MARKETING OF FADAMA PRODUCED TOMATOES, PEPPER AND ONION: A CASE STUDY OF KANO AND JIGAWA STATES OF NIGERIA

BY
JOSIAH FOLA ALAMU

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL OF AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

DOCTOR OF PHILOSOPHY (PH.D)
IN
(AGRICULTURAL ECONOMICS)

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

NOVEMBER, 1996

DECLARATION

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

Signature ..... Date 24th Dec 1995...

Josiah Fola Alamu

CERTIFICATION

This thesis entitled "Marketing of Fadama Produced Tomatoes, Pepper and Onion: A case study of Kano and Jigawa States of Nigeria" by Josiah Fola Alamu meets the regulations governing the award of the degree of Doctor of Philosophy (in Agricultural Economics) of Ahmadu Bello University and is approved for its contribution to knowledge and literary presentation.

Professor A.O. Ogungbile
Chairman, Supervisory Committee

24/12/96.
Date

Professor J. O. Olukosi
Member, Supervisory Committee

24/12/96
Date

Dr. M. I. Kolawole
Member, Supervisory Committee

Date 20-1-97

Head of Dept.

Dean, Postgraduate Schools

Date 24-1-97

Date 27/5/97

DEDICATION

This thesis is gratefully dedicated to my Lord and Saviour Jesus Christ for His sustaining grace inspite of life's harrowing experiences, and to my precious wife Mrs Grace Titilope Alamu whose simple and beautiful life has made our home into a santuary where the sorrowing may find comfort, and the lonely may find love.

ACKNOWLEDGEMENTS

My deepest, heartfelt thanks go to my major Supervisor Professor A.O. Ogungbile for his invaluable contributions in terms of advice, comments and constructive criticisms at various stages of the production of this thesis. I owe him more than I can express in words. His encouragements and suggestions have helped to improve the quality of this work.

I am equally grateful to Professor J.O. Olukosi my second Supervisor for his invaluable contributions, accessibility and positive attitude towards the project from the beginning to the end of it. Mere over used words cannot adequately express the depth of my appreciation to him.

Special regards and thanks also go to my third Supervisor Dr. M.I. Kolawole for his useful advice and observation on the earlier draft.

I especially appreciate the contribution of Professor I.D. Erinle who read my proposal and made useful suggestions that improved the work. My sincere thanks also go to my good friends and brothers Drs B.A. Oyejola and C.A.M. Lakpini for opening my eyes to the statistical tools for the analysis of this work and for proofreading every chapter. I owe them immense thanks.

I wish to express my thanks to the Ahmadu Bello University Board of Research for the financial assistance it gave me for this study. I am also thankful to Professor M.O. Awogbade - the Director of Centre for Social and Economic Research, for

his understanding and loving concern. Mention must be made of a childhood friend Mr Stephen Dambo Haruna for his usual care and encouragement.

I am greatly indebted to my dear wife Titilope Alamu for her patience and encouragement without which this thesis may never have come to fruition. Finally, I owe not this thesis alone but more than words can tell, gratitude to God for giving me all these wonderful people and for seeing me through this work.

ABSTRACT

Since the attainment of political independence, successive governments have initiated various programmes aimed at accelerating food production and improving the welfare of the rural farmers in Nigeria. However; most of these efforts have not been successful in realizing their objectives. Some people are of the opinion that the neglect of the marketing component was in part responsible for these failures.

This study made use of a wide range of information, some from secondary source and mostly from primary sources by interviewing. Fadama farmers and marketers were interviewed. Storage and processing of crops produced appear to be a problem. For the highly perishable crops such as tomatoes and sweet pepper, the most common form of processing is the sun-drying method, albeit done unhygenically. Besides, most respondents agreed that the fresh vegetables bring them more financial returns because the sun dried tomatoes and pepper have not gained total acceptability as the fresh ones.

Investigations further reveal that fadama produce especially tomatoes, pepper and onion have the bulk of their consumption centres in the southern markets. The cost of transportation is usually enormous which therefore accounts for the reduction in the margins that would have been accruing to fadama farmers. One other factor affecting the margin of highly perishable fadama crops is poor and improper handling. This is because farmers and marketers pay little

attention to handling, processing and storage of fadama crops. To prevent losses, the handling of these crops would need to be undertaken with caution.

The study identified two types of markets - rural and urban. The rural markets are located in villages and are held periodically while the urban markets operate on daily basis. Five types of market intermediaries were observed in the study area; namely; rural selling agents, rural assemblers; rural retailers, urban wholesalers and urban retailers.

The distributive marketing margin figures indicated that middlemen received 32%, 38% and 46% of consumers expenditure on onions, tomatoes and sweet pepper respectively in Kano State. The gross marketing margin for the three crops in Jigawa State are 36%, 48% and 19% respectively.

Three hypotheses were tested. The first showed that in Kano State the mean prices at various markets were signficantly ($P<0.05$) different for the three crops - onion, tomatoes and sweet pepper. In Jigawa State, it was observed that the mean prices at various markets were significant. ($P<0.05$) different for onions and tomatoes, but prices were not significant for sweet pepper.

The second hypothesis showed that there was no significant ($P>0.05$) difference between the profits wholesalers and retailers made in Kano State, but there was in Jigawa State. The third hypothesis showed that there was enough evidence to show that traders in fadama crops would sell at lower than

market price to allow them sell more and earn more profit in both Kano and Jigawa States.

The study identified six major marketing problems. They are transportation, storage, finance, packaging and grading, education and marker information problems. Based on the marketing problems identified, the study made recommendations that could enhance the efficiency of the marketing system of fadama perishable crops. These are: improved transportation system; adeguate provision of storage facilities while the sun-drying method is improved upon. The use of fibre board cartoons and moulded plastic containers for packaging should be encouraged: government should also encourage private initiatives in agro-processing industries through incentives. Information about prices of produce should be wide, disseminated by radio and T.V. and Government should fund more research on agricultural marketing.

TABLE OF CONTENTS

TITLE PAGE i

DECLARATION ii

CERTIFICATION iii

DEDICATION iv

ACKNOWLEDGEMENT v

ABSTRACT vii

TABLE OF CONTENTS x

LIST OF TABLES xiv

LIST OF FIGURES xv

CHAPTER ONE 1.0 INTRODUCTION

1.1 Introduction 1

1.2 The need for fadama agriculture 2

1.3 Research on fadama agriculture 3

1.4 Crops grown in fadama 4

1.5 The problem of losses of produce in fadama cultivation 6

1.6 Problem statement 9

1.7 Justification of the study 12

1.8 Objectives 14

1.9 Hypothesis 14

1.10 Organisation of the study 15

1.11 Limitation of the study 15

CHAPTER TWO 2.0 LITERATURE REVIEW

2.1 General approaches to the study of food marketing 17

2.2 Structure – Conduct – Performance Paradigm Paradigm 19
2.3 Measures of pricing efficiency in Food Marketing 21
2.4 Theoretical Nature of marketing system of Traditional staple crops in Nigeria 22
2.5 Summary 26
CHAPTER THREE 3.0 METHODOLOGY
3.0 Research Methodology 28
3.1 The Study Area 28
3.2 Climate 28
3.3 Soil and Vegetation 30
3.4 The state of rural infrastructure for fadama crop production 30
3.5 Data source and collection 32
3.6 Sourcing for information 33
3.7 The main survey 35
3.8 Data processing and analysis 37
CHAPTER FOUR 4.0 SOCIO-ECONOMIC CHARACTERISTICS OF FADAMA CROPS MARKETERS..... 41
4.1 Organisation of the marketing System 53
4.2 Types of Markets 53
4.3 Marketing infrastructure 54
4.4 Intermediaries involved in the marketing system..... 57

CHAPTER FIVE 5.0 ANALYSIS AND PRESENTATION OF FIELD FINDINGS

5.1 Marketing functions performed by fadama produce Marketers 62

5.2 Marketing Channels in the study area 66

5.3 Efficiency and performance of the marketing system.. 68

5.4 Marketing margin 76

5.5 Hypothesis One 81

5.6 Hypothesis Two 85

5.7 Hypothesis Three 88

5.8 Marketing Problems 89

CHAPTER SIX 6.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings 95

6.2 Recommendations 97

6.3 Conclusion 98

References 104

Appendix 1 Questionnaire for fadama farmers 109

Appendix 2 Questionnaire for traders of fadama crops 117

Appendix 3 Calculation of Marketing Margins in Naira for Kano State Onions, Tomatoes 123

Appendix 4 Calculation of Marketing Margin in Naira for Kano State Sweet Pepper 125

Appendix 5 Calculation of Marketing Margin in Naira and percentages for Kano and Jigawa States 126

Appendix 6 Commodity prices for some vegetables in Nigeria, 1992 128

Appendix 7 Commodity prices for some vegetables in Nigeria 1993 129

Appendix 8 Commodity prices for some vegetables in Nigeria 1994 130

Appendix 9 Prices of some Vegetables in Jigawa State 1994 131

Appendix 10 Prices of some vegetables in Kano State first quarter 1994 132

Appendix 11 Prices of some vegetables in Kano State second quarter 1994 133

Appendix 12 Prices of some vegetables in Kano State Third quarter 1994 134

Appendix 13 Prices of some vegetables in Kano State fourth quarter 1994..... 135

Appendix 14 Prices of some vegetables in Kano State first quarter 1995 136

Appendix 15 Prices of some vegetables in Kano State second quarter 1995..... 137

Appendix 16 Prices of some vegetables in Kano State third quarter 1995 138

Appendix 17 Prices for some vegetables in Kano State fourth quarter 1995..... 139

Appendix 18 Estimated costs and benefits of fadama produce in Kano State 1994 140

LIST OF TABLES

Tables		Page
1.1	Annual production figures of some important Fadama Crops and estimated losses	8
1.2	Share of food and live animals in total import bill selected years	10
3.1	Sampled zones in the study area	34
4.1	Distribution of respondents by age in Kano State	41
4.2	Distribution of respondents by age in Jigawa State	42
4.3	Distribution of respondents by age in Kano and Jigawa States combined	43
4.4	Distribution of respondents according to level/type of Education attained in Kano and Jigawa State combined	45
4.5	Distribution of respondents according to Years of experience in fadama marketing in Kano and Jigawa States combined	46
4.6	Distribution of respondents according to types of markets in Kano State	47
4.7	Distribution of respondents according to types of marketers in Jigawa State	47
4.8	Distribution of respondents according to types of marketers in Kano and Jigawa States combined	48
4.9	Distribution of respondents according to means of transportation in Kano State	48
4.10	Distribution of respondents according to means of transportation in Jigawa State	49
4.15	Distribution of respondents according to means of transportation to Kano and Jigawa States combined	50
4.16	Distribution of respondents according to sources of loan in Kano State	50
4.17	Distribution of respondents according to sources of loan in Jigawa State	51
4.18	Distribution of respondents according to sources of loan in Kano and Jigawa States combined	52

5.1 Average market prices for wholesalers in different markets in Kano and Jigawa States 1995 74

5.2 Wholesale price correlation for tomatoes for Kano and Jigawa States in 1995 75

5.3 Percentage gross margin received by middlemen in Kano State 79

5.4 Percentage gross margin received by middlemen in Jigawa State 80

5.5 ANOVA tables comparing prices of various commodities in three types of markets in Kano State 82

5.6 Comparing mean price of commodities by sources in Kano State using Duncan's multiple range test 82

5.7 ANOVA tables comparing prices of various commodities in three types of market in Jigawa State 84

5.8 Comparing mean prices of commodities by sources in Jigawa State using Duncan's multiple range test ... 84

5.9 Comparing profits by type of marketers in Kano State 86

5.10 Table of mean profits by three types of marketers in Kano State 86

5.11 Comparing profits by type of marketers in Jigawa State 87

5.12 Table of mean profits by three types of marketers in Jigawa State 87

5.13 Frequency distribution of respondents to whether traders will sell at lower than the market price in order to increase sales and earn more profit in Kano State 88

5.14 Frequency distribution of respondents as to whether traders will set at lower than market price inorder to increase sales and earn more profit in Jigawa State 89

LISTS OF FIGURES

Figures

2.1 Location of Study Area 29

5.1 Marketing Channel for Fadama Crops 67

5.2 Price movement of tomatoes and sweet-pepper in Jigawa State 1994..... 71

5.3 Price movement of tomatoes and onion in Kano State 1994 73

CHAPTER ONE

1.0 INTRODUCTION

1.1 The Hausa word, "Fadama" is used extensively in geographical and agricultural writings in the West African region. Turner (1977) described fadama thus

> Low lying lands, relatively those areas adjacent to streams. They are waterlogged or flooded in the wet season. At the beginning of the wet season they may be marked by a lush of new vegetation before the upland turns green but they are most conspicuous after the end of the rains when they remain prominently green as the surrounding upland turns brown.

Fadamas are found in the Northern states of Nigeria located in the Sudanian and Sahelian ecological zones. This region has mainly dry savannah vegetation and a mean rainfall of between 400mm and 1,000mm which is concentrated within four to five months of the year (May to September). Evaporation and evapotranspiration in these zones are high. As a result, some states in Northern Nigeria are prone to moderate and strong drought risks. Variations in weather, particularly the timing of rainfall, limit the profitability of rainfed cropping in the season. Consequently, fadama farming is not only essential for crop production in the dry season, it can also reduce crop risks in the wet season (World Bank, 1992, P8).

A corresponding feature of fadama in East and Central Africa is Dambos. Dambo has been studied and documented by Ackerman (1936), Garlic (1961), Louis (1964), Tatzold and Baum (1968), Graham (1969) and many others. According to World Bank reports (1992), fadama

are mainly found in low-lying flood plains composed of alluvia deposits and containing extensive exploitable aquifers.

Marketing on the other hand, could be defined as the performance of all those business activities that direct the flow of goods from the producer to the final consumer and which make a commodity available at the right time, in the right place and in as convenient a form as possible to consumers (Jones, 1974). But in this thesis, we are concerned with agricultural marketing. Agricultural marketing has been defined as the performance of all business activities involved in the flow of goods and services from the point of initial production until they are in the hands of the ultimate consumers (Kohls, 1955). In this sense, marketing process is one of movement. It is a series of actions and events that take place in sequence.

1.2 THE NEED FOR FADAMA AGRICULTURE

Agriculture occupies a formidable position in the Nigerian economy. It accounts for 35 percent of the GDP and employs two-thirds of the Nigerian labour force (World Bank, 1992). Small holders are the backbone of the agricultural sector. They cultivate land by traditional methods mostly under rain-fed conditions. The country is endowed with a wide range of agro-ecological zones which permits a diversified systematic planting of annual crops - such as cassava, yam, sorghum, millet, maize, rice, wheat and perennial crops such as cocoa, oil palm, rubber, etc.

Future agricultural growth based entirely on rain-fed farming is likely to fall short of the needs of the rapidly growing

population. A recent report recognises that there are substantial surface and ground water resources in the fadamas particularly along the rivers located in the northern part of the country. Harnessing these by developing small-scale (private) irrigation can make a major contribution to increasing food supplies (World Bank, 1992). In view of this, the Federal Government requested a bank loan of US $67.5 million to finance a project of developing fadama lands by introducing small-scale irrigation. The project is being implemented in Bauchi, Jigawa, Kano, Kebbi and Sokoto States, that pioneered fadama development under the earlier World Bank funded Agricultural Development Project (ADP).

1.3 RESEARCH ON FADAMA AGRICULTURE

Inspite of the importance of fadama agriculture, very few studies have been carried out on the geomorphology, hydrology and agriculture of fadama areas. Norman (1972) suggested that neglect of research into fadama agriculture might be due to the fact that staple food crops, such as sorghum, millet, cowpeas and major cash crops like groundnuts and cotton were grown on upland fields in the wet season. Also, fadama holdings were usually small in size. They were regarded as being inaccessible and were usually located within small areas under complicated land ownership arrangements.

Turner (1977), however, estimated fadama lands to be about 10 percent of the total land surface in the Northern States of Nigeria. Fadama lands are the only areas that are cultivated in the dry season except for the large scale irrigation projects such as the Kano River Irrigation Scheme. Consequently, fadama

agriculture is a complementary farming activity to upland farming since it makes use of the surplus labour following all upland farming activities. Apart from this, in times of drought or failure of upland crops, fadama cultivation becomes the only alternative source of food supply.

Generally, fadama fields are much smaller in size than upland fields. But they are very much valued by Hausa farmers. In his study of 350 farmers in three Zaria villages, Norman (1972) found that although only about 9.4 percent of the total farm land cultivated were fadama farms, their net farm income consisting of high valued crops was about 22.9 percent of the total farm land income.

Fadama crop farming is labour intensive. More labour is expended if the crop cultivated is to be irrigated at least three times a week when ground water supply is inadequate for cultivation. Such irrigation is carried out from January to April. Traditional implements like the shadouf, buckets and calabashes are used. The methods are labour intensive. Planting/seedling, transplanting and irrigation therefore constitute the greatest labour demand among fadama cultivation activities. Labour intensiveness of fadama farms is also determined by the type of crop grown.

1.4 CROPS GROWN IN FADAMA

Since most crops do better in dry climate, there are a lot more varieties of crops grown in the fadamas than when cultivation takes place in the wet season. Also pests are less likely to

attack crops on fadama farm. There is more sunshine and the possibility of flood or storms destroying the farm is remote. The vegetable crops that are grown in the fadamas include those listed below :

CROPS	BOTANICAL NAME
Onion	Alhum cepa
Tomatoes	Lycopersicum esculentum
Sweet Pepper	Capsicum annum and rutescans
Carrot	Daucus carrosa
Lettuce	Lattuca sativus
Maize	Zea Mays L
Rice	Oryza sativen & Oryza glaberrima
Sugarcane	Saccharuim, officinarum
Bananas	Musa sapientum
Guava	Psidium guajare
Pawpaw	carica papaya
Citrus fruits	Citrus spp
Mangoes	Mangiera indica
Okro	Abelmoschus esculentus
Egg plant	Solenum melongena (L.)

This study is focussed on the marketing of only three of the above-listed crops namely onion, tomatoes, and sweet pepper. These crops are chosen for study because they are highly valued all over Nigeria. However, their highly perishable nature poses peculiar marketing difficulties in most developing world. They are planted

in large quantities. They incur heavy post - harvest losses arising from poor post-harvest handling and unavailability of preservation facilities. Since these are the most problematic of the fadama crops, handling of onions, tomatoes and sweet pepper at harvest would need to be undertaken with caution. Farmers should be trained appropriately on the necessary harvesting practices to obtain high quality vegetables, e.g. avoidance of mechanical damage and thermal stress.

Furthermore, the prices of these crops are notoriously unstable in Nigeria. A season of glut results in low prices of produce. On the other hand, low production results in high prices. This inter-season fluctuation in the supply and price of produce is a disincentive to large scale production on the part of the farmers. Consequently, the marketing of these crops at present gives neither a fair return to the producer nor a fair price to the consumer (Alamu, 1982). Also, there are no storage facilities such as shades and cooling infrastructures which can prevent losses. There are very limited or almost no government-owned food processing facilities that provide steady demand for these crops.

1.5 THE PROBLEM OF LOSSES OF PRODUCE IN FADAMA CULTIVATION

The development of fadama agriculture has encouraged the cultivation of fruits and vegetables such as tomatoes, okra, carrot, pepper, onions and garlic in northern Nigeria. These vegetables represent a major contribution to the aggregate food production system in Nigeria. They also have special relevance to

the food and vitamin requirement of consumers during the critical months of the long dry season in northern Nigeria. Unfortunately, a significant percentage of these produce is lost during post-harvest handling or through distributive chain system (Olorunda and Aworh, 1983).

