaria.

This Questionnaire is to help me determine your views on the issue of Fadama Users Associations in Kura and Madobi Local Government Areas of Kano State. It will be highly appreciated if you can spare time to answer the questions below.

All you are required to do is to tick or fill in the appropriate places provided for the following questions. Rest assured that the information you provided will be treated with strict confidentiality.

Yours faithfully,

Bello Ado Mohammed

Serial No.----------

Date:----------

A. FARMERS PARTICULARS

1. Age: . . . . . .

2. Village: . . . . . .

3. District/LG.: . . . . . .

4. Sex: . . . . . .

5. Marital status: . . . . . .

01	Married	( )
02	Single	( )
03	Divorced	( )
04	Widow	( )
05	Separated	( )

7. How many children do you have

01	1 - 3 children	( )
02	4 - 7 children	( )
03	Above 7 children	( )

8. State number of dependants apart from your children

. . . . . .

9. Have you been to school?

01	Yes	( )
02	No	( )
03	No response	( )

10. If yes, which type of education do you attend?

01	Qur'anic Education	( )
02	Adult Education	( )
03	Western Education	( )
04	Others (specify)	

11. Level of Education attained

01	Primary	( )
02	Secondary	( )
03	Technical	( )
04	University	( )
05	Others (specify)	

B. GENERAL

12. How did you acquire your land for fadama farming?

01	Purchase	( )
02	Inheritance	( )
03	Rentage	( )

13. What is your fadama land holding? (consolidated)

01	0.1 - 0.4ha	( )
02	0.5 - 0.9ha	( )
03	1.0 - 1.4ha	( )
04	1.5 - 1.0ha	( )
05	2.0 and above	( )

14. Which of these fadama crops do you produce?

01	Maize	( )
02	Wheat	( )
03	Rice	( )
04	Sugar cane	( )
05	Onion	( )
06	Garlic	( )
07	Tomatoes	( )
08	Peppers	( )
09	Vegetables	( )
05	Others	

15. Which crops do you produce most and why? . . . .

01	It is more profitable	( )
02	Easier and cheaper to produce	( )
03	Used only for food	( )
04	Give higher output per unit area	( )
05	Others (specify)	

16. Where do you get your seed for planting from?

01	Previous harvest	( )
02	Market	( )
03	Government sale outlet	( )

17. What type of fadama crops variety do you use?

01	Local variety	( )
02	Improved variety	( )

18. Do you dress your seeds before planting?

01 Yes ( ) 02 No ( )

19. Do you apply fertilizer to your crops?

01 Yes ( ) 02 No ( )

20. If yes, what type of fertilizer?

01	Organic fertilizer/manure	( )
02	Chemical/Inorganic fertilizers	( )
03	Both	( )

21. At what stage do you apply the fertilizer?

01	Before planting	( )
02	After planting	( )
03	Both	( )

22. How effective is the fertilizer application with regards to yield per hectare?

    01 Very effective ( )
    02 Effective ( )
    03 Not effective ( )

23. What is your source of fertilizer (specify) . . .

    . . . . . .

24. How do you come to know about the use of fertilizer?

    01 Through Agric Extension Agent ( )
    02 Through neighbours ( )
    03 Through Relatives ( )
    04 Through friends ( )
    05 Others (specify) . . . . . .

25. Who taught you how to use fertilizer?

    01 Agric Extension Agent ( )
    02 Neighbours ( )
    03 Relatives ( )
    04 Friends ( )
    05 Others (specify) . . . . . .

26. State the problems associated with fertilizer usage

    . . . . . .

    . . . . . .

27. Do you have any disease and pest problem on you fadama farm?

    01 Yes ( ) 02 No ( )

28. State how you control this problem? . . . . . .

    . . . . . .

29. When do you harvest your fadama crops?

    01 When fresh/green ( )
    02 When ripe ( )
    03 Others (specify) . . . . . .

30. Do you have any storage problem with your fadama produce?

    01 Yes ( ) 02 No ( )

31. If yes, state the problem(s) . . . . . .

. . . . . .

32. State the type of labour you use on your fadama farm?

01 Family ( )
02 Hired ( )
03 Communal ( )

33. Whom do you sell your produce to?

01 Neigbour ( )
02 Government ( )
03 Co-operative ( )
04 Others (specify) . . . . . .

34. Do you get good price for your fadama produce?

01 Yes ( ) 02 No ( ) 03 Sometimes ( )

35. How do you take your produce to selling point?

01 On foot ( )
02 On bicylce ( )
03 By lorry ( )
04 By rail ( )
05 By donkey ( )

36. What is your marketing problems if any? . . . . .

. . . . . .

C. ASSOCIATION ACTIVITIES

37. What do you see is the need for the formation of Fadama Users Associations in your fadama area?

01 To work together with others ( )
02 To improve work force ( )
03 To produce more food ( )
04 Others (specify) . . . . . .

38. Do you think it can help you in your fadama farm business?

01 Yes ( ) 02 No ( )

39. Do you think it can raise your standard of living?

01 Yes ( ) 02 No ( ) 03 Explain ( )

40. What form of Government assistance do you get?

01	Extension services	( )
02	Loan facilities	( )
03	Credit facilities	( )
04	Input subsidy	( )
05	Others (specify)	

41. What type of infrastructural facilities did you benefit from as a result of the formation of Fadama Users Associations in your fadama areas?

01	Feeder road	( )
02	Borehole	( )
03	Tubewells	( )
04	Washbore	( )
05	Water pump	( )
06	Others (specify)	

42. In what other areas would you require Government's assistance?

. . . . . .

43. What is your first source of information about Fadama Users Associations?

01	Fadama farmers colleagues	( )
02	Radio	( )
03	Project	( )
04	Friends/Relatives	( )
05	Publication	( )
06	Neighbours	( )

44. At what stage did you join the Fadama Users Associations?

01	Identification stage	( )
02	Inception stage	( )
03	Implementation stage	( )
04	Maintenance stage	( )
05	Others (specify)	

45. What problems do you face in your fadama irrigation farming?

01	Lack of fund	( )
02	Equipment shortage	( )
03	Scarcity of fuel	( )
04	Shortage of spare parts	( )
05	Others (specify)	

46. How do you rate Fadama Users Associations' performance?

01	Excellent	( )
02	Good	( )
03	Average	( )
04	Poor	( )

47. How often do you hold meetings?

01	Weekly	( )
02	Fortnightly	( )
03	Monthly	( )
04	Others (specify)	

48. What advice would you give other small scale fadama farmers outside Fadama Users Associations?

. . . . . .

. . . . . .

49. Is there any change in yield from your fadama farming after joining the Fadama Users Associations?

01 Yes ( ) 02 No ( )

50. What in your own opinion do you think is the contributions of Fadama Users Associations to your community:

D. INCOME EARNING AND STANDARD OF LIVING

51. State your income for the following year

	Year	Income
01	1994/95	
02	1995/96	
03	1996/97	
04	1997/98	

52. Are you able to repay your loan?

01 Yes ( ) 02 No ( )

53. If NO, what is the problem? . . . . . .

. . . . . .

54. What type of house do you live in before joining the Fadama Users Association?

. . . . . .

55. What type of house do you now live in after joining the Fadama Users Association?

. . . . . .

56. Tick against the following items you owned

	Item	Year acquired
01	Bicycle	
02	Motor-cycle	
03	Car	
04	Lorry/Pick-up/Truck	
05	Wheel barrow	
06	Radio/Cassette recorder	
07	Television	
08	Electric Generator	
09	Other (specify):	

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