The excessive waste of fadama crops plays a significant role in the crises that have bedevilled agriculture in Nigeria. Though fruit and vegetable production in the fadama area doubled in recent years due to activities of River Basin Authorities (Adeyemi, 1984), it has been established that a substantial percentage of fadama crops produced in Nigeria is lost because of the prevailing physical, physiological and pathological factors in the food chain system. These factors include rough handling which cause mechanical injuries such as bruises, cuts, punctures and scratches, poor road network/transportation facilities and lack of means of preservation at fresh state. Recent research conducted to investigate the handling practices during distribution of tomatoes and pepper revealed a loss of about 40-60 percent (Akinbolu et al. 1991).

In order to conserve these produce, adequate attention should be given to effective post-harvest handling and distribution systems. Suitable storage facilities such as evaporative cooling shades for fresh produce must also be provided. According to Goldberg (1966), not only must all parts of the food system expand in a co-ordinated way, the system itself must have a strong infrastructure of transport, credit, storage, communication, education as well as a stable political and social climate.

Table 1.1: Annual production figures of some important fadama crops and estimated losses.

Commodity	Production 1000 tonnes	Estimated loss (%)
Tomato	6,000	20 - 60
Onion	3,800	15 - 20
Pepper	4,500	10 - 20
Cabbage	2,500	35 - 40
Cauliflower	100	2 - 15
Okra	500	20 - 25
Amaranth	2,000	10 - 20
Plantain	15,000	35 - 80
Yam	18,000	10 - 50
Cassava	30,000	10 - 15
Sweet Potato	1,800	10 - 20
Carrot	250	20 - 25
Irish potato	1,500	25 - 40
Cocoyam	2,000	5 - 10
Ginger	720	2 - 5

Source: Adapted from O. Onayemi (1981). Post-harvest Management in Nigeria Industry and Environment.

From Table 1.1, it can safely be concluded that one of the major constraints of fadama agriculture is the heavy losses of fadama perishable crops. This also affects the price. As the crops cannot be stored for a long time, producers tend to have little bargaining power in price determination.

1.6 PROBLEM STATEMENT

Since the attainment of political independence, successive governments have initiated various programmes aimed at accelerating food production and improving the welfare of the rural farmers. Some of these programmes are the National Accelerated Food Production Programme (NAFPP), the Agricultural Development Projects (ADP), the Accelerated Agricultural Development Area Programmes (ADAP), the River Basins and Rural Development Authorities, the Operation Feed the Nation Programme (OFN), the Green Revolution Programme, and more recently, the National Fadama Development Project (NFDP), Women in Agriculture (WIA) and Better Life for Rural Women/Dwellers. But most of these efforts have not been successful in increasing food production and raising the standard of living of the rural people. This is evident from the fact that the prices of food items has been on the increase in the past ten years. The share of food import in the total value of import bill has also not decreased significantly despite the ban placed on the importation of food since 1986. Table 1.2 below shows the share of food and live animals in total value of import bill.

Table 1.2: Share of Food and Live Animals in Total Import Bill. (Selected years).

YEAR	TOTAL IMPORT (₦ Million)	FOOD IMPORT (₦ Million)	PERCENTAGE OF FOOD
1964	507.76	41.24	8.12
1966	513.93	51.57	10.03
1968	385.16	28.39	7.37
1970	752.58	57.69	7.67
1972	986.22	95.10	9.64
1974	1,737.38	153.71	8.96
1976	5,132.51	438.93	8.55
1978	8,211.70	1,020.70	12.43
1980	9,658.10	1,091.00	11.30
1982	9,130.00	950.60	10.41
1983	9,723.00	1,477.90	15.20
1984	11,521.00	2,311.60	20.81
1985	7,932.9	686.1	8.65
1986	5,974,699	801,967	13.42
1987	15,698,137	1,646,489	10.49
1988	17,645,145	1,509,016	8.55
1989	25,175,327	1,720,663	6.84
1990	34,704,677	2,653,725	7.65
1991	53,497.9	3,960.3	7.40
1992	122,426.1	9,995.4	8.16
1993[a]	165,629.4	13,912.9	8.40

Sources (1) Olayide et al, Food Production in Nigeria, Report of Agricultural Statistics Taskforce, 1979
(2) Central Bank of Nigeria, Annual Report (various years).
(3) Annual Abstract of Statistics, FOS, Lagos, 1991 Edition.
(4)[a] Provisional Annual Abstract of Statistics, FOS 1995 Edition, Table 264 page 319.

It has been observed that food import was only ₦801,967 million in 1986 when ban was placed on the importation of food. By 1988 food import had risen to ₦1,509,016 million, and in 1990 it had jumped to ₦2,653,725 million naira.

With the looming food insecurity particularly where preservation, storage and processing are lacking, fadama farming is the only hope of making food available during the long dry season. The seeming intractable nature of food wastage problems of developing nations and the need to study options available to stop

food wastage with particular reference to perishable crops make this study a necessity.

There seems to be a wide misconception of the exact roles of middlemen in particular and possibly other participants in the marketing activities of perishable fadama crops that could have great significance in enhancing productivity and sustainability of fadama agriculture. This misunderstanding of the useful role of traders has led to many government programmes designed for replacing them. Examples of these include the establishment of Commodity Boards, system of licensed buying agents, replacement of "middlemen" with cooperatives in the supply of essential commodities and distribution of fertilizer are other examples. (Egaji, 1979, p.27)

Another factor that increases post harvest loss is packaging materials and modes of transportation. The inherently short life of perishable fadama crops is caused by the traditional packaging and transportation techniques. For example, dis-used industrial packaging materials like unventilated cartons, large volume tin containers and sacks are commonly used for perishable fadama crops. Where woven palm frond baskets are used, it is often observed that over-loading and careless stacking occur. The trucks used for haulage most often have an interior vertical clearance for stacking. Olorunda and Tung (1985) showed that mechanical damage during transportation results from both static and dynamic stresses especially along the bumpy rural roads. These factors inflict injuries through scratches and abrassion which result in ultimate

decay.

All these problems of marketing perishable fadama produce need to be studied in order to determine their effects on production. Ways of eliminating the problems should be investigated.

1.7 JUSTIFICATION OF THE STUDY

Agricultural marketing plays a crucial role in agricultural development. The marketing system is expected to offer good prices which could serve as an incentive for food crop production. The traditional system of marketing food crops in Nigeria has recently been a subject of criticism. The marketing system has variously been described as being inefficient, dis-organised, unresponsive and oligopolistic. Middlemen operating in the system have often been accused of exploiting both the farmers and the consumers. (Southworth et al., 1979).

Studies carried out in the 1960s and early 70s to evaluate the efficiency of the traditional food marketing system in Northern Nigeria include those of Gilbert (1969), Hays (1973), and Ejiga (1977). However, these studies were on staple food crops and other cash crops such as sorghum, millet, cowpeas, groundnut and cotton which are grown on upland fields in the wet season. They did not include fadama crops probably because fadama holdings are usually small in size, sometimes inaccessible and the products often perishable.

This research can be justified on several grounds. Firstly, there has been no recent reliable research conducted on the marketing of perishable fadama crops in Northern Nigeria. All allegations and reports about the exploitation by middlemen pay little or no attention to the supply and demand nature of perishable fadama crops. Therefore, this study will examine the characteristics of the marketing pattern of perishable fadama crops and generate empirical results to identify the structure, efficiency and productivity of the marketing system.

Secondly, various reports have shown high rate of post harvest losses estimated at between 40 - 60 percent for perishable fadama crops. This waste is caused by over-ripening, improper packaging, poor transportation and inadequate storage (Akinbolu et al, 1991). The causes of losses mentioned are obvious symptoms of marketing inefficiency.

This research investigates techniques of post-harvest handling of fadama perishable crops. It examines causes of damages during their distribution and marketing with a view to finding solutions to the problems. It investigates the most efficient mode of transporting these crops and suggests ways in which the marketing efficiency can be enhanced. The information from this research will be helpful in reducing waste throughout the distribution system. It is hoped that this will minimise the loss incurred by

farmers. Fadama farmers, middlemen and consumers will all benefit from the result of the research.

1.8 OBJECTIVES

The broad objective of the study is to understand the relationship between fadama agriculture and traditional crop marketing system in Nigeria. The premise of this is to analyse the marketing problems and recommend strategies to overcome them.

Specifically the study would:

(i) describe the organisation of participants involved in the traditional marketing system of selected fadama crops in the study area.

(ii) assess the efficiency and the performance of the marketing system,

(iii) identify all marketing problems associated with perishable fadama crops,

iv) recommend strategies to overcome existing marketing problems in the study area.

1.9 HYPOTHESIS

This study tests the following three hypotheses:

i. There is no significant difference between rural and urban market prices of fadama crops

ii. There is no significant difference in the profits made by wholesalers and retailers of fadama crops

iii. Traders in fadama crops will not sell at lower than the market price even if this will allow them to sell more and earn more profits because of economics of scale.

1.10 ORGANISATION OF THE REPORT

This thesis is divided into six chapters. The first three chapters deal with the introduction, the review of relevant literature and the methodology. Chapter four addresses responses collected to provide solution to the first objective of the thesis which is descriptive in nature. Chapter five contains results and discussions on the objectives two, three, and four where substantial quantitative analysis are involved. The summary of findings, recommendations and conclusion are contained in chapter six.

1.11 LIMITATION OF THE STUDY

A study of this nature which attempts to determine appropriate marketing strategies for perishable fadama crops in an environment where there is an absolute dearth of data and with predominantly illitrate subjects is supposed to have a wider geographical coverage which will make for broader overview of the subject of study in both the Northern and Southern states of Nigeria.

Secondly, this study is limited to the marketing of perishable fadama produce within states only. It does not include interstate marketing of fadama crops. Constraints of time and funds made the collection of primary data which cover a number of years and the study of inter-state relationships in perishable fadama crops marketing impossible.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

This chapter deals with the review of literature on food marketing studies in Nigeria. It starts with a discussion of approaches to the study of food marketing and the structure - conduct performance paradigm.

2.1 GENERAL APPROACHES TO THE STUDY OF FOOD MARKETING

There are various ways of studying food marketing. One of such was proposed by Kohls and Uhl, (1980), under the following three main categories:

(1) the Functional Approach

(2) the Institutional Approach

(3) the Behavioural System Approach

1. **The Functional Approach:-** This approach emphasizes the various functions performed by the marketing system. They include the exchange functions of buying and selling which lead to a change of ownership. The physical functions are those that involve the physical handling of the produce to be marketed, such as storage, transportation, packaging and processing. The facilitating functions include sorting, grading, standardization, financing, risk-bearing and market intelligence. Main attention is not focused on who does what, but on what is done.

2. **The Institutional Approach:-** This is centred on the nature and character of the various personnel related agencies and any other institutional arrangements that are

involved in the markeing process. The approach focuses on operating procedures, scale of operations, costs and returns. Studies using this approach concentrate efforts on institutional arrangements of middlemen, at retail and wholsale levels. This institutional approach is useful in analysing attitudes toward change and improvement of the marketing system.

3. **The Behavioural System Approach:-** This stipulates that food marketing should be viewed as a number of behavioural systems such as in various kinds of decision making. It emphasizes the multi-disciplinary nature of a meaningful study of the market system.

Another marketing classification was proposed by Hill (1975). They are the problem identification approach, the functional approach and the performance criteria approach.

The problem identification approach deals with the major problems confronting the industry or marketing system. It determines how the structure and organization of the marketing system relate to those problems and their solutions.

The performance criteria approach makes use of some criteria like efficiency, industrial stability, ability of the marketing system to reflect consumers preferences with respect to time, form and place utilities to evaluate and compare marketing systems. Any of these approaches can be

used singly or combined. The choice of any or a combination of the approaches is usually guided by considerations such as the nature of the problem, complexity of the marketing systems and the constraints involved.

2.2 STRUCTURE - CONDUCT - PERFORMANCE PARADIGM (S.C.P. PARADIGM)

A large number of agricultural marketing studies rely on the theoretical foundations laid by the "perfect competition" model.[1] This is particularly true in studies based on the structure-conduct-performance (S.C.P.) paradigm. The S.C.P. paradigm originated from the work of Bain (1968).

The structure variable refers to the number and relative sizes of firms as well as the degree of product differentiation and the extent of vertical integration. Market conduct refers to the behaviour of firms with regards to pricing practices, innovativeness, investment and similar matters. Structure and conduct are influenced by "basic condition" like location and ownership of raw materials, available technology, price elasticity

---

1. The basic assumptions of the perfect competition are
   (i) firms produce homogeneous commodity, and consumers are identical from sellers' point of view.
   (ii) both firms and consumers are numerous, and the sales or purchases of each individual unit are small in relation to aggregate volume of transaction.
   (iii) both firms and consumers possess perfect information about prevailing price and current bids.
   (iv) entry into and exit from the market is free for firms and consumers in the long run. (Henderson and Quandt, 1981)

of demand for products, laws and government policies within which the first operates.

Performance is the consequence of structure - conduct. It is a multi-dimensional concept whose criteria for evaluation need to be set out clearly especially where the SPC model is the norm. Criteria for performance evaluation which are often used besides the standard norm of the SPC model include elimination or minimization of waste; technological innovativeness; full or commensurate employment of resources; and equitable distribution of income. Some of the latter criteria are already implicitly considered in the SPC model under its requirements of operational and pricing efficiency conditions. However, for employment and income distribution issues, additional analysis is often needed beyond strict adherence to the SPC model.

The criteria listed above, unlike the SPC model, have received little serious attention. Part of the problem results from the indeterminance of S-C-P model. For example, the structure of the market influences does not totally control the conduct of firms. Thus, the system is not determinate with respect to performance. No given performance can be attributed to a given structure without considering conduct which is indeterminate.

2.3 MEASURES OF PRICING EFFICIENCY IN FOOD MARKETING

Pricing efficiency[2] refers to how well prices across space, time, and variety reflect expected prices based on assumptions of competitive conditions. In spatial analysis, prices in two locations for the same commodity should differ only by transfer cost, provided competitive conditions prevail.[3] The analysis is simplified when there are few central markets to which produce is sent and thus the pattern of flow is easily mapped. Where the pattern of supply sources and destinations are many, the mapping and interpretation of spatial price variation need to be approached more cautiously. The levels of transfer costs are not a linear function of distance independent of cost component that reflects the cost of loading and unloading.

In temporal price analysis, a price series is studied to reveal its components like the trend, the seasonal, and if relevant some cyclical variations. Trend is the long-run movement in the price level; "long-run" being dependent on the type of product (for example, two to three years in grain crops and up to ten or twelve years in cattle). Trend can be estimated using simple linear regression of the form:

---

2. Two major criteria of efficiency used in agricultural marketing are pricing and operational efficiency. Operational efficiency is achieved when the maximum amount of marketing services is on the same level with a minimum of inputs. It is the achievement of maximum output/input ratio (Breimyer, 1976)

3. Transfer cost include loading and handling besides transportation charges. High value of transfer costs in relation to the value of agricultural products may result in big price differentials between locations. (Tomek and Robinson, 1972).

$Y = a + bx + e$

where, a is the constant

Where, b is the trend coefficient

y is the estimated price

x is the time variable of the series, and

a is the error term

2.4 THEORETICAL NATURE OF MARKETING SYSTEM OF TRADITIONAL STAPLE CROPS IN AFRICA

The Standard Research Institute pioneered research work on the efficiency of the traditional staple food marketing systems in Africa. These empirical studies revealed that the traditional marketing system for staple food crops operate in a competitive manner. Markets are characterized by large number of retailers, wholesalers and consumers. The activities of trade associations did not deter competition. Entry into and exit out of the system was found to be free from obstacles. There was very little government intervention in the operation of the staple food marketing system. Southworth et al. (1979) noted that these results are largely at variance with most of the stereotyped notions held by many government officials and other members of the intelligensia in Ghana and elsewhere in tropical Africa. There is evidence that traditional African wholesale marketing system for food crops is remarkably efficient and competitive in the face of numerous obstacles (Gilbert, 1969; Hays, 1976; Ejiga, 1977).

Igene and Akinbolu (1993) writing on post-harvest preservation

technologies for fadama food products noted that though fruit and vegetable production in the fadama areas have doubled in recent years, their supply are always inadequate due to heavy post-harvest losses resulting from poor handling, poor road network and lack of preservation facilities at fresh state. They suggested that government should create opportunities for the development of agro-industries based on the cottage plan model. They also suggest that there should be a link between agriculture as a total system and food processing and marketing.

Amaza et al. (1993), writing on marketing constraints of fadama agricultural products, listed three major constraints on marketing fadama agricultural products. These are poor accessibility to the market, lack of price information and inadequate storage facilities. These constraints in turn affect growth in production of fadama crops.

They suggested that government should intervene in the marketing of fadama products by developing infrastructures such as roads and by promoting the collection, processing and dissemination of market information. More research on appropriate storage facilities should be conducted in order to minimise losses of fadama agricultural products. Balogun and Ishola (1989) writing on management and marketing of fruits and vegetables in Nigeria stressed that for efficient management and marketing, the grower, wholesaler and retailer must plan the marketing functions adequately. They must also organize the productions and marketing inputs. Goods cannot pass through the marketing system without

financial support. Thus, fruit and vegetable farmers apart from being ready to bear the risk involved, need capital or credit for production and marketing of products.

The fadama farmer is susceptible to physical and market risks. Physical risk involves the destruction or deterioration of the produce itself by fire, accident and climatic forces like cold, heat and earthquakes. Market risk, on the other hand, involves inflation and adverse changes in the value of goods during the post-harvest period. The traditional staple food marketing system in developing countries is often depicted as a major barrier to agricultural development. It was a commonly accepted belief that markets for agricultural products do not operate efficiently (Jones, 1970). Large spreads (margins) between prices paid by consumers and those received by producers over time and space are often cited to buttress this point. However, results of empirical studies have shown that this notion is not always true (Lele, 1965; Mellor, 1968; Jones, 1970).

Bauer's "West African Trade" (1963) was one of the first studies on marketing conducted in Africa. The highlight of this finding was that there existed a high degree of competition in internal trade. The study of Thodey (1969) on the "Behaviour of staple food prices in Western Nigeria" indicated a fairly competitive market structure with traders experiencing low margins. He concluded that average seasonal price increases did not seem unreasonably large considering the cost and risks involved in storage. Other studies by Anthonio (1968) and Ilori (1968) on

marketing of food grains in southern part of Nigeria point to the fact that competition among wholesalers and retailers resulted in relatively low return for trader's labour, management and capital.

In her study of food grain marketing system in India, Lele (1974) concluded that in general, the market structure was a competitive one with market intermediaries receiving low margins. Her analysis of price variation over space showed that inter-market price differentials compared favourably with transfer cost. It was also shown that storage was not always profitable because the off season price rise did not always cover costs.

Gilbert's (1968) study on food grain marketing in Kano (1968) found a competitive situation among wholesalers and retailers, and between wholesalers and retailers for food grains. He reported that retail and wholesale markets in Kano City had subdued competition. There was no clear relationship between the number of traders and the degree of competitiveness. He further stated that "marketing margins did not appear excessive but the large profits encountered derived from shortage of lorries as well as trade in marginal surplus and deficit area which is risky". On the issue of intertemporal price variations, Gilbert concluded that average seasonal movements corresponded rather well with the cost of storage although his analysis of inter-market price correlation indicated a rather weak relationship between some selected markets in the Northern states of Nigeria.

Hays (1976) concluded that market intermediaries were generally productive. Marketing services were also provided at reasonable

cost given the technical environment and other constraints under which they operated. He observed that "the organisation and conduct of the markets were typical of those necessary for competitiveness in the marketing system. He noted that farmers had access to many buyers and that there were up to seven intermediaries in the marketing chain. However, Hays (1976) noted that the excessive price difference among urban markets did not result from planned manipulation under monopolistic or monopsonistic conditions inherent in the system. Rather they were due to certain characteristics of production and marketing which made response to inter-market price differentials difficult. Such inherent characteristics according to Hays and Mcloy (1977) included poor market information dissemination system and high risk. However, in a review of Hays' work, Hill (1976) noted that seven intermediaries in long marketing chains are rare. This indicated that the margin received by each of the intermediaries was larger than Hays implied.

2.5 SUMMARY

The review of empirical studies discussed above vividly shows that there is a seemingly high degree of competition in the traditional marketing system for staple food crops in Nigeria and other developing countries. The little differences in conclusions reached could be due to differences in approach, the different methodologies used and also the area of interest to the researcher. The problem specified to the area studied and the commodities could also be determining factors. Most of the studies cited were

specific markets while little attention was paid to the farmers' returns on investment. Market competitiveness, although necessary in determining the efficiency of a market, sometimes suppresses the market margin. According to Jones (1970), "It is clear that competitive market may be necessary but it is certainly not sufficient for the maximisation of productivity". Thus, to concentrate attention on the concept of competition could divert attention from the structural inter-relationships between production, exchange and distribution and hinder growth of potentially viable enterprise such as fadama cropping.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 THE STUDY AREA

The study area covers two states, namely: Kano and Jigawa. Kano State is located between latitudes 10° 5′ and 12° 6′ North of the Equator and between longitude 7° 8′ and 9° 4′ East of Greenwich Meridians. It shares boundaries with Katsina State to the West and Northwest, Jigawa to the East and Northeast and Kaduna and Bauchi states to the South. Jigawa State, on the other hand, lies approximately between latitudes 10° 58′ and 13° of the Equator and between longitude 8° 20′ and 10° 50′ of Greenwich Meridians. The state shares boundaries with the following: Niger Republic to the North, Yobe State to the North East, Bauchi State to the East and South and Kano State to the West (See Map 1).

3.2 CLIMATE

The zone has a number of climatic features which makes it a vulnerable zone in the country (Kolawole, 1991). First, the zone is characterised by a long dry season (October to May), and a relatively short wet-season (June to September). Second, the rainfall is not only scanty, but also erratic in distribution. Third, the rainfall pattern is characterised by spatial and temporal variations in distribution, which often means a drastic reduction in the growing season, low yields and malnutrition or even famine (Kolawole, 1991). The zone is consequently fraught with risk and uncertainty.

MAP OF NIGERIA SHOWING THE STUDY AREA

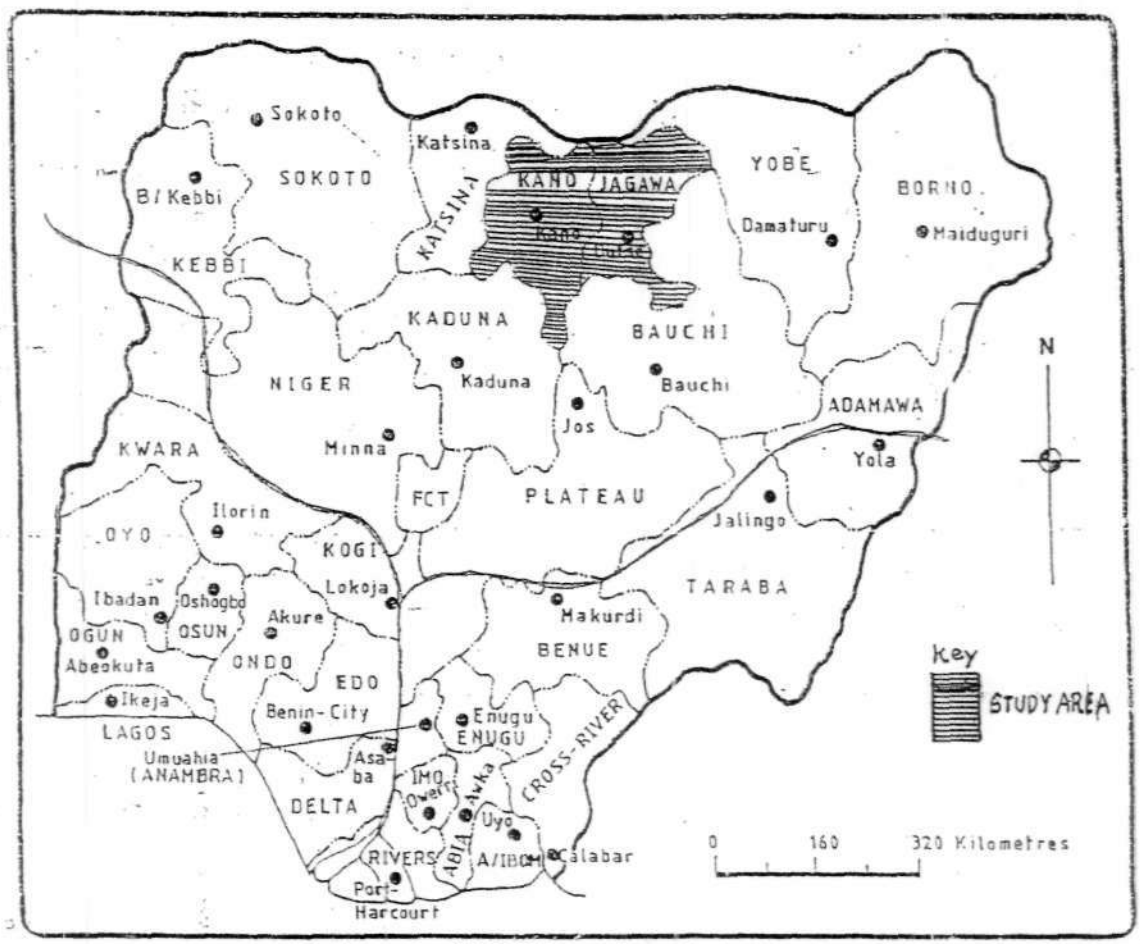


Fig. 1: NIGERIA: The States.

3.3 SOIL AND VEGETATION

The Soil in the study area comprising of Danbatta, Kura Wudil and Bichi in Kano State are made up of the quarternary deposite of consolidated sand and clays; eaolian sand, black sand and gravels, deltaic sands, and the ancient and recent alluvium deposits. In Jigawa State the study area comprising of Birin Kudu Gumel, Hadejia and Kazaure. Here the ancient and recent alluvium deposite are mostly found along the water courses of river Gari and Hadejia. The soils are generally hydromorphic (Kolawole Alamu and Ambi, 1990). The vegetation is the Sudan Savannah of relatively dry types of woodland and savannah (Kowal and Kanabe, 1972).

The main occupation of the people in the study area is farming. The main crops grown are groundnuts, millet, and cowpeas with some sorghum. Rice, wheat and vegetables are also produced. Wheat, Rice and many fadama crops are grown with irrigation during the dry season.

3.4 THE STATE OF RURAL INFRASTRUCTURE FOR FADAMA CROP PRODUCTION

The success of any agricultural and rural development programme depends on a number of infrastructure. Fadama crops production requires a sustainable development of certain infrastructures which include roads, drilling for ground water, and marketing and storage facilities for the fadama crops. These are crucial to the realization of a full irrigation potential. In addition, roads are essential for the transportation of inputs and

outputs as well as for providing access for drilling rigs and maintenance equipment. Other infrastructures needed include the provision of both feeder and access roads for effective marketing of fadama products as well as the construction of certain irrigation facilities, notably dams and canal network. These apart, certain institutional infrastructures such as cooperative societies, financial institutions, research institutions and extension service are necessary. The availability or lack of these are parameters for measuring the level of preparedness for fadama agriculture.

Kano and Jigawa States are among the first three states to have the statewide Agricultural Development Programmes (A D Ps). The other two states are Bauchi and Sokoto (now Sokoto and Kebbi). In the study area there are old irrigation facilities, some of them dating back to the colonial period. The first among them is the Thomas irrigation project for the development of 750 hectares for wheat production. The project involved the construction of a dam and a 9 kilometer main canal as well as distributary channels, and a 650,000 litre fuel storage tank (Mon, 1989).

Thomas scheme is located in Dambatta Local Government Area. Similarly, the Jakarade irrigation project of Kazaure Local Government involves the development of 600 hectares of irrigation agriculture along the Jakara River valley down stream of Jakara dam. In Jahun Local Government area, the Jahun project involves the provision of irrigation facilities of 350 hectares. The people of Yankunama and Hantsu in this area seem to be untouched by the

government scheme. Consequently, they have to rely on self-help efforts to purchase pumps with which they pump water from River Hadejia.

As a means of assisting the farmers associations, the NFDP proposed that the State Implementing Agencies (SIA) engage in the construction of some fadama infrastructures, which are to enhance the marketing of the increased production gained from extension interventions. Such infrastructures like the evaporative cooling sheds and fadama access roads are all geared towards improving the efficiency of the marketing of fadama produce in the study area. However, the market structures in most of the fadama markets were not only sub-standard but also some have non-existing infrastructures. For example Guri Rural Assembly market in Jigawa State has no single infrastructure.

3.5 DATA SOURCE AND COLLECTION

The research methodology used in this study was a combination of data collection methods through primary and secondary sources.

Primary data from fadama farmers were obtained by the use of structured questionnaire. There were two sets of questionnaires. The first one contained information on the major fadama crops produced by fadama farmers in the study area, the marketing arrangements, transportation, marketable surplus, extent of processing and the methodology adopted in the storage of their produce (Appendix 1).

The second questionnaire was directed to marketers of fadama

crops. Information collected include number of years spent in vegetable marketing business, commodities traded in, whether respondent was wholsesaler or retailer; what measure is used to buy and sell a basket/bag of each of the crops, the means of transportation used for transporting the produce, problems of marketing, whether the respondent got loan and the source of loan. Appendix II.

Secondary information were collected from Libraries, Magazines and Journals. Invaluable information was also collected from some agencies such as Kano State Agricultural and Rural Development Agency (KNARDA), Jigawa State Agricultural and Rural Development Authority (JARDA) documents. In addition, oral interviews were held with officers of the Fadama Users Association (FAUs) and that of Women in Agriculture (WIA).

3.6 SOURCING FOR INFORMATION

The survey was multi-staged. The first was a visit to the five States benefitting from the National Fadama Development Project Loan (NFDP) of US $67.5 million. The States are Kano, Jigawa, Kebbi, Sokoto and Bauchi. Kano and Jigawa states were chosen because they are located in the most suitable fadama crop production area in terms of population density. According to World Bank (1992), when the general aridity of the climate and the amount of uncultivable land are taken into consideration, Kano and Jigawa States are the highest. For example, Kebbi and Sokoto States have a mean density of 1.13 person per ha. Bauchi State has a density of 0.85 while Kano and Jigawa States have a mean density of 3.2.

The study area in Kano State was zoned into four, namely: Danbatta, Kura, Wudil and Bichi. That of Jigawa State was also zoned into four, namely: Birnin Kudu, Gumel, Hadejia and Kazaure. Following the reconnaissance survey, two zones in Kano State were chosen for detailed study. They are, Danbatta and Wudil. Similarly, two zones were also chosen in Jigawa State for detailed study. They are Gumel and Kazaure (Table 3.1). The choice of these zones was based on their sizes, accessibility and infrastructural facilities.

Table 3.1

SAMPLED ZONES IN THE STUDY AREA

STATES	ZONES	NAMES OF ZONES
KANO	1	DANBATTA
	II	WUDIL
JIGAWA	1	GUMEL
	II	KAZAURE

Source: Field Survey, 1995.

The reconnaissance survey was very helpful in that it enabled the researcher to reframe some of the questions that were not operational in the field. Some questions that were not useful were also dropped, while useful ones that were previously omitted were included. It also revealed some worthwhile observations about the strategy and time for data collection. For example, it was discovered that it is not wise to interview fadama farmers very early in the morning when they were just starting their work. They

appeared more relaxed and ready to answer questions after the day's labour.

3.7 THE MAIN SURVEY

The field work started on Monday 13 February, 1995. Four enumerators were recruited for the field work.

It was difficult to estimate the number of farmers and marketers in the study area. It was therefore not possible to compile the sampling frame for the study. However, precaution was taken to avoid interviewing any respondent that had been interviewed previously by asking them whether they had gone through the interview before. The marketers were stratified into three depending on whether they sold as wholesalers, retailers or as both wholesalers and retailers.

A total of 180 farmers were interviewed in the study area. The questionnaire contained questions relating to socio-economic characteristics of the fadama farmers, how long they had been in fadama farming; what crops they grow; the activities they carried out in the process of fadama farming, how often they irrigated their various crops in a week, the type of fertilizer they used for each crop, storage distribution, etc. (See questionnaire 1 in Appendix 1).

The second set of questionnaire was directed to 180 fadama crops traders. The questionnaire also asked questions relating to how long they had been involved in vegetable marketing, whether they were wholesalers or retailers, where they bought and sold their crops, what measure they used to buy and sell, the mode of transportation they used, whether they had storage facilities or got loans from the bank, etc. (questionnaire II in Appendix II).

It was difficult to adequately measure the market margins of fadama produce. Figures used were averages. This was due to the differences in the prices at which retailers claimed they bought produce from wholesalers and sold same quantity to consumers. In order to circumvent this problem, we got the average price the farmers sold a standard basket of each of the fadama crops and weighed each basket. We also got the average price the retailers sold the smallest basket of each of the crops to consumers and weighed each of the baskets. Before calculating how many of the small baskets can be got from the big basket we deducted 10% from the standard basket of tomatoes, 7.5% from the standard basket of sweet pepper and 5% from a standard basket of onion. We assumed that these percentages would be lost through spoilage before the retailer finished selling the standard basket. These percentages were got from the retailers.

The weight of the smallest basket which was sold for ₦20.00 for tomatoes and ₦20.00 for sweet pepper and ₦10.00 for onions was used to divide the remaining 90 percent, 92.5 percent and 95 percent of tomatoes, sweet pepper and onions respectively. We multiplied the

number of small baskets by the price of the smallest basket. Thus, we got the price the retailer sold a standard basket of each of the three crops. With the price the farmer sold the standard basket and the price the retailer sold the same standard basket, we were able to calculate the gross marketing margin.

The gross marketing margin for each of the three crops, onions, tomatoes and sweet pepper was calculated. Also the percentage share that goes to the farmer, the rural assembler, local transport, urban wholesaler, lorry transporters and retailer was calculated. The formular used is shown below:

mmg = VPc – Fe

where,

mmg = marketing margin

VPc = value of product to consumers

Fe = Farmers earnings

Also,

mmg = Asse + Lte + Uwe + Ltte + Ure

where,

Asse = Assemblers earnings

Lte = Local transporters earnings

Uwe = Urban wholesalers earnings

Ltte = Lorry transporters earnings

Ure = Urban retailers earnings

Detailed calculation is shown in (appendix 3, 4, and 5).

DATA PROCESSING AND ANALYSIS

The 360 copies of questionnaire were processed in three stages,

namely, coding data preparation and data analysis. The coding was carried out by giving numerical values to each respondent's answer with zero denoting non-response. This stage was relatively easy since the questionnaire had been pre-coded.

The coded data were then fed into the computer for analysis The data were analysed using the statistical package for social sciences (SPSS). The analysis was based on simple descriptive statistical instruments such as frequency distributions, tables, percentages mean and standard deviations. Other statistical tools such as Chi-square test, analysis of variance and correlation coefficient were used.

The Chi-square distribution is one of the most fundamental and useful distributions encountered in theoretical and applied statistics. It is the distribution of variances of random samples. Thus, it may be used to establish the confidence limits for an estimate of the standard deviation in the same way that the normal distributions are used to establish confidence limits for means. It is convenient for analyses of the sample counts of individuals who do and do not possess the attribute being investigated. (Snedecor and Cochran, 1967).

When computing Chi-square, it is essential to use the actual size of sample and the actual numbers in the two attribute classes. The main function of Chi-square is to enable us judge whether the sample ratio itself departs much or little from the hypothetical population value. Thus, Chi-square is a good tool in survey studies. It is used for the test of goodness of fit. When the

enumeration data are available with discrete variables in clear cut classes, the Chi-square statistics can be used to determine whether the observed values conform to certain theoretical distribution or not. The formular for Chi-square is $X^2 = \frac{\Sigma(O - E)^2}{E}$

Where O = observed frequency and

E = expected frequency

Analysis of Variance (ANOVA) on the other hand is used in the evaluation of the statistical significance of the difference between a pair of variances. This type of statistical problem arises most directly and obviously in the comparison of two methods of measuring the same thing.

ANOVA consists of a formalized system of statistical analysis designed to evaluate the contributions of various sources of variation to the estimated variance. This system depends on the operations of two basic principles, namely:

(i) the variance of the sum of two variables is equal to the sum of the variances of each of the variables

(ii) the variance of a distribution curve is independent of its location on the abscissa.

The system of ANOVA is then a method of experimental design which holds each variance unvariant for a series of simultaneous observations.

A correlation coefficient, like a regression equation, is determined for X and Y scores that are paired. There are a number of different correlation coefficients, but this study concentrates on the Pearson correlation coefficient, γ . This correlation coefficient gives a maesure of closeness to linearity of a

relationship between the variables and determines the precision with which the regression equation can be used for prediction (Gilbert, 1976).

There is, however, no need considering one variable as dependent and the other as independent in correlation problems. For example, we may consider the relationship between weight and height of farmers. Tall people tend to be heavier and short people lighter. Thus, height could be used to predict farmers weight and vice-versa.

This study made use of correlation because it measures the strength of a linear relation between two variables when there is no distinction between the two variables X and Y. Either one may be designated as X. Therefore, γ measures how closely the (X, Y) pairs of data are linearly related and it tells whether the slope of a regression line is positive or negative. The formular for obtaining γ is written as:

$$\gamma = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n \Sigma X^2 - (\Sigma X)^2}\ \sqrt{n \Sigma Y^2 - (\Sigma Y)^2}}$$

CHAPTER FOUR

4.0 SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENT FADAMA CROPS MARKETERS

This chapter examines the socio-economic characteristics of respondent fadama crop marketers. It focuses on the organisation of the marketing system, types of markets, marketing infrastructure and the intermediaries involved in the marketing system.

Table 4.1 Distribution of Respondents by Age.

Age group	Frequency	Percentage
21 - 25	2	2.22
26 - 30	10	11.11
31 - 35	12	13.33
36 - 40	14	15.56
41 - 45	18	20.00
46 - 50	24	26.67
51 and above	10	11.11
Total	90	100

Source: Field Survey, 1995.

Table 4.1 shows that the highest concentration of respondents which was 26.67 percent fell within the age group of 46 - 50 years, while the least 2.22 percent are those within the age group of 21 - 25 years. Others include the 41 - 45 age group with 20.00 percent; 36 - 40 age group with 15.56 percent; 31 - 35 age group with 13.33 percent and 26 - 30 and 51 and above coming last with 11.11 percent each. The highest concentration of respondents in the age groups of 41 - 50 which accounts for more than 35.00 percent could be because this group of people could have acquired enough experience in

the trade to be able to cope with the problems involved in fadama crop marketing.

The mean age is 41.22 years and the standard deviation is 2.81. This means that over half of the respondents are above the age of 40 years. Naturally, when people are above 40 years, their productivity diminish, especially when the work they do demands physical efforts rather than mental. Thus, the productivity of the respondents in terms of marketing efficiency would be low. In addition to this, only 24.44 percent of the respondent fall within the age group of 26 - 35 years which can be termed energetic youths.

Table 4.2: Distribution of Respondents by Age in Jigawa State

Age group	Frequency	Percentage
21 - 25	4	4.44
26 - 30	12	13.33
31 - 35	22	24.45
36 - 40	26	28.89
41 - 45	12	13.33
46 - 45	8	8.89
51 and above	6	6.67
Total	180	100

Source: Field Survey, 1995

Table 4.2 confirmed that the highest concentration of respondents which was 28.89 percent fell within the age group of 36 - 40 years, while the least 4.44 percent are those within the age group of 21 - 25 years. Others include the 31 - 35 years with 24.45 percent; 26 - 30 and 41 - 45 age group

coming next with 13.33 percent each; 46 - 50 years with 8.89 percent and 51 years and above with 6.67 percent.

The highest concentration of respondents are those in the age group of 31 - 40 years. This group accounts for over 50.00 percent. On the other hand the lowest are those in the age group of 21 - 25 years with 4.44 percent. The very low percentage recorded for this age group could be because they are too young and relatively new in the business.

The mean age in Jigawa State is 37.3 years and the Standard Deviation is 0.79 which shows that the age of the respondents is closely distributed about the mean. About 70 percent of the respondents also fall between the ages of 26 and 45 years. This is very significant because this is the age group that naturally produces the highest level of efficiency because they are very strong.

Table 4.3: **Distribution of Respondents by Age, Kano and Jigawa States combined**

Age group in years	Frequency	Percentage
21 - 25	6	3.33
26 - 30	22	12.22
31 - 35	34	18.89
36 - 40	40	22.22
41 - 45	30	16.67
46 - 50	32	17.78
51 and above	16	8.89
Total	180	100

Source: Field Survey, 1995

Table 4.3 shows that the highest concentration of respondents 22.22 percent fall within the age group of 36 - 40 years, while the least 3.33 percent are those within the age group of 21 - 25 years. Others include the 31 - 35 age group with 16.67 percent; 26 - 30 age group with 12.22 percent and 51 and above being second to the last with 8.89 percent.

The highest concentration of the respondents in the 36 - 40 age group could be explained on two grounds. First, this group is made up of those who are physically strong enough to undertake most of the operations involved in fadama produce marketing using their own labour. Second, this group of people could have acquired enough experience in the trade to be able to cope with the problems involved in fadama crop marketing.

On the other hand, the very low percentage recorded for age group 21 - 25 and 51 and above could be because the former are too young and may be relatively new in the business while the latter could be too old to cope with the physical riguor and risk involved in fadama crop marketing.

10 percent of them have primary and secondary education. Thus, they may forget the cost price. Furthermore, these illitrates will find it difficult to export crops to Europe markets as Chelagric (Nig) Ltd, Kano is doing in Kano State.

4.4 Education

Table 4.4 Distribution of Respondents According to Level/Type of Education Attained in Kano and Jigawa States combined.

Type/Level of Education	Frequency	Percentage
Koranic	136	75.56
Adult	26	14.44
Primary	10	5.56
Secondary	8	4.44
Total	180	100.00

Source: Field Survey, 1995

As confirmed in Table 4.6 above, the most popular type of education among the respondents was Koranic education which recorded 75.56 percent. Followed by adult education with 14.44 percent while primary education came third with 5.56 percent. The effect of Universal Primary Education (UPE) is not felt in this study probably because most of the respondents would have been above school age at the time UPE was introduced in 1973.

Koranic education ranks as the most popular educational system because of the predominance of the Hausa/Fulani ethnic group who are mostly muslim by religion. Since in Islam, preference is given to Koranic education, most of our respondents appear to have resorted to it. The fairly high proportion of adult education 14.44 percent could be as a

result of the impact of the Kano State government's promotion of adult education in the State.

4.4 Experience

Table 4.5: Distribution of Respondents According to Years of experience in Marketing in Kano and Jigawa States combined.

Years of Experience	Frequency	Percentage
1 - 5	18	10.00
6 - 10	28	15.56
11 - 15	38	21.11
16 - 20	26	14.44
21 - 25	22	12.22
26 - 30	44	24.45
31 and above	4	2.22
Total	180	100.00

Source: Field Survey, 1995.

Table 4.5 indicates that majority of the respondents 24.45 percent fall within the group that has 26 - 30 years of experience in marketing fadama produce. This is followed by the group that has 11 - 15 years of experience with 21.11 percent. Others are those with 6-10 years of experience with 15.56 percent; those with 16 - 20 years of experience came next with 14.14 percent, those with 21 - 25 years followed this group closely with 12.22 percent and the least are those with 31 and above years of experience with only 2.22 percent.

Table 4.6: Distribution of Respondents According to types of Marketers in Kano State.

Types of Marketers	Frequency	Percentage
Wholesaler	34	37.78
Retailer	48	53.33
Both Wholesaler and Retailer	08	8.89
Total	90	100

Source: Field Survey, 1995.

Table 4.6 shows that majority of the Respondents in Kano State are retail traders. They represent 53.33 percent of our respondents. The wholesalers came next with 37.78 percent while those who said they are both wholesalers and retailers came last with 8.89 percent.

Table 4.7 : Distribution of Respondents According to types of Marketers in Jigawa State

Types of Marketers	Frequency	Percentage
Wholesaler	20	22.22
Retailer	64	71.11
Both Wholesaler and Retailer	06	6.67
Total	90	100.00

Source: Field Survey, 1995.

Table 4.7 shows that majority of the Respondents in Jigawa State are retail traders. They represent 71.11 percent of our respondents. The wholesalers came next with 22.22 percent while those who are both wholesalers and retailers came last with 6.67 percent. This is in consonant with normal trend in any marketing system. That is retail traders are

always more than wholesalers.

Table 4. 8: Distribution of Respondents According to Types of Marketers in Kano and Jigawa States combined.

Types of Marketers	Frequency	Percentage
Wholesaler	54	30.00
Retailer	112	62.22
Both	14	7.78
Total	180	100

Source: Field Survey, 1995.

Table 4.8 shows that majority of the respondents are retail traders. They represent 62.22 percent of the total. The wholesalers came next with 30 percent and those who claim to be both retailers and wholesalers came last with 7.78 percent. The data is in consonant with the normal trend in any marketing system which shows that there are always more retail traders than wholesalers.

Table 4.9: Distribution of Respondents According to means of Transportation used in Kano State

Type	Frequency	Percentage
Pick-up	42	46.67
Motor cycle	26	28.89
Bicycle	14	15.56
Donkey	08	08.88
Total	90	100.00

Source: Field Survey, 1995.

Table 4.9 shows that transportation is usually by pick-up, motorcycles and bicycle. About 47 percent of the respondents farmers use this mode of transport. This is

followed by motor cycle with 28.89 percent; bicycle with 15.56 percent. The least is donkey with 08.88 percent.

The main difficulty of the respondent farmers in Kano is the high cost of transportation. This problem has been ascentuated by the increase in the price of petroleum and spare parts. As a result transporters always ask for so much money that it sometimes wipes away a large proportion of the profit of fadama farmers.

Table 4.10: Distribution of Respondents According to means of Transportation used in Jigawa State

Type	Frequency	Percentage
Lorries	80	88.89
Motor cycle	08	08.89
Bicycle	02	02.22
Donkey	0	0
Total	90	100.00

Source: Field Survey, 1995.

Table 4.10 shows that the most common means of transportation used in Jigawa State is pick-up, 88.89 percent of the respondent farmers use this mode. This is followed by motor cycle with 08.89 percent. The least being bicycles with 02.22 percent.

The problem of farmers in this State is that lorries charge high rate because of the difficulties of moving into the farm to evacuate farm produce. Farmers claimed that transportation cost accounts for the highest form of costs incurred in the marketing of agricultural produce.

Table 4.11: Distribution of Respondents According to means of transportation used in Kano and Jigawa States combined.

Type	Frequency	Percentage
Pick-up	122	67.78
Motor cycle	34	18.89
Bicycle	16	8.89
Donkey	08	4.44
Total	180	100.00

Source: Field Survey, 1995.

Table 4.11 shows that the most common means of transportation used in the two States is pick-up. About 68 percent of the respondent farmers use this mode. This is followed by motor cycle with 18.89 percent, and bicycle with 08.89 percent. The least is donkey with 4.44 percent.

Farmers said that because of the nature of fadama crops, which is usually bulky and highly perishable, the cost of transportation is always high. Evidence from the two states tend to suport this. For example, in Jigawa State a basket of tomatoes is transported at the cost of ₦35.00 from Ringim to Central market. Similarly, the farmers claimed that it costs them between ₦13,000.00 to ₦15,000.00 to transport their produce from Jigawa State to Lagos by a 911 lorry. The produce carried by each of these pick-up is about 150 tonnes.

Table 4.12: Distribution of Respondents According to sources of loans in Kano State

Sources of Loan	Frequency	Percentage
NACB	06	6.67
Friends	15	16.67
FUAs	14	15.56
Money Lenders	04	4.44
No Loans	51	56.66
FUAs	90	100.00

Source: Field Survey, 1995.

Table 4.12 shows that only 43.34 percent of our respondent got loans at all. Among these people 16.67 percent got loans from friends; while 15.56 percent got loans from Fadama Users Associations (FUAs). Only 6.67 percent of our respondents got loan from NACB, the remaining 4.44 percent got their loans from money lenders. The table shows that 56.66 percent of our respondent marketers in Kano State did not get loans at all. It follows therefore that most of the traders in fadama crops do not have credit facilities. One would have expected the Fadama Users Association to be able to assist traders to get credit, but there is enough indication to suggest that credit mobilisation is low among FUAs since only 15.56 got loan through the association in Kano State.

Table 4.13: Distribution of Respondents According to sources of loan in Jigawa State.

Sources of Loan	Frequency	Percentage
NACB	04	4.45
Friends	12	13.33
FUAs	15	16.67
Money Lenders	03	3.33
No Loans	56	62.22
FUAs	90	100.00

Source: Field Survey, 1995.

Table 4.13 above shows that as much as 62.22 percent of our respondent fadama traders in Jigawa State did not get any loan. The table shows that only 16.67 percent got loans through the Fadama Users Associations in Jigawa State. This was followed by those who got loans from friends with 13.33 percent. NACB gave loans to only 4.45 percent of our respondent marketers in Jigawa State. The remaining 3.33 percent loans got theirs from money lenders. It follows that majority of the traders in Jigawa State also do not have credit facilities. This is most unfortunate, because it appears as if the financial institutions do not recognise traders of fadama crops as farmers.

Table 4.14: Distribution of Respondents According to Sources of Loan in Kano and Jigawa States Combined

Sources of Loan	Frequency	Percentage
NACB	10	5.56
Friends	27	15.00
FUAs	29	16.11
Money Lenders	07	3.89
No Loans	107	59.44
FUAs	180	100.00

Source: Field Survey, 1995.

Table 4.14 shows that only about 40.00 percent of our respondent traders in the two States, Kano and Jigawa benefitted from any form of loan. Among these 15.00 percent got their loans from friends while 16.11 percent got loans from Fadama Users Associations (FUAs). Only 5.56 percent got

loans from NACB, while the remaining 3.89 percent that got loans, got them from money lenders. Considering the importance of marketing in fadama farming business one can conclude by saying that the data on loan in the two States are not impressive. Marketing involves a lot of costs and credit facilities should be made available to traders inorder that they may be able to perform relevant marketing functions.

4.1 ORGANISATION OF THE MARKETING SYSTEM

The marketing system in the study area consists of various types of markets and exchange points where the marketing services of assembling, bulk breaking, transportation and storage are performed. The marketing process ranged from the simple exchange between households at the village level to movement of fadama crops to rural, semi-urban markets and on to the final consumers.

4.2 TYPES OF MARKETS

Markets can be classified according to their locations as either rural or urban markets. Rural markets are markets which are located in rural areas. They can be classified according to their accessibility by transport route into isolated and non-isolated rural markets. The isolated rural markets refer to markets in the remote villages which are not easily accessible to motor vehicles. Such markets are held periodically and the market population is usually small. The most important modes of transportation in such markets are head portage, bicycle, motorcycle, donkey and to a limited extent, lorries which are used mainly during the dry season.

The non-isolated rural markets usually hold once or twice in a week and draw buyers and sellers from up to fifty kilometer radius. Apart from easy accessibility, these markets could be easily distinquised from isolated village markets by large attendance of both buyers and sellers and also by large market arrivals. This type of market serves as a link between the isolated rural markets and the large urban markets.

Urban markets are the major sources of fadama crops to the urban consumers. They operate on a daily basis. In some towns there are often more than one market. For example in Kano there are more than four markets where fadama crops are sold. Urban markets have better physical structures such as lockable stalls. This makes it possible for fadama crops like onion to be stored. They attract a large number of market participants and offer a wider assortment of merchandise than rural markets.

4.3 MARKETING INFRASTRUCTURE

Marketing infrastructures refer to all such amenities that facilitate the performance of various marketing functions. In the agricultural sector, the existence of good infrastructural network is of primary importance because of the nature of some agricultural produce, especially the bulky and highly perishable ones. These two features are particularly significant because they, to a large extent, affect the cost of transportation, storage and quality

maintenance.

Most of the structures in the study area are of temporary nature. They are made of wood, open ended and covered with leaf, tree branches or grass thatches. In most cases this low cost approach is found in the rural market. This is probably because the traders' lack of confidence in the permanency of the market location including the insecure tenure of privately owned facilities. The few permanent structures, mainly lock-up stalls which exist are in larger markets. Generally, they are constructed by the Local Government Councils (LGC).

In most of the markets, there are no pipe-borne water. This not only causes health hazards but also contribute to the quality losses of fadama produce due to inadequate water for washing and sprinkling. Similarly, public conveniences are mostly absent or inadequate. This further contribute to the public health problem. The regular collection of refuse and the provision of safe garbage pits are also unsatisfactory.

Rural Markets

Rural markets in the study area can be termed periodic markets (PMs). This is often called weekly markets. The PMs operate periodically. The period can vary from every other day to every seventh or eighth day. The periodicity of a market in a given rural area is linked to the periodicity of a number other markets in the same rural area. They act as a closed circuit for itinerant traders and retailers who operate on a week-long basis visiting each of the markets on a

particular day of the week.

The majority of PMs are retail markets where a great variety of consumer goods, clothing, electrical products, soft-ware, fadama produce, fish and meat are sold. The periodic markets are only in small part agricultural: Agricultural products (Fadama) account for only a small part of total activity. These PMs are typically located along tarred roads.

The Rural Assembly Markets (RAMs)

Rural Assembly Markets are specialized markets where large quantities of one or two commodities are collected, displayed and sold for despatch to industrial users or central wholesaler markets in major consumption centres. In markets where two or more commodities are traded, one will usually dominate, with the few remaining commodities occupying only a small portion of the market.

Generally, RAMs are appreciably smaller in size than PMs. They are more compact and self-contained, and are more easily accessible for tructs and lorries than PMs. RAMs, generally cater for the long distance, inter-state or inter-regional trade. Traders operating in RAMs assemble truck loads of a given commodity, act as agents for wholesalers in urban centres. They also sell directly to industrial users. Retail in Fadama produce is typically absent here. An example of RAM noted in Kano State is Gwanar Gafa market. That of Jigawa State is the Guri market in Madachi Village. In these markets

when the main commodities arrive they are packed in the appropriate packing materials, be it baskets, bags or crates. They are sold in wholesale quantities by traders specializing in this line of business.

4.4 INTERMEDIARIES INVOLVED IN THE MARKETING SYSTEM

The intermediaries in the marketing system are the various functionaries or agencies involved in marketing of fadama produce as it moves from the producers to the final consumers. The marketing intermediaries perform the marketing functions necessary to create the utilities of time, place, form and possession. The nature and types of market intermediaries identified in this study are discussed below.

Rural Selling Agent

This group of middlemen are resident in the village or nearby villages. They usually rent a market stall from where they measure and sell fadama crops on behalf of the farmer on market days. The selling agents do not take title to the crop but function mainly as an intermediary between the buyers and the sellers. They sell fadama crops on behalf of the farmers in convenient units to buyers. Usually, tomatoes are sold in baskets. These baskets are of varying sizes. For example, we have the big, medium and the small sizes. The big standard size weigh about 38.8kg, the medium one weighs about 22.5kg while the small one weighs about 3.6kg. The big standard size is used mainly by farmers and Rural Assemblers, the big and medium ones are used by wholesalers and Retailers while the

small ones are used between Retailers and Consumers.

At the first stage of marketing, the big standard basket is used to sell and buy tomatoes. The Rural Selling Agents sell the tomatoes on behalf of the farmers to the Rural Assemblers. The Rural Selling Agent is given his commission in cash or in kind for his service.

As for Onions, they are sold in bags or baskets. At the level of farmer/Rural Assembler/Wholesaler and Retailer the transaction is done in bags. The same goes for sweet pepper. But at the level of Retailers and Consumers all transactions are done with the small basket. The Rural Selling Agents do not require much capital to operate. The only capital he needs to enter business is what he will use to purchase the big Standard baskets and bags for measurement. The rural Selling Agent is known as 'Dilali' in the study area.

Rural Assemblers

Rural assemblers are merchants who reside either in the rural or urban areas and go from one rural market to another to purchase fadama produce. They have linkage among the Rural Selling Agents in villages who contact farmers on their behalf. The Rural assemblers buy in bags or baskets. These are sown up or sealed. In the end, the crops so assembled are transported by motor vehicles to wholesalers in urban and semi-urban markets.

The rural Assemblers use their initiatives to decide when to buy. Usually they buy very early in the morning from those

who brought their products the previous day. They also buy cheaply in the evening when people are about to go home. Because farmers are not willing to take their highly perishable crops, especially tomatoes and sweet pepper back home they have not better choice other than sell them on the same day. Since the rural assemblers buy in the rural markets and sell in urban markets, they serve as price informants to the farmers and rural commission Agents. They require a large amount of capital for the purchase and transportation of fadama crops.

Rural Retailer

The rural retailer is usually resident in the village. He rents a market stall or provides a shade in the rural market where he carries out his retail business on market days. The rural retailer takes title to the crop he purchases mainly from the farmers and the rural commission agents. The rural retailer sells to the rural consumers and sometimes to the rural assemblers.

The unit of measure used in the traditional marketing system for the purchase and sales of fadama crops is the small basket. Some times a small metal container like a bowl is used. In some other markets, rural and urban retailers just gather up their produce in small heaps and sell at ten or twenty Naira each.

The actual weight of crops contained in the small baskets or in small heaps is not known. The tomatoes put together in

small baskets, metal containers and in small heaps when weighed were 1.8, 2.00 and 2.2 kg respectively costing ₦20.00 each. As for onions, each measure weighed 0.8, 1.2 and 1.4 kg respectively which cost ₦10.00. A measure of sweet pepper however weighed between 1.25 and 1.50 kg each of which cost ₦20.00

Urban Wholesalers

The urban wholesalers usually resides in the urban areas. They sell on wholesale basis in bags/baskets in the urban markets. The urban wholesalers have lockable stalls in the urban markets where they preserve and store some fadama crops, like onions, until they are bought. The urban wholesalers take title to the produce, and they buy and sell for profit purposes. The urban wholesalers specialise in selling only one commodity. If he buys and sells tomatoes he does that with care and tact because they are soft, succulent, fragile and highly perishable. He uses baskets only for selling tomatoes. Those who deal in sweet pepper specialise in that only and use both bags and baskets. Wholesalers who sell onions put them in bags and can store his crops for a longer time than the first two who trade in tomatoes and sweet pepper.

Urban Retailers

Urban retailers usually sell in small and convenient units such as small baskets, metal containers or in small heaps as described in Rural retailers. These they sell to

urban consumers in the daily urban markets. It was observed that the quantity sold in urban markets for ₦20.00 is less than those sold by the Rural retailers for the same amount. For example, the weight of tomatoes in urban centres was between 1.6kg and 1.9kg instead of between 1.8 and 2.2kg in the rural markets. That of onions was between 0.8kg and 1.00kg, but it was sold for ₦10.00 instead of ₦20.00. As for sweet pepper the weight was between 0.75kg and 1.25kg instead of between 1.25 and 1.50kg that was sold for the same amount of ₦20.00 in the rural market.

The urban retailers either buy fadama crops in baskets or fraction of a basket from urban wholesalers in the same market. The urban retailers are sometimes engaged in selling up to five different fadama crops. The retailers are more numerous in fadama crop marketing system than all the other market intermediaries discussed above.

CHAPTER FIVE

5.0 ANALYSIS AND PRESENTATION OF FIELD FINDINGS

This chapter examines the structure and conduct of fadama crop marketing in the study area. It focuses on the marketing functions performed by fadama produce marketers, the channels of distribution, efficiency and performance of the marketing system. Furthermore, the chapter examines the gross marketing margin of each of the three crops studied, tested three hypotheses and concludes by identifying the marketing problems in the study area.

5.1 MARKETING FUNCTIONS PEFORMED BY FADAMA PRODUCE MARKETERS

There are many functions which must be performed for the smooth flow of goods and services. There are three categories of such functions in fadama produce marketing. They are the physical functions; the exchange and the facilitating functions.

(1) **Physical Function**

The physical functions include assembling, grading, packaging, transportation, storage and processing. Assembling refers to the collection of the small quantities of individual farmer's products into large wholesale units. Grading on the other hand, refers to sorting of products into various categories.

Packaging refers to the placing of commodities into containers that protect them from damaging during the journey. And transportation is concerned with making goods available at the proper place (Ejiga, 1979).

The type of function performed differs and varies with the crop under consideration. For instance, tomatoes and sweet pepper

being highly perishable, as a result of their high moisture content pose greater problems in handling. The commonest form of storage and processing of tomatoes and sweet pepper is through sun drying with over 85% of the respondents alluding to this fact. But this traditional method of drying tomatoes and pepper appears not acceptable to consumers and are generally not attracting commensurate prices. It is however, important to note that cold storage which would have facilitated the quality retention and guarantee good prices for the highly perishable products is not commonly practised in the study area. The non-use of cold storage could be due to the fact that most of the producing villages are not connected to the national electric grid, while the cost of buying refrigeration equipment has been exacerbated by the high inflation prevalent in the country (Development Consultant Ltd., 1985).

2. **Exchange Function**

The profitability of agricultural produce could be a measure of the timing of sales. For instance, during peak production season, there are evidences of localised gluts of agricultural produce with the attendant drops in prices. This logically follows the simple law of demand and supply. All things being equal, farmers do prefer selling of their produce off-season so as to attract better prices. Field investigations show that majority of farmers dispose off their produce at harvest, because there are no storage facilities.

3. Facilitating Functions

Evidence from the study area lends credence to the fact that processing and storage of fadama produce appears to be the major set-back against effective marketing arrangement for some fadama crops. This is particularly important for such fadama crops like tomatoes and sweet pepper which are characterised by high level of moisture content. Field investigations confirm that the best method of processing tomatoes is the turning of the produce into tomatoes puree. This system requires some level of sophistication in terms of handling equipment and high degree of hygiene. The hygiene factor is particularly relevant here because failure to observe this could lead to food poisoning.

Transportation

Transportation is usually by bicycle, motorcycles or motor vehicles. Unless the quantity is very large, most farmers transported themselves to the markets hence transport cost is then an imputed cost. However, most itinerant traders move their produce from farmgate to markets using pick-ups, buses and/or lorries. Here the costs are real. In Ringim central market, it costs a farmer about ₦35.00 to transport a basket of tomatoes to the market. In Kafin Gana/Ruda village in Birnin Kudu, the farmers said it costs them about ₦13,000.00 to use a 911 lorry to transport their produce to Lagos.

Transportation of fadama products was found to be inefficient, its cost alone was found to constitute about 15 percent of wholesale prices for these commodities. Any sudden rise in

marketing cost was found to be as a result of higher transportation cost. This was usually resulting into a proportional higher commodity price. The recent hike in fuel pump price has been adduced as the reason for high transport cost in the study area.

Roles of institutions in Fadama Produce Marketing

The National Fadama Development Project (NFDP) is considered unique because of the formation of Fadama Users Association Unit (FUAU). This unit is expected to carry out the work of organising farmers into Fadama Users' Association (FUA), with the aim of giving an array of assistance which will help in the improvement of the welfare/standard of living of the fadama farmers. The (FUA) is expected to organise the farmers in such a way to encourage them to take-up joint activities through training, marketing and maintenance of infrastructures on the fadama lands.

The unit has made remarkable progress in some of these areas, but when respondents were asked on the group effort in the marketing of their produce, only about 30% of the respondents agreed that membership of the FUA groups have facilitated the disposal of their produce.

Another role expectation of the farmers groups is in the area of assisting members with credit. There are indications that credit and savings mobilisation is low among the FUAs. Only about 15% of the respondents said that they have obtained credit assistance from the groups.

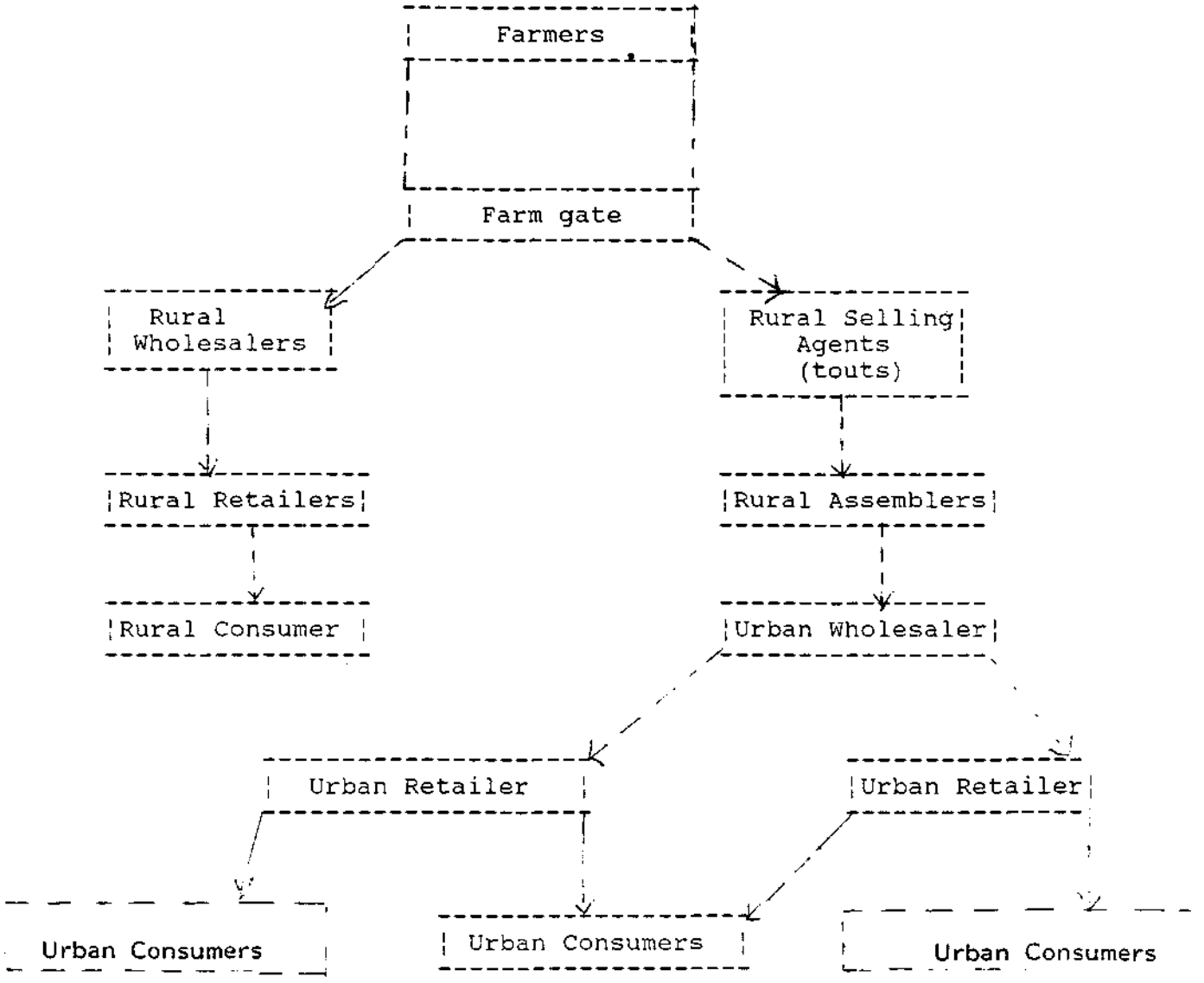
5.2 MARKETING CHANNEL IN THE STUDY AREA

The systematic pathway of moving the fadama produce from the farmers farm (farm gate) to the final consumers, defines the channel of distribution,of these produce. The issue of market channels is of paramount importance to market economist since it marks the way and manner by which the production cycle is completed.

The major actors in the channelling of fadama produce in the study area include the assemblers, the wholesalers, retailers, producers and final consumers. Field data collected delved into the most prominent of these market-channel actors. To this end farmers were requested to indicate the major buyer of their products. A large proportion of the farmer respondents opined that they prefer selling their produce to assemblers. The main reasons adduced is that of quick and guaranteed payment for their produce, the reduction of risk associated with the handling of some of the highly perishable fadama produce and the reduction of costs associated with the performance of marketing functions that could well be efficiently undertaken by assemblers.

The assemblers sell to the rural wholesaler and the rural selling agents. These two set of people sell either to the rural retailer or urban wholesalers. The rural retailers then sell to the rural consumers. The urban wholesalers sell to urban retailers. Finally, the urban retailers sell to the urban consumers. Figure 5.1 is a diagramatic represention of the channels of fadama produce movement in the study area.

Fig. 5.1 **MARKETING CHANNEL FOR FADAMA CROPS**



There are five distinct types of middlemen involved in the marketing of fadama crops in the study area. They are rural selling agents, rural assemblers, rural retailers, urban wholesalers and urban retailers. In terms of number, there are many of each of the above categories of middlemen operating in the rural and urban markets. A limiting factor to the amount of crops a middleman is able to buy at any given time is the amount of money available to him.

In terms of distribution of purchase, there is enough evidence from the study to suggest that purchase of a few "big" wholesalers outweights the purchases of the other wholesalers put together. For example, while some wholesalers could buy between 10 and 15 baskets of tomatoes, there are a few who would buy between 150 to 200 baskets. In times of glut, when every farmer wants to sell off his produce in order to avoid spoilage, some of them sometimes persuade big wholesalers to buy from them by reducing price. This is done because they do not want to cut and dry their produce. The economists may call this monopsony power. The only difference is that it is not the big wholesaler who cuts down the price, but desperate farmers who want to get rid of their produce.

5.3 EFFICIENCY AND PERFORMANCE OF THE MARKETING SYSTEM

The term "efficiency" which describes a ratio between output and input is a term that economists have borrowed from engineers (Breimyer, 1976). In contrast to engineering system however, the efficiency of economic system is not as easily and precisely determined. The efficiency of marketing systems is one of the

least precisely determined in economics largely because of the difficulty associated with measuring the outputs of marketing. The outputs of marketing are consumers satisfaction with products and services. Marketing contributes to consumer satisfaction by making goods available at the desired place through transportation, at the desired time through storage and at the desired form through processing and packaging.

In assessing marketing efficiency, two types of efficiency studies are usually made: Operational efficiency and pricing efficiency. Operational efficiency considers how the physical parts of marketing (transport, storage, processing, handling etc.) are carried out. Pricing efficiency, on the other hand is concerned with improving the operations of buying and selling so that the resultant prices throughout the marketing channel accurately and promptly reflect the consumer's wish.

The theoretical model of analysis is by contrasting the actual prices generated by the marketing system with those expected from perfectly competitive markets. In this regard, we expect that an efficient marketing system will establish prices at different geographical markets that are related through transport costs. Similarly, in a competitive system, prices of different forms of a commodity are related through processing costs and prices of a commodity at different times of the year are related through storage costs.

Spatial Pricing Efficiency

Spatial pricing efficiency analyses the integration of markets by comparing price differentials between markets and transfer costs and also the correlation in the movement of price in different markets. The theory is that in markets that trade with each other price differentials should not greatly exceed transfer costs and the correlation between price movement in such markets should be high (Gilbert, 1976).

Correlation analysis is not a test of direction, rather it is a test of strength. It shows whether the correlation is high or low (Gilbert, 1976). Correlation analysis can be done between crop and crop and between markets. Both crop and market correlation analyses are used in this study. A correlation analysis of tomatoes and sweet pepper was done for Jigawa State. The result is the graph below in Fig. 5.2.

Fig. 5.2: Price movement of Tomatoes and Sweet Pepper in Jigawa State in 1994.

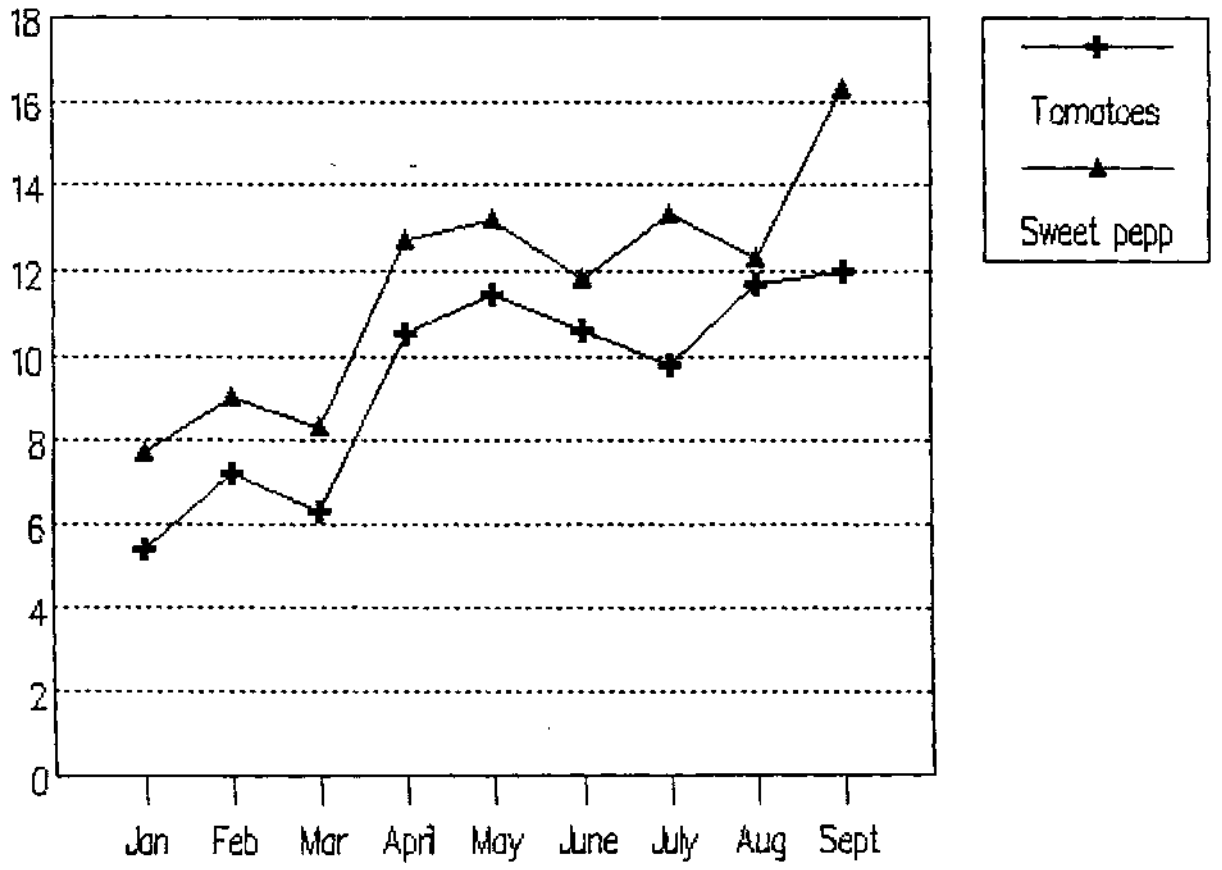
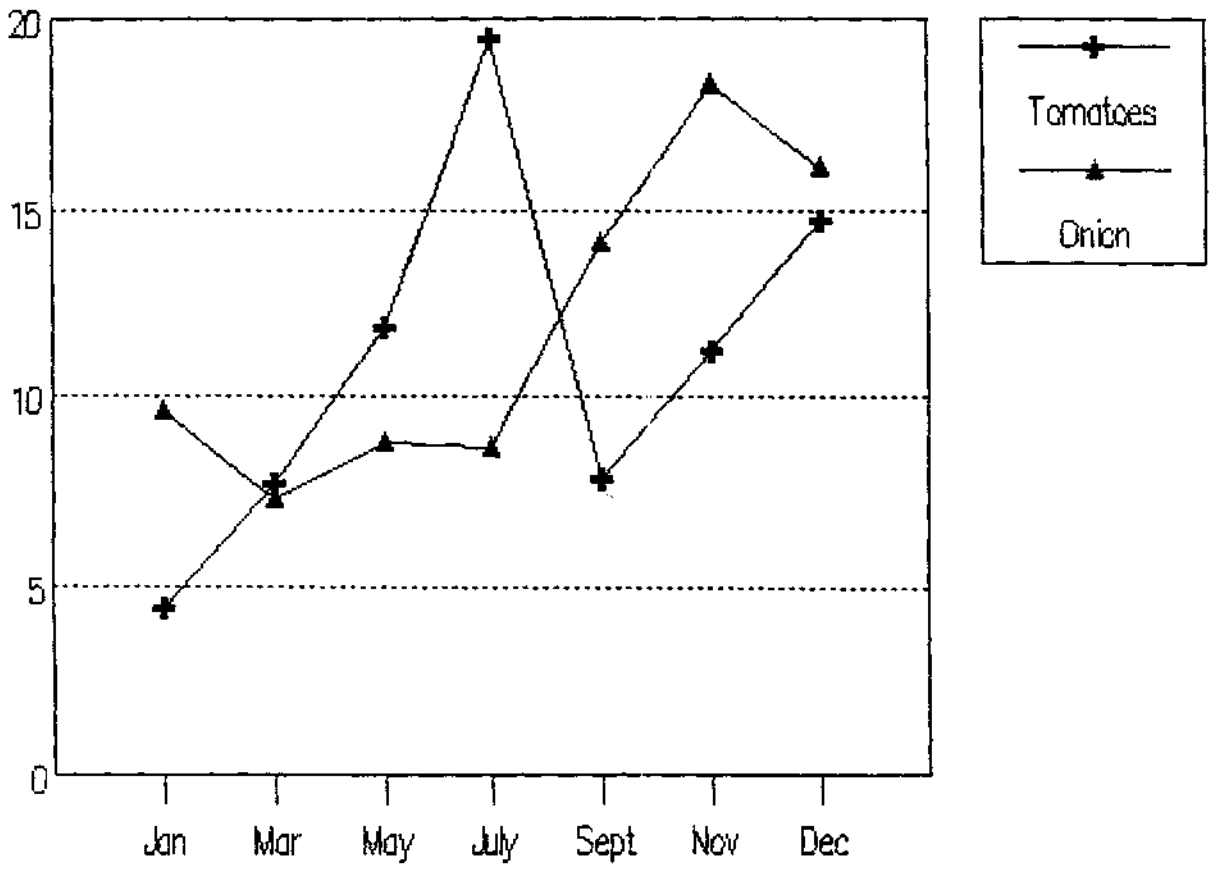


Fig. 5.2 shows a positive price correlation between sweet pepper and tomatoes. It shows that when farmers are producing and marketing tomatoes and sweet pepper, as the price of sweet pepper goes up, the price of tomatoes also goes up and vice versa. The implication of this is that farmers income will be threatened because when the price of the two crops go down it could be bad for farmers and this is not good for risk aversion. On the other hand, a farmer may market two crops that have a negative price correlation. Fig. 5.3 below shows the graph of two crops in Kano State with negative price correlation.

Fig. 5.3: Price movement : of Tomatoes and Onion in Kano State in 1994.



Graph 5.3 shows a negative price correlation between tomatoes and onions. It shows that when farmers are producing and marketing the two crops, tomatoes and onions, as the price of tomatoes goes up, the price of onion goes down and vice versa. The implication of a negative price correlation is that farmers will be better off, because when the price of one crop is low the price of the other will be high. This is good for risk aversion.

Correlation analysis was also carried out among markets. Data was obtained from seven (7) different markets and for the three crops studied, tomatoes, onions and sweet pepper.

Table 5.1: Average market prices for wholesalers in different markets in Kano and Jigawa States in 1995

	Crops in Naira per Basket		
Markets	Tomatoes	Onions	Sweet pepper
Birnin Kudu	250	310	350
Gadangare	225	325	380
Sundimi	190	350	425
Gateri	260	275	370
Karfe	270	280	450
Kwanangafe	250	300	500
Yankaba	330	430	550

Source: Field Survey, 1995

The result of price correlation between the crops is as follows: The correlation between tomatoes and onions equals 0.403. That of tomatoes and sweet pepper equals 0.57 while that of onions and sweet pepper equals 0.600. All the three crops are positively

correlated probably because the time of sowing, harvesting and marketing are the same and most of the time the three crops have composite demand.

The correlation of market and market shows that some markets may behave as price leaders while other markets will be price followers. This happens when the first market is very important in terms of location and size. All other markets close to it are smaller and the distance is less than 100 kilometers. In addition, there is a good road network. As a result, price information move quickly from that market to other surrounding markets. In a given season, a positive correlation among markets means that prices move in the same direction for all crops in all markets.

The result of price correlation analysis for some markets are shown in Table 5.2. The markets are Birnin Kudu, Kadangare, Sundimi, Gateri, Karfe, Kwanagafe and Yankaba.

Table 5.2. Wholesale Price Correlation for Tomatoes for Kano and Jigawa States in 1995

	Birnin Kudu	Kadangare	Sundimi	Gateri	Karfe	Kwanagafe	Yankaba
Birnin-Kudu	1						
Kadangare	0.999	1					
Sundimi	0.996	0.999	1				
Gateri	0.872	0.845	0.823	1			
Karfe	0.831	0.802	0.778	0.997	1		
Kwanagafe	0.901	0.878	0.858	0.998	0.990	1	
Yankaba	0.986	0.976	0.967	0.941	0.912	0.961	1

From the table 5.2 above we observed that the wholesale prices are highly correlated among the markets. Wholesale prices correlations were highest among Kadangare and Birnin Kudu, and

Kadangare and Sundimi with 0.999 each but are lowest between Karfe and Sundimi with 0.778. This is probably because of the nearness of the first two markets as compared to Karfe and Sundimi markets.

Inter-Temporal Pricing Efficiency

Another dimension of pricing efficiency often analysed is inter-temporal pricing efficiency. The theory has it that in competitive markets, seasonal rises in prices are expected to equal storage costs. Various studies indicate that seasonal price rises do approximate storage cost (Jones, 1972 p. 139; Ejiga, 1981). For perishable fadama crops under study, storage is not practised by the marketters, because they do not have the facilities needed for such storages. The most common way of storing perishable fadama crops in the study area is the sun-drying method. This type of storage has two limitations. First, it is done unhygenically and second, sun-dried crops have not gained total acceptability far and wide. Thus, measuring inter pricing efficiency was not considered necessary because of the prevailing circumstances.

Another aspect of pricing efficiency which has been investigated in Nigerian markets is the margins of the various participants in the distribution system. This is always called marketing margin.

5.4 MARKETING MARGIN

Marketing margin is one of the indices often used to assess the efficiency of a marketing system. Marketing margin is simply the difference between buying and selling prices. The gross margin, is not a good measure of profit because out of it the

trader has to pay all other costs such as transportation, storage, packaging and handling expenses. The theory of perfect competitive market states that the margin received should be commensurate with the cost of services rendered.

In this study, the concurrent method was used to estimate the marketing margin. This involves comparing prices at different levels of the marketing chain at the same point in time. For example, by obtaining the price at which farmers sold their crops to rural assemblers, it was discovered that there were variations of between ₦5.00 to ₦25.00. All these different prices were added up and the mean selling price was got. It was not difficult to get the mean of commission of the Rural selling agents per bag and per basket. Similarly, it was not difficult to get the mean price at which transporters carry each basket or bag of fadama produce. We got the price at which the wholesaler bought and sold each basket or bag of his produce. What was difficult was the selling price of the retailer who bought from the wholesalers and sold in small bits to numerous consumers. This was difficult for three reasons:

i) The retailers do not keep records of their sales

ii) Each retailer sells about three to five different fadama crops and does not separate the money received for one from the others

(iii) The retailers are probably the most inconsistent traders among the middlemen in fadama marketing chain. This is so because when they show a small basket that costs ₦20.00, it is not impossible to see them sell three of those same baskets

for ₦50.00

In view of these facts, it was difficult to know whether the profits they claimed they made was true or not. In order to circumvent this problem, we took the price of a standard basket of tomatoes sold by the farmer and weighted the basket. It weighed 43.81 kg and it cost ₦326.00.

Since the retailer sells in bits which may take more than one day to complete selling the basket, the weight of the tomatoes normally sold for ₦20.00 was taken. The percentage spoilage in a wholesaler's standard basket was given to be between 5 and 15 percent. The mean percentage spoilage of 10 percent was used for tomatoes in this study. The number of retailer's small baskets that can be obtained in the wholesaler's standard basket was determined.

From the weight of the standard basket we deducted 10 percent for tomatoes, 7.5 percent for sweet pepper and 5 percent for onions. This is because investigation from the traders shows that tomatoes is the most perishable of the three crops, sweet pepper came next and onions is the least perishable of the three crops. From what was left, the number of small baskets obtained multiplied by the price gave the amount the retailer sold the wholesalers standard basket. By this the farmer's selling price can be compared with the retailer's selling price.

The marketing margins for three fadama perishable crops namely onions, tomatoes and sweet pepper in the study area are shown in Tables 5.18 and 5.19. First we show the percentage of gross margin received by middlemen in Kano State, then we show that of Jigawa State.

Table 5.3: Percentage gross margin received by middlemen in Kano State.

Class of Middlemen	Onion	Tomatoes	Sweet pepper
Rural Assemblers	9.4	8.52	9.98
Local Transporters	2.63	3.36	5.64
Urban Wholesalers	12.15	14.05	15.78
Lorry Transporters	3.26	4.71	5.74
Retailers	4.63	7.55	8.89
Marketing Margin	32.08	38.19	46.03
Farmers	67.92	61.81	53.97
Total	100.00	100.00	100.00

Source: Field Survey, 1995.

Table 5.3 reveals that the marketing margins for onion, tomatoes and sweet pepper in Kano State are 32.08%, 38.19% and 46.89% respectively. Put in another way, it means that 32.08 percent of consumers expenditure on onion goes to middlemen, while the faremrs received 67.92 percent. It was observed that the gross margin received by middlemen are not the same for each of the three crops. While middlemen's shares of consumer payment appear to be acceptable for onions and tomatoes, their share of consumers payment appears high for sweet pepper.

In order to state whether or not the margins are excessive, one needs to deduct the cost of performing the services from the margins to obtain the profit of middlemen. Detailed accurate information on costs are not available. Nevertheless, a marketing margin of 46.03 percent for sweet pepper appears to be high. If the crop were transported over a long distance like Lagos or

other distant places, it would have been acceptable, but the study is for markets within the State.

Table 5.4. Percentage gross margin received by middlemen in Jigawa State.

Class of Middlemen	Onion	Tomatoes	Sweet pepper
Rural Assemblers	9.57	9.68	5.25
Local Transporters	4.25	5.92	1.09
Urban Wholesalers	13.36	15.83	8.26
Lorry Transporters	3.91	6.96	2.18
Retailers	5.28	9.95	2.04
Marketing Margin	36.37	48.34	18.82
Farmers	63.63	51.66	81.18
Total	100.00	100.00	100.00

Table 5.4 shows the marketing margins for onions, tomatoes and sweet pepper in Jigawa State. The data reveal that the margins for onions, tomatoes and sweet pepper are 36.37%, 48.34% and 18.82% respectively. Put in another way, it means that 48.34 percent of consumers expenditure on tomatoes goes to middlemen, while 51.66 percent was received by fadama farmers. Middlemen's share of consumers payment is acceptable for onion and sweet pepper in Jigawa State. The share of middlemen of consumers payment appears high for tomatoes.

In the two states therefore, middlemen's shares of concumers payment appear high for one of the three crops studied. This is probably one of the reasons why middlemen are sometimes called exploiters who get more than their normal

share of consumers payment on farm produce. But this is not a good enough reason to conclude that middlemen are exploiters. The best way to decide would have been to calculate the profits of middlemen. Since detailed accurate information on costs are not available it was not possible to obtain the profits of middlemen. However, with the available information three hypotheses were tested. The first hypothesis investigated the differences between farmgate, rural and urban market prices of fadama crops. The second examined the difference between the profit made by wholesalers and retailers while the third tried to find out whether traders in fadama crops will sell at lower than the market price inorder to sell more and earn more profit.

5.5 HYPOTHESIS ONE

The first hypothesis tested was "there is no significant difference between the rural and urban prices of fadama crops". We tested this hypothesis for each crop in Kano State.

The analysis of variance (ANOVA) technique was used to test whether prices depended on source of commodity. The ANOVA tables are given below:

Table 5.5

ANOVA tables for comparing prices of various commodities in three types of markets in Kano State

i. ONION Source of variance	degree of freedom	sum of square	Mean Square	F-statistics	F-table
Between market	2	41668	20834	4.5*	4.0
Residual	11	50927.6	4629.8		
ii. TOMATOES s.v	df	ss	MS	F.cal.	F.table
Between markets	2	203814	101907	3.96*	2.34
Residual	37	950826	25698		
iii. SWEET PEPPER s.v	df	ss	MS	F.cal.	F-table
Between markets	2	251313	125656	4.8*	4.7
Residual	7	183248	21178		

F-table at 5% level of significance.

From the table 5.5 above, we noticed that in Kano State, the mean prices at various markets were significantly ($P < 0.05$) different for the three crops - onion, tomatoes and sweet pepper. Since the calculated F-statistic is higher than the F-table value at 5% level of significance.

The mean prices from various markets were further compared using DUNCAN's Multiple Range Test as seen below.

Table 5.6

Comparing mean prices of commodities by sources in Kano State Using Duncan's Multiple Range Test.

Commodity	Farmgate	Rural Market	Urban Market
Onions	326^a	428^b	450^b
Tomatoes	267^a	281^a	432^b
Sweet pepper	333^a	463^b	617^c

a, b, c means with same superscript in a row are not significantly ($P<0.05$) different.

For onions, the prices at the farmgate were significantly ($P<0.05$) lower than the prices at the rural and urban markets. However, the prices of onion at the rural and urban markets were not significantly ($P<0.05$) different, although the prices at the urban market were slightly higher than those at the rural market.

For tomatoes, the prices at the farmgate and rural markets were not different but significantly ($P<0.05$) higher in the urban market. As for sweet pepper, the price was significantly ($P<0.05$) lowest at the farmgate, while the price in the urban market was significantly ($P<0.05$) highest. It could therefore be concluded that it is cheaper to buy these commodities at the farmgate than from other sources. The price margin would likely be higher if the commodities were bought from the farmgate. The price margin of onion or tomatoes would likely be the same when these two commodities were bought in the rural and urban markets because of transportation cost.

As for sweet pepper, the price margin would be higher when the commodity was bought in the rural market than at the urban market considering the large difference in the average price of the commodity from the two sources. The price margin would be highest if the commodity was bought at the farmgate.

Table 5.7

ANOVA tables for comparing prices of various commodities in three types of markets in Jigawa State

i. ONION Source of variance	degree of freedom	sum of square	Mean Square	F-statistics	F-table
Between market	2	109872	54936	4.1*	4.0
Residual	15	200985	13399		
ii. TOMATOES s.v	df	ss	MS	F.cal.	F.table
Between markets	2	376718	188359	19.54*	2.34
Residual	40	385506	9633		
iii. SWEET PEPPER s.v	df	ss	MS	F.cal.	F-table
Between markets	2	4008	2004	0.1 NS	4.7
Residual	9	182079	20231		

From the table 5.7 above, we observed that in Jigawa State, the mean prices at various markets were significantly different for onions and tomatoes since the F-calculated is higher than F-table at 5% level of significance. For sweet pepper, the mean price does not depend on sources of the commodity since F-table is higher than F-calculated at 5% level of significance.

The mean prices for various markets are again further compared using Duncan's Multiple Range Test as seen below.

Table 5.8

Comparing of mean prices of commodities by sources in Jigawa State Using Duncan's Multiple Range Test.

Commodity	Farmgate	Rural Market	Urban Market
Onions	262.8^{a}	405^{b}	431^{b}
Tomatoes	146.2^{a}	224.2^{b}	432^{c}
Sweet pepper	345^{a}	383^{a}	385^{a}

a, b, c means with same superscript in a row are not significantly ($P<0.05$) different.

From the table above the price of onion was significantly lower at the farmgate than at the rural and urban markets. The prices at the rural and urban markets were not significantly (P>0.05) different although the prices in the urban market was slightly higher than those in the rural market. The margin of prices between farmgate and rural market was higher than between the latter and the urban market.

For tomatoes, the prices depended on the source. The price was lowest at the farmgate and highest at the urban market with the difference being significant (P<0.05). The price margin would be expected to follow the same trend. For sweet pepper, the prices was not significantly (P>0.05) different when bought from the three sources although prices were slightly (though not significantly) lower at the farmgate than from other sources. For sweet pepper, the prices at the Rural and urban markets were practically the same.

5.6 **HYPOTHESIS TWO**

The second hypothesis tested was "there is no significant difference in the profit made by wholesalers and retailers of fadama crops".

The analysis of variance (ANOVA) technique was used to test whether there were differences between wholesalers and retailers profit.

Table 5.9

Comparing profits by type of marketers in Kano State.

S.V	d.f.	S.S	M.S	F-calc.	F-statistics
Types of marketers	2	127479.1	63739.6	1.9^{NS}	3.22
Within marketers	41	1363818.6	33263.9		
	43	1491297.7			

The ANOVA table above shows that there was no significant difference in the mean profit of the 3 types of marketers since the calculated F (1.9) is lower than the table value (3.22). The Duncan's Multiple Range Test was done to compare the mean profit as seen below.

Table 5.10

Table of mean profits by three types of marketers in Kano State

Type of marketers	Wholesaler	Retailer	Both Wholesaler and Retailer
Mean	299.4^{a}	316.1^{a}	300.0^{a}
N	17	23	3

The table of mean profit shows that retailers made slightly more profit ₦316.1 than wholesalers who made ₦299.4. The profit of those who were both retailers ₦300.00 was between the profits of retailers and wholesalers.

Table 5.11

Comparing profits by type of marketers in Jigawa State.

S.V	d.f.	S.S	M.S	F-calc.	F-statistics
Types of marketers	2	29837.6	14918.8	8.99*	3.24
Within marketers	39	64682.0	1658.59		
	41	1481297.7			

The ANOVA table above shows that there were significant differences in the profits made by the 3 types of marketers since the calculated value (8.99) was higher than the table value (3.24). The Duncan's Multiple Range Test was done to compare the mean profit as seen below.

Table 5.12

Table of mean profits by three types of marketers in Jigawa State

Type of marketers	Wholesaler	Retailer	Both Wholesaler and Retailer
Mean	101.5^{b}	62.0^{a}	125.0^{b}
N	10	30	2

a, b, c means with the same superscript in a row are not significantly ($P<0.05$) different.

The table of mean profit shows that the profit made by the retailers ₦62.00 was lower than the profit made by wholeslaers ₦101.5. The profit made by those who were both wholesalers and retailers was not significantly ($P<0.05$) different, though slightly higher than the average profit made by the wholesalers.

5.7 HYPOTHESIS THREE

The third hypothesis tested was "traders in fadama crops will not sell at lower than market price even if this will allow them to sell more and earn more profit because of economies of scale"

Chi-square was used to test the hypothesis for which the following frequencies were obtained.

Table 5.13

Frequency distribution on respondents as to whether traders will sell at lower than the market price inorder to increase sales and earn more profit in Kano State.

Opinion	Frequency	X^2
Traders will sell	36	16.2*
Traders will not sell	9	

X_1^2 0.05 = 3.84

Since the calculated X^2 value (16.2) is higher than the table value (3.84 at 1 degree of freedom) we reject the null hypothesis. That is, there is enough evidence to show that traders in fadama crops will sell at lower than market price to allow them sell more and earn more profit. This is however on the condition that the lower price will still give them some profit.

In Jigawa State, the following frequencies were obtained.

Table 5.14

Frequency distribution on respondents as to whether traders will sell at lower than market price inorder to increase sales and earn more profit in Jigawa State.

Opinion	Frequency	X^2
Traders will sell	38	21.4*
Traders will not sell	7	

X_1^2 0.05 = 3.84

Since the calculated X^2 value (21.4) is higher than the table value (3.84 at 1 degree of freedom) we reject the null hypothesis. That is, there is enough evidence to show that traders win fadama crops will sell at lower than market price to allow them sell more and earn more profit because of economies of scale.

In both states therefore, traders will reduce price to sell more and therefore earn more profit.

5.8 MARKETING PROBLEMS

Six major marketing problems were identified in the study as perceived by the farmers and traders. They are (1) Transportation (2) Storage problems (3) Inadequate credit (4) Packaging and grading problems and (5) Education and (6) Market information problem.

(1) Transportation

The means of transportation available in the study area is road. There are no larger organised distribution with systematic coldstores. Instead, there are multitudes of small suppliers and a variety of small middlemen who arrange to buy and transport theproduce.

Road transportation is substantially used by

middlemen to convey vegetables from sources of supply to the market in the study area. Quite often, this system is erratic, irregular, unpredictable and leads to a lot of wastage as a result of bad roads, badly maintained vehicles liable to frequent break downs and unscheduled timings that are not specially geared to the peculiar conditions of the highly perishable fadama crops.

In addition, transporters seeking the best prices often divert to other commodities, leaving vegetables in the lurch to perish or rot. It is no wonder then that over 80 percent of our respondents acknowledge that transportation is a big problem in fadama crop marketing. The study revealed that the sale of fadama crops take place more at the farm site and at village markets that are more accessible to motor vehicles. Middlemen buying from these two places incur lower transport cost. This factor tends to contribute to raising the vegetable distributive margin.

2. **Inadequate Storage**

Another serious problem confronting the marketers of fadama crops is that of storage. Vegetables require scientific storage process with coldstores at exact temperatures, suitable air movement and correct humidity. But in the study area, storage for fadama products particularly vegetables is only for a few days, while the product is awaiting sale. This is because of inadequate

storage facilities which results in heavy losses. The quality of most of the fadama produce, particularly vegetables, begins to deteriorate immediately after harvest. The deterioration continues throughout the marketing period.

Because of rapid deterioration rate, farmers try to market their vegetables immediately after harvest to preserve their farm-fresh value. The perishability nature of vegetables also affects their prices. This is because the vegetables cannot be stored for a long time. Thus, fadama farmers tend to have little bargaining power in price determination.

The most common way of storing highly perishable crops like tomatoes and sweet pepper in the study area is the sun-drying method which is done unhygenically. Besides most respondents agreed that the sun-dried tomatoes and sweet pepper brings them less financial returns because the use of sun dried crops has not gained total acceptability far and wide as the fresh ones.

3. **Inadequate Credit Facilities**

Agricultural produce marketing is an expensive business. Marketers of fadama produce need money to pay for the produce, transportation, packaging of materials, handling charges and rent of storage structures. Unfortunately, most of our respondents had never benefitted from marketing loans from the formal sources

of credit.

More than 75 percent of the wholesellers and retailers interviewed claimed that their greatest problem in fadama crop marketing is lack of funds. Fadama crop marketers claim that they are less lucky than fadama farmers because most of the financial institutions do not regard them as farmers. For example the Nigerian Agricultural and Cooperative Bank (NACB) would first examine the farm site and attach some rigid conditions that are impossible to fulfil before granting loans. Even the FUAs that is expected to mobilise effort to get credit for members, there are indications that credit opportunity is low among members because only about 15% of our respondents said they obtained credit assistance from their group.

4. **Packaging and Grading**

Since the procurement, distribution and retailing are a host of disorganised small enterprise which exploit the situation on a seasonal basis, not much thought is given to grading, packaging and presentation of vegetables which are necessary to their life span, quality and marketability. Grading in the study area is rare and very erratic. There are also no established standards. Packaging is in baskets and sacks. There are neither crates with systematic ventilation nor cartons with standard measurements and weights. This is probably

because most of the traders are illitrates. Besides, in the study area vegetables are often displayed on the floor under unhygienic conditions. To cap it all, there is no standard unit of measurement. This makes consumers buy the same quantity of vegetables at varying prices.

(5) **Education**

Another marketing problem that need to be mentioned is the lack of education of the marketers. For instance in Kano State about 32.00% had any form of formal education, primary, adult and secondary. In Jigawa State things are worse because less than 20.00% of the Respondent Marketers had any form of formal education, primary, adult and secondary put together. The study identified illiteracy of traders as a major factor that appear to cuase inefficiency in the marketing of fadama products in the study area. Unfortunately, it is the majority of this illiterate class that market the bulk of these products.

Their inability to read or write put a serious constraint to the use of tags which would have been a good alternative to the process of haggling. Furthermore, because of the inability of these illiterate traders to keep records they often tend to forget the cost prices of their products so that when selling, arbitrary prices are charged for commodities. There was a lack of standard measures for weights and quality of

fadama products in the study area. The inadequacy of these measures lies in the fact that they are not standardized and lack uniformity. As a result, the prices they sell their products is a function of the bargaining power of customers.

(6) **Lack of Market Information**

Information on market prices is very important in marketing agricultural products. Market information according to Kohls and Uhl (1985), assist farmers to decide the when, where and how of their marketing strategies.

Investigation about price discovery with regards to fadama products in the study area revealed that most of the farmers fix prices arbitarily. For example, in response to a question seeking to know how fadama farmers come about the price they fix for their vegetables, some of them said that they just fix a price, others say they sell at the price they see others selling, while some others sell at the previous year's price. It is only a very infinitesimal percent of the respondents that claimed to compute their cost of production. Even those who computed their cost of production did not add the costs of labour they and their children put into the production.

CHAPTER SIX

6.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This study examines the prevailing marketing system of fadama perishable crops in Kano and Jigawa States. It identifies the major problems encountered in the marketing process. The study reveals that marketing of fadama crops consist of many functions. In order to perform these functions, the indigenous marketing system has evolved many middlemen in the distribution chain. These numerous middlemen are required because of the scattered small marketable surpluses of the farmers. Information was collected from both primary and secondary sources and major conclusion drawn from their analysis which are summarized in the paragraphs here under.

6.1 SUMMARY OF FINDINGS

It was found that the highest concentration of respondent marketers in Kano State 26.67 percent fall within the age group of 46-50 years while the least 2.22 percent are those within the age group of 20-25 years. The mean age is 41.22 years while the standard deviation is 2.81. A large proportion of respondent marketers 68.88 percent had Koranic education, while only 6.67 percent had secondary education. In Jigawa State, the highest concentration of respondent marketers 28.89 percent fall within the age group of 36-40 years, while the least 4.44 percent are those within the age group of 20-25 years. The mean age in Jigawa State is 37.3 years while the Standard Deviation is 0.79. Similar to that of Kano State, a large proportion of respondent marketers

82.22 percent had koranic education while only 2.22 percent had secondary education.

Most of the respondents interviewed are into fadama crop marketing in order to maximise gain. It was observed that the mean prices of the crops in the two states differed according to market. For example, it was observed that there was a pattern which showed higher mean prices as each of the crops move from the farm gate to the rural and urban markets. This pattern can be seen in Kano State where the mean price of onion rose from ₦326.00 to ₦428.00 and ₦480.00 per bag from farmgate to the rural and urban market respectively. The same trend was noticed in Jigawa State.

The field data revealed that wholesale prices are highly correlated among the markets. The wholesale price correlations were highest among Kadangare and Birnin-Kudu; and Kadangare and Sundimi with 0.999 each. All the three markets are in Jigawa State. But the wholesale price correlations are lowest between Karfe and Sundimi.

Another important observation was the higher mean prices in the three different markets in Kano State. For example, while the mean prices of sweet pepper in Kano State were ₦333.00, ₦463.00 and ₦617.00 per basket for farmgate, rural and urban markets respectively. Those of Jigawa State were ₦345.00, ₦383.00 and ₦425.00 respectively.

The gross marketing margin for the three crops studied in Kano State namely, onions, tomatoes and sweet pepper are 32.08%, 38.19% and 46.03% respectively. Those of Jigawa State are 36.37%, 48.34%

and 18.82% respectively.

In terms of infrastructural provision, most of the market structures in both Kano and Jigawa States are of temporary nature. Most of them are made of wood, open ended and covered with leaf, tree branches or grass thatches. In Jigawa State, JARDA has constructed some go-downs and evaporative cooling shed. However, field investigation revealed that these sheds and go downs are not being put into effective use, perhaps due to non-proper education of the marketers. Besides, some of these constructions are not properly located.

Three hypothesis were tested. The first showed that in Kano State the mean prices at various markets were significantly ($P<0.05$) different for all the crops while in Jigawa State, mean prices at various markets were significantly ($P<0.05$) different for onions and tomatoes, but were not for sweet pepper.

The second hypothesis showed that there was no significant ($P>0.05$) difference between the profits wholesalers and retailers made in Kano State, but there was in Jigawa State.

They third hypothesis showed that there is enough evidence to show that traders in fadama crops will sell at lower than market price to allow them sell more and earn more profit in both Kano and Jigawa States.

6.2 CONCLUSION

Evidence from this study suggests that the whole system of marketing and distribution of fadama products in Nigeria is catered

for by a vast number of individual efforts. These efforts are disjointed, unskilled and often part-time. The natural corollary to this is that the system does not lead to the necessary organisation of transport, storage and marketing. The loss from harvest to consumption is enormous. Losses incurred are estimated to a range of between 10 - 30%. These losses arise from a number of inter-related factors, most of which can be classified as physical, physiological and pathological. The degree of loss is greatly compounded by lack of adequate infrastructures and educational facilities.

To keep some of the problems in check, a division of marketing needs to be created within the ministry of agriculture. Such division will be charged with the responsibility of developing and implementing a system of market information. The division should work hand in hand with Traders association to collect and disseminate information on market supplies, arrivals in key markets and market prices. Finally, the division should be responsible for enforcing regulations concerning standard measures, market grades and market facilities improvement. Efficient implimentation of all the above could lead to marketing efficiency that could increase the productivity of fadama farmers.

6.2 **RECOMMENDATIONS**

Based on the findings of this research which have been summarised, the following recommendations are being proffered for the enhancement of the marketing system of fadama perishable crops.

(1) Transportation from points of supply to demand.

The first problem a fadama farmers is faced with other than harvesting his produce is how to get his produce to the market. Inadequate transport and communication systems are some of the major reasons for inefficiency in fadama crop marketing. There is also a lack of large organised distribution network with appropriate coldstores. As a result, there are multitudes of small suppliers and a variety of small middlemen who arrange to buy and transport fadama produce to the market. The bulk of distribution and sale in the markets is again done by a great number of small traders. This type of system adds to the cost of marketing.

The most viable route of transportation in the study area is by road. This is substantially used by farmers and middlemen. This type of transportation lends itself easily to small units and individual despatches. But quite often, bad roads, badly maintained vehicles and delays in lorry movement which are not conducive for highly perishable fadama produce make this system unpredictable leading to a lot of wastage and spoilage of the produce.

In view of these facts, it is recommended that government should develop infrastructures such as all season roads which would link the rural producing areas. This will facilitate the evacuation of fadama produce from the rural producing villages to the urban centres where there is much demand for them. As at now the cost of transporting fadama produce to

the South is too high. This should be looked into.

(2) **Storage**

Inadequate storage facilities result in heavy losses in the study area. This perishability factor inhibits fadama farmers from producing optimally. The perishability nature of fadama produce also affect their prices. Because fadama crops cannot be stored for a long time, fadama farmers tend to have little bargaining power in price determination.

Therefore, there is need for more research in appropriate storage facilities which can help to minimise losses of fadama produce. Adequate provision of market place storage facilities which has been noted to be generally lacking is highly recommended. In addition, government should create opportunities for the development of food agro-industries based on the cottage plan model. This should link agriculture as a total system with food processing and marketing. This could be done through economic measures such as tax incentives or granting credits with low interest rates to those who want to produce an acceptable measure of volume. The sun-drying method of storage should also be improved by drying it hygenically so that it can gain total acceptability far and wide as the fresh ones.

(3) **Handling/Packaging**

Handling of onion, tomatoes and sweet pepper at harvest would need to be undertaken with great caution. Farmers should be trained appropriately on the need to observe

necessary harvesting practices to obtain high quality vegetables e.g. avoidance of mechanical damage and thermal stress. This would greatly reduce the percentage of produce loss due to quality reduction as a result of poor handling.

To prevent losses due to stress fadama produce would need to be effectively managed. Therefore, the use of fibre board cartoons and moulded plastic containers which are suitable packaging materials for longer storage is highly recommended for use by farmers. In addition, this study also advocates for improved packaging materials that will be highly ventilated and pressure resistant to enhance freshness.

(4) **Processing**

Another major marketing problem especially for such produce as onions, tomatoes and sweet pepper that are highly perishable is that there are no organised processors to handle marketable surplus. The only vegetable processing factory producing tomatoe paste termed Antonella, is a subsidiary of Churchgate. It was incorporated in 1991 with the factory situated in kilometer 24, Zaria road, Kano. But the plant processes 150 tonnes per day, which is an equivalent of a trailer load of fresh tomatoes. This is too small compared to the marketable surplus in Kano State.

In Jigawa State, there is nothing of such. At best, there are proposed plants by government expected to take off in Kazaure and Gumel respectively. The non availability of processing plants has been a dis-service to farmers in the

ABU ZARIA
10 NOV 1995
Ahmadu Bello University

cultivation of vegetables which would have been more profitable than even wheat, were it not for the problem of storage. As a result of non-availability of processing plants, sundried tomatoes/pepper appear to be the most popular form of processing among farmers. But this has not gained total acceptability far and wide as the fresh ones, because sun-drying method is done unhygenically.

In view of these facts, the State governments in the study area would need to put in place, those incentives that would facilitate the encouragement and participation of private initiatives in agro-processing industries.

(5) **Price Information**

Market information according to Kohls and Uhl (1985), assists farmers to decide on when, where and how of their marketing strategies. Investigations about price discovery of fadama produce in the study area, revealed that most of the farmers fix prices arbitrarily.

In order to allow fadama farmers and traders to take advantage of profitable price differentials over space and time, it is necessary that they know about such differentials. This is the reason why market price information is important. Accurate information about prices of fadama produce should be widely disseminated (by radio, TV or newspapers) so that farmers can bargain effectively and traders can make efficient decisions about arbitrating between markets.

Market information will not be meaningful in the absence

of standard for quality (grades) and quantity (weights and measure). There is therefore a need to also come up with meaningful grades for produce and an acceptable measure of volume.

(6) **Marketing Research**

Market research in Nigeria is usually frustrating because of lack of data needed. The research on Fadama product marketing is not an exception. Inadequate funds and support for appropriate agricultural research studies is also a problem. The government should therefore fund more agricultural research studies so as to obtain more relevant data concerning its operations. There is also a need to train high level manpower for skilled market research studies for obtaining appropriate market information and knowledge and for adequate marketing extension.

REFERENCES

Ackerman, E. (1936). Damobs in Nordrhodesien,WISS Veroff Mus. Lankerkde, Leipzig, NFU Pp. 148-157.

Adeyemi, S.A.O. (1984). The status of Fruits and vegetables industry in Nigeria. A paper presented at the National Workshop for fruts and vegetables Processing. NIHORT, Ibadan.

Akinbolu, A.M.; Ukoh, U.U. Negbenebor, C.A. and Igene J.O. (199?). Evaluation of post-harvest losses and quality changes in Tomatoes in Borno State, Nigeria. Tropical Science. 31: 235-242.

Alamu, J.F. (1982). The Economic significance of Horticultural crops in Nigeria's Agriculture. Proceedings of the 5th Annual Conference of Horticultural Society in Nigeria. 21-25 November.

Amaza, P.S.; Ogunbameru, B.O.; Iheanacho, A.C. and Anogie, D.A. (1993). Marketing constraints of Fadama Agricultural Products: A case study of Borno and Yobe States. In Proceedings of the National Policy Workshop, Maiduguri, February.

Anthonio, Q.B.O. (1968). The marketing of staple foodstuff in Nigeria: A case study of pricing efficiency. A Ph.D. Thesis: Department of African Economics, University of London.

Aworh, O.C. and Olorunda, A.O. (1988). Packaging and storage technology of fresh fruits and vegetables with special reference to tropical conditions. An invited paper at FMS&T/NISPRI workshop, Ilorin, March 30.

Bain J.S. (1968). Industrial Organisation 2nd ed. New York: John Wiby and Sons.

Balogun and Ishola (1989). Management and Marketing of Fruits and Vegetables in Nigeria. Paper presented at the National Workshop, on Horticultural Crops Production, AERLS, ZARIA/NIHORT, Ibadan. 17th - 21st July.

Baner P.T. (1963). West African Trade: A study of competition Oligopoly, and Monopoly in a changing Economy. Routledge and Kegan Paul Ltd., London.

Breimyer, H.F. (1976). Economics of the product markets of agriculture. Ames, Iowa, Iowa State University Press.

Development Consultant Ltd. (1995). National Fadama Development Marketing Study. Draft Final Report Submitted to Jigawa State Agricultural and Rural Development Authority (JARDA).

Coursey D.G. (1983). Post-harvest losses in perishable food of the developing world. In post-harvest phisiology and crop preservation pp. 485-510. M. Geberman (ed.) Pleum Publishing Corporation, U.K.

Ejiga N.O.O. (1977). Economic Analysis of Storage, Distribution and Consumption of cowpeas in Northern Nigeria. A Ph.D. Thesis. Corneel University.

Ejiga N.O.O. (1979). The Marketing System for Agricultural Products in Kaduna State. A Consultancy Report Submitted as part of Economic Survey of Kaduna State (Agriculture). For Kaduna State Ministry of Economic Development, Kaduna.

Eniayeju E.D. (1985). Evaluation of local packing materials for efficient handling of an easily bruisable horticultural produce - Tomato (Lycopersicum esculentum Mill. Ife plum and Ife 2). Unpublished M. Phil theses, University of Ife, Ile-Ife, Nigeria, p. 128.

Erinle, I.D. (1986). Low cost technologies for reducing losses in fruits, roots, tubers and vegetables in Nigeria. Paper presented at the 16th Annual Conference Nigeria Soc. Pl. Path. A.B.U., Zaria. March 17th-19th, 1986.

Famoriyo S. (1983). "A Review of the changes in Agricultural and Rural Development Strategies in Nigeria". In issues on Development Occasional Seminars; Vol. 1, C.S.E.R. A.B.U., Zaria.

Garlick W.G. (1961). Geomorphology in The geology of the N. Rhodesia Copper Belt ed. F. Mendelsonn Chap. 2, London.

Gilbert, E.H. (1968). Marketing staple foods in Northern Nigeria: A staple food market serving Kano City: An unpublished Ph.D. Thesis submitted to standford University.

Gilbert, E.H. (1969). Man-water relationship in East-Central Sudan, in Environment and Land use in Africa. (eds M.F. Thomas and G.W. Whillington) Page 409-446.

Gilbert, N.M. (1976). Statistics W.B. Saunders Company Philadelphia, London, Toronto.

Hays H.M. (1973). The organisation of staple food grain marketing system in Northern Nigeria: A study of efficiency of Rural-Urban Link. A Ph.D. Thesis, Kansas State University.

Hays, H.M. (1976). Agricultural Marketing in Northern Nigeria. Savanna 5(2) P. 139-148.

Handerson and Quandt (1980). Microeconomic Theory: A Mathematical Approach 3rd ed. New York: Pp. 135-137.

Hill, L.D. 1975. Agricultural Market Planning in Resource Development University of Illionis, College of Agric Special Publication No. 9.

Hill, P. (1976). Review of Hill, H.M. Hays Marketing and Storage of Food Grains in Northern Nigeria Savanna 5(1).

Igene, J.O. and A.M. Akinbolu, (1993). Post-Harvest Preservation Technologies for Fadama Food Production. A paper presented at ...

Igene, J.O. (1992). Food Technology, National Food Self-sufficiency and Food-Agro industrilization: The Nigerian Experience: 52nd Inaugural Lecture. University of Maiduguri.

Ilori, C.O. (1968). Economic study of Production and Distribution of Staple Food crops in Western Nigeria. A Ph.D. Dissertation: Standard University.

Jones, W.O. (1970). Measuring the Effectiveness of Agricultural Marketing in contributing to Economic Development: Some African Examples. Food Research Institute Studies. Vol. 9, No. 3.

Jones, W.O., (1974). Marketing Staple Food Crops in Tropical Africa. Ithaca and London: Cornel University Press.

Karikari S.K. (1988). The effect of nitrogen and potassium fertilizer on the yield and quality of plantains (Musa AAB Group) in Ghana Nigerian Agric. Journal 23(2) 35-42.

Karikari S.K. (1989). Harvesting, Handling and Storage of Major Fadama Vegetable Crops. Paper presented at the NAERLS, A.B.U. Workshop on Fadama and Irrigation Development, Bauchi. 9th to 12th October.

Kohls, R.L. (1955). Marketing Agricultural Products Macmillian New York.

Kohls and Uhl (1985). Marketing of Agricultural Products. Six edition New York: Macmillan.

Kolawole, A., Alamu, J.F. Ambi, Y.A. (1990). Accelerated Wheat Production Programme (AWPP) in Nigeria. The cases of Kano and Kaduna States. A research report submitted to the SSCN-Ford Foundation on Contemporary Development Issues in Nigeria. July, 1990.

Kolawole A. (1991). Economics and Management of Fadama in Northern Nigeria. In Wetlands in Drylands: The Agroecology of Savanna Systems in Africa. International Institute for Environment and Development.

Kowal J.M. and D.T. Kanebe (1972). An Agro climatological Atlas of the Northern States of Nigeria. A.B.U. Press.

Lele, U.J. (1965). Market Integration: A study of sorghum price in West India. Journal of Farm Economics 49 pp. 147-159.

Lele, U.J. (1974). Food Grain Marketing in India: Private Performance and Public Policy Ishea, New York Cornell University Press Pp. 21-22.

Lowis H. (1964). Ubeir Rumpfflactenunid-Talbildung in Chen Wechse-Heuchten Tropen, besonders much studies in Tangayika, Zeitschriff fir Geomorphologie.

Maijanbu, I.A. (1989). Onion Bulb Production. Paper presented at the AERLS Horticultural Crops Production Workshop organised in collaboration with NIHORT Ibadan held at National Horticultural Research Institute, Ibadan. 17th to 21st July.

Mellor, J.W. (1968). The functions of Agricultural Prices in Economic Development: Indian Journal of Agricultural Economics Vol. 23 No. 1 Pp. 23-37.

Mittal, J.P. (1982). Quality criteria and storage conditions for prominent Nigerian vegetables. In proceedings vth Annual Conf. of Hort. Soc. of Nigeria (HORTSON). Pp 52-61. Ahmadu Bello University, Zaria. 21 November, 1982.

MOA (1988). Ministry of Agriculture and Rural Development, Kano. Annual Reports January 1984 - December, 1988.

Morgan, W.B. and Purgh J.C. (1969). West Africa, London Mehren.

Norman D.W. (1972). An Economic Study of Three Villages in Zaria province. Input-Output Study Vol. 1 Text. Samaru Miscellaneous Paper. 37 Vol. II Basic data and survey forms, Samaru Miscellaneous Paper, 28.

Olorunda, A.O. and O.C. Aworh (1983). A quantitative assessment of Post-harvest losses of perishable vegetables in Nigerian Marketing System. Nigeria Journal of Science (1 and 2) Pp 41-49.

Olorunda A.O. and Tung M.A. (1985). Simulated transit studies on Tomatoes, effects of compressive load, container, vibration and maturity on mechanical damage. J. Food Technology, 20 pp. 669-678.

Onayemi O. (1981). Post-harvest food loss management in Nigeria. In Industry and Environment 1981. January/Feb/March vol. 4(1) Pp. 5-8.

Robinson D.H. (1972). Fream's elements of Agriculture. A text book prepared under the authority of the Royal Agricultural Society of England, 11th Edition, London.

Ryall, A.L. and Lipton, W.P. (1972). Handling, transportation and storage of fruits and vegetables. AVI Publishing Inc., West-Port, Conn.

Southworth, U.R., W.O. Jones and S.R. Pearson (1979). Food Crop Marketing in Atabubu District, Ghana" Food Research Institute Studies. Vol. XVII No. 2.

Snedecov and Cochran (1967). Statistical Methods 6th Edition. Iowa State University, U.S.A. pp. 20-25.

Tatzold and Baun (1968). The kilombero vallye, Tanzania characteristic features of the economic geography of a semihumid East African flood plains and its margins. Africa. (Afrika-Studien No. 28). Munchen, Weltform Verlag.

Thodey, A.R. (1969). Analysis of staple food price behaviour in Western Nigeria. A Ph.D Dissertation, University of Illionis.

Tindall H.D. (1975). Fruit and Vegetables in West Africa. FAO Publication.

Turner, B. (1977). The fadama lands of central Northern Nigeria: their classification, spatial variation, present and potential use. A Ph.D thesis submitted to the University of London.

Wills R.B.H. Lee, T.H. Graham D., McGlasson W.B. and E.G. Hall (1981). An introduction to the physiology and handling of fruits and vegetables AVI Pub. Co. West-Port, Conn.

World Bank (1992). National Fadama Development Programme. Staff Appraisal Report (SAR).

APPENDIX 1

MARKETING OF PERISHABLE FADAMA CROPS AND ITS INFLUENCE ON THE PRODUCTIVITY OF FADAMA FARMERS IN KANO AND JIGAWA STATES OF NIGERIA

QUESTIONNAIRE FOR FADAMA FARMERS

A. **BACKGROUND INFORMATION**

Questionnaire No ..... Date .....

State ..... Village .....

B. **PERSONAL CHARACTERISTICS OF FARMER**

1. Name ..... Optional
2. Sex: .....
3. Age: 20 - 25 years 01
   26 - 30 " 02
   31 - 35 " 03
   36 - 40 " 04
   41 - 45 " 05
   46 - 50 " 06
   over 50 " 07
4. Marital status: Married 01
   Single 02
5. Number of children .....
6. What is the highest level of education you attained?
   (i) Islamic school..... 01
   (ii) Primary school 02
   (iii)Secondary school 03
   (iv)Post secondary school 04
   (v) Others (specify) 05
7. What is your occupation? .....

C. FARMING ACTIVITIES

8. What is the size of your fadama farm?

.....

9. How do you acquire the land? Tick as applicable.

(a) Owned/inherited 01

(b) Leased 02

(c) Join ownership 03

(d) Somebody's employee 04

(e) Gift 05

(f) Others (specify) 06

10. How long have you been in Fadama farming?

1 - 5 years

6 - 10 "

11 - 15 "

16 - 20 "

21 - 25 "

26 - 30 "

Over 30 "

11. What crops do you grow? (Tick the appropriate)

(i) Tomatoes 01

(ii) Carrot 02

(iii) Onions 03

(iv) Sweet Pepper 04

(v) Okro 05

(vi) Lettuce 06

(vii) Garden eggs 07

(viii) Others specify 08

12. Which of the following operations do you carry out in the process of fadama farming?

(i) Land preparation 01

(ii) Land levelling 02

(iii) Sowing 03

(iv) transplanting 04

(v) fertilizer application 05

(vi) Weeding 06

(vii) Watering 07

(viii) Harvesting 08

(ix) Others specify 09

13. Please can you help me re-arrange the above according to the first thing you do first and what follows next to the end?

1. 01

2. 02

3. 03

4. 04

5. 05

6. 06

7. 07

8. 08

9. 09

10. 10

11. 11

12. 12

14. How long does it take each of these crops to germinate after planting?

(i) Tomatoes ..... days 01

(ii) Carrot .... days 02

(iii) Onions ..... days 03

(iv) Sweet Pepper ..... days 04

(v) Lettuce ..... " 05

15. How many days after germinating do you transplant each of the following?

(i) Tomatoes ..... days 01

(ii) Carrot ..... days 02

(iii) Onions ..... days 03

(iv) Sweet Pepper ..... days 04

(v) Lettuce ..... days 05

16. How many times a week do you water each of the crops in a week?

(i) Tomatoes ..... times in a week

(ii) Carrot ..... times in a week

(iii) Onions ..... times in a week

(iv) Sweet Pepper ..... times in a week

17. How many times do you weed each of the crops in two weeks?

(i) Tomatoes ..... times in 2 weeks

(ii) Carrot ..... times in 2 weeks

(iii) Onions ..... times in 2 weeks

(iv) Sweet Pepper ..... times in 2 weeks

(v) Lettuce ..... times in 2 weks

18. How many times do you apply fertilizer on each before harvest?

(i) Tomatoes ..... times

(ii) Carrot ..... times

(iii) Onions ..... times

(iv) Sweet Pepper ..... times

(v) Lettuce ..... times

19. After how many weeks do you start harvesting each?

(i) Tomatoes .....

(ii) Carrot .....

(iii) Onions .....

(iv) Sweet Pepper .....

(v) Lettuce .....

20. After you have harvested each of the crops what do you do next?

(i) Tomatoes .....

.....

(ii) Carrot .....

.....

(iii) Onions .....

.....

(iv) Sweet Pepper .....

(v) Lettuce .....

MARKETING AND DISTRIBUTION ACTIVITIES

21. Where do you sell your crops? (tick as many as are applicable)

(i) On the farm 01

(ii) At the village market 02

(iii) At the rural periodic markets 03

(iv) Urban markets 04

(v) Others (specify) 05

22. To whom do you sell your crops? (Tick as many as are applicable)

(i) Traders in Fadama crops 01

(ii) Middlemen 02

(iii) Consumers 03

(iv) Others (specify) 04

23. Do you store your vegetables after harvest?

Yes ..... No .....

24. What proportion of your crop do you sell?

(i) All the crops 01

(ii) About 80 percent 02

(iii) About 60 percent 03

(iv) About 50 percent 04

(v) Less than 50 percent 05

25. Do you have problem with storage of your vegetables?

Yes ..... No .....

26. By what means do you transport your crops to the village?

(i) Donkey 01

(ii) Bicycle 02

(iii) Motorcycle 03

(iv) Lorries 04

(v) Head portrage 05

27. How much do you pay to carry a basket of your crop to the village market?

₦1 – ₦5

₦6 – ₦10

₦11 – ₦15

₦16 – ₦20

Over ₦20

28. What is the distance in kilometers from your farm to the village market?

.....

29. What type of road links your farm to the village market?

(i) All season road 01

(ii) Dry season road 02

(iii) No motorable road 03

(iv) Others specify 04

30. Do you have problems transpcrting your crop?

Yes ..... No .....

31. Do you ever get credit from the Bank for fadama farming?

Yes ..... No. .....

32. Do you have problems with any of the following? If so answer yes or no.

(i)	getting land for farming	Yes___ No ___
(ii)	Storage problem	Yes __ No ___
(iii)	Price fluctuation	Yes __ No ___
(iv)	Transportation	Yes __ No ___
(v)	Inputs	Yes __ No ___
(vi)	Credits from banks	Yes __ No ___

33. Mention the input you have the greatest problem with.

34. What type of problem do you have with the input?

35. How do you know the price you should sell your crops?

(i) Just fix a price 01

(ii) See how others are selling 02

(iii) Compute the cost of production 03

(iv) Use previous year's price 04

(v) Others (specify) 05

36. If the marketing condition of your crops is improved so that you can sell all you produce without spoilage will you produce more?

---

37. State what the government can do to make you produce more fadama crops.

(i) Buy all we produce 01

(ii) Give us better price 02

(iii) Supply us with inputs 03

(iv) Make roads to our farms 04

(v) Help us with storage facilities 05

(vi) Others (specify) 06

38. If the government will buy all that you produce at reasonable price will you be able to produce more of these crops?

Yes ..... No .....

Thank you for your co-operation.

APPENDIX 2

MARKETING OF PERISHABLE FADAMA CROPS AND ITS INFLUENCE ON THE PRODUCTIVITY OF FADAMA FARMERS IN KANO AND JIGAWA STATES OF NIGERIA

QUESTIONNAIRE FOR TRADERS OF FADAMA CROPS

A. BACKGROUND INFORMATION

Questionnaire No. ..... Date .....

State ..... Village .....

B. PERSONAL CHARACTERISTICS OF TRADER

1. Name ..... optional
2. Sex: Male 01
   Female 02
3. Age: 20 - 25 years 01
   26 - 30 " 02
   31 - 35 " 03
   36 - 40 " 04
   41 - 45 " 05
   46 - 50 " 06
   Over 50 " 07
4. Marital status: Married 01
   Single 02
5. Number of children .....
6. What is the highest level of education you attained?
   (i) Islamic school..... 01
   (ii) Primary school 02
   (iii) Secondary school 03
   (iv) Post secondary school 04
   (v) Others (specify) 05

7. How long have you been in vegetable marketing business?

i. 1 - 5 years

6 - 10 "

11 - 15 "

16 - 20 "

21 - 25 "

26 - 30 "

Over 30 "

8. What commodities do you trade in?

(1) Onions 01

(2) Tomatoes..... 02

(3) Sweet Pepper..... 03

(4) Carrot..... 04

(5) Lettuce 05

(6) Okro 06

(7) Others (specify)..... 07

9. Are you a wholesaler or retailer?

(i) Wholesaler 01

(ii) Retailer 02

(iii) Both wholesaler and retailer 03

MARKETING ACTIVITIES

10. From where do you buy your crops? (tick the appropriate)

(i) Farmers farm 01

(ii) Village market 02

(iii) Others (specify) 03

11. What measure do you use to buy?

(i) Basket 01

(ii) Bags 02

(iii) Tiya 03

(iv) Others (specify) 04

12. Do you have agents buying vegetables for you in the villages?

Yes ..... No. .....

13. If your answer to question 12 is yes, how much commission do you pay in Naira per unit? (state unit)

₦ .....

14. To whom/where do you normally sell your vegetables?

(i) to retailers 01

(ii) in urban market 02

(iii) to consumers 03

(iv) others (specify) 04

15. How much do you buy a basket of each crop?

Vegetables	Farmgate ₦	Rural market ₦	Urban market ₦
Onions	----------	----------	----------
Tomatoes	----------	----------	----------
Sweet Pepper	----------	----------	----------
Carrot	----------	----------	----------
Lettuce	----------	----------	----------
Okro	----------	----------	----------

TRANSPORTATION

16. How far is the place you buy your crop from the place you sell it?

_____ Km.

17. How do you transport your crop from the village market to your store?

    1. by motor vehicle 01
    2. by motor cycle ..... 02.
    3. by wheel barrow 03
    4. others (specify) 04

18. How much do you pay for transporting one basket?

    ₦ .....

19. How much do you pay for handling charges i.e loading and unloading per basket?

    ₦ .....

20. What is the nature of transportation problem you have? (tick as many as applicable)

    (i) Vehicles not readily available 01
    (ii) transporters not willing to ply bad roads .. 02
    (iii) high cost of transportation 03
    (iv) spoilage of the crops due to bad handling... 04
    (v) spoilage of the crops due to poor packaging. 05

21. Do you pay any money to your commission agents?

    Yes ..... No. .....

22. How much do you pay per basket?

    ₦ .....

23. Seeing that you pay so much to get each basket to the urban market, how much do you sell a basket?

    ₦ .....

24. About how much profit do you make on every basket?

    ₦ .....

25. What are some of the difficulties you have selling your crops?

    (i) No enough profit 01

(ii) Some get spoilt 02

(iii) Price falls when too much is supplied in the market 03

26. Would you rather sell your crops at prices lower than the equilibrium than leaven them unsold?

Yes ..... No. .....

27. If your refusal to sell at lower than equilibrium price will make your vegetables go bad will you sell at lower prices?

Yes ..... No. .....

28. Will you sell at lower than equilibrium price and sell more or you will always maintain the price you want to sell?

(i) I will sell at lower than equilibrium price.... 01

(ii) I will not sell at lower than equilibrium price 02

29. Is there a way of preventing your unsold crops from getting bad?

Yes ..... No. .....

30. If your answer to question "29" is yes, what are the ways?

(i) 01

(ii) 02

(iii) 03

(iv) 04

31. Do you obtain loan to finance your marketing business?

Yes ..... No .....

32. From where do you get the loan?

(i) From commercial banks 01

(ii) From NACB 02

(iii) From friends and relatives 03

(iv) From money lenders 04

(v) Others (specify) 05

33. Can you give a list of people your crops pass through from the farmer to the final consumer?

(i) 01

(ii) 02

(iii) 03

(iv) 04

(v) 05

34. Can you give the approximate profit each of these people makes per basket?

35. How important are middlemen to the distribution of fadama crops?

	Wholesaling	Retailing
Very important		
Important		
Not so important		

36. What would you like the government to do for traders of fadama crops?

Thank you for your co-operation.

Appendix 3

CALCULATION OF MARKETING MARGINS IN NAIRA

FOR ONION – KANC STATE

Average weight of a standard basket	=	47.2kg
Average weight of empty basket and grass for cushioning	=	1.63kg
:. Average weight of onions	=	45.49kg
Average selling price of farmers	=	₦326.00
Average price received by rural assemblers	=	45.12
Average price received by local transporters	=	12.64
Average price received by urban wholesalers	=	58.33
Average price received by lorry transporters	=	15.65
Average price received by urban retailers	=	22.24
Average weight of onion	=	45.49kg
Less 5% loss due to spoilage	=	2.28kg
Balance sold by urban retailer	=	43.21kg
Average weight of small basket sold by retailer	=	.9kg =₦10
:. Average selling price	=	$\frac{₦43.21 \times 10}{.9}$
	=	₦480.11

Appendix 3 contd.

Tomatoes

Average weight of standard basket	=	43.81kg
Average weight of empty basket and grass for cushinoning	=	1.80kg
:. Average weight of tomatoes	=	42.01kg
Average selling price of farmers	=	₦267.00
Average price received by rural assemblers	=	36.81
Average price received by local transporters	=	14.52
Average price received by urban wholesalers	=	60.69
Average price received by lorry transporters	=	20.35
Average price received by urban retailers	=	32.63
Average weight of Tomatoes	=	42.01kg
Less 10% loss due to spoilage	=	4.20kg
Balance sold by urban retailer	=	37.81kg
Average weight of small basket sold at 1.7kg	=	₦20
:. Average selling price by urban retailer	=	$\frac{₦37.81 \times ₦20}{1.75}$
	=	₦432.00

Appendix 4

SWEET PEPPER

Average weight of standard basket	=	34.89kg
Average weight of grass and empty basket	=	1.53kg
:. weight of Sweet pepper	=	33.36kg
Average selling price of farmers	=	₦333.00
Average price received by rural assemblers	=	61.58
Average price received by local transporters	=	34.79
Average price received by urban wholesalers	=	97.36
Average price received by lorry transporters	=	35.42
Average price received by urban retailers	=	54.85
Average weight of Sweet pepper	=	33.36kg
Less 7.5% loss due to spoilage	=	2.50kg
Balance sold by urban retailer	=	30.86kg
Average weight of small basket is sold at 1kg	=	₦20
:. Average selling price by urban retailer	=	$\frac{₦30.86 \times ₦20}{1}$
	=	₦617.2

Appendix 5

MARKETING MARGINS RECEIVED BY MIDDLEMEN IN KANO STATE IN NAIRA AND PERCENTAGES

Class of middle-men	ONIONS Price ₦	%	TOMATOES Price ₦	%	SWEET PEPPER Price ₦	%
Rural assemblers	45.12	9.4	36.81	8.52	61.58	9.98
Local transporters	12.64	2.63	14.25	3.36	34.79	5.64
Urban wholesalers	58.33	12.15	60.69	14.05	97.36	15.78
Lorry transporters	15.65	3.26	20.35	4.71	35.42	5.74
Retailers	22.24	4.53	32.63	7.55	54.85	8.89
Marketing margin	153.98	32.08	164.98	38.19	284.01	46.03
Farmers	326.00	67.92	267.00	61.81	333.00	53.97
Total	480.00	100	432.11	100	617.2	100

Source: Field Survey, 1995

Appendix 5 contd.

MARKETING MARGINS RECEIVED BY MIDDLEMEN IN JIGAWA STATE IN NAIRA AND PERCENTAGES

Class of middle-men	ONIONS Price ₦	%	TOMATOES Price ₦	%	SWEET PEPPER Price ₦	%
Rural assemblers	41.25	9.57	27.39	9.68	22.31	5.25
Local transporters	18.32	4.25	16.75	5.92	4.63	1.09
Urban wholesalers	57.58	13.36	44.80	15.83	35.11	8.09
Lorry transporters	16.85	3.91	19.70	6.96	9.26	2.8
Retailers	22.76	5.28	28.16	9.95	8.98	2.04
Marketing margin	156.76	36.37	136.80	48.34	79.98	18.82
Farmers	274.24	63.63	146.20	51.66	345.0	81.18
Total	431	100	283	100	425	100

Source: Field Survey, 1995

Appendix 6

COMMODITY PRICES OF SOME VEGETABLES IN NIGERIA 1992; PRICES IN NAIRA PER KG.

Months	Onions	Tomatoes	Sweet Pepper	Lettuce	Carrot
January	9.78	2.79	8.10	9.92	5.40
February	6.30	2.48	9.70	7.72	6.16
March	5.38	3.82	10.93	9.27	5.82
April	5.03	4.53	13.96	8.89	5.79
May	4.51	8.49	16.83	6.28	10.81
June	6.96	9.90	14.87	5.19	14.6
July	8.17	5.1[illegible]	12.94	6.01	11.00
August	6.60	4.06	13.25	7.25	18.46
September	6.19	4.03	11.93	7.62	27.60
October	9.36	6.26	14.08	9.54	26.33
November	18.56	7.48	17.38	9.42	23.24
December	14.50	8.81	21.19	10.53	17.51

Source: NAERLS Monthly Commodity Prices

Appendix 7

COMMODITY PRICES OF SOME VEGETABLES IN NIGERIA 1993; PRICES IN NAIRA PER KG.

Months	Onions	Tomatoes	Sweet Pepper	Lettuce	Carrot
January	8.32	5.05	15.14	10.63	9.17
February	6.17	4.12	11.77	5.74	6.30
March	5.75	4.45	14.67	5.13	8.03
April	5.79	8.99	15.01	16.57	11.91
May	6.38	14.17	18.79	14.18	19.02
June	8.43	19.02	22.44	19.97	41.25
July	9.78	18.17	19.56	18.57	50.00
August	15.76	16.72	20.24	16.88	53.75
September	10.22	13.73	12.50	31.43	43.26
October	10.83	8.72	9.568	32.80	36.04
November	13.36	11.15	16.61	24.40	27.25
December	17.43	12.70	23.23	19.80	18.38

Source: NAERLS Monthly Commodity Prices

Appendix 8

COMMODITY PRICES OF SOME VEGETABLES IN NIGERIA 1994
PRICES IN NAIRA PER KG.

Months	Onions	Tomatoes	Sweet Pepper	Lettuce	Carrot
January	12.69	10.21	16.38	13.88	13.71
February	8.27	11.10	10.55	10.80	11.14
March	9.39	12.94	14.60	20.59	14.62
April	9.08	14.31	23.79	18.06	12.74
May	8.64	19.16	29.75	19.24	21.09
June	10.09	20.83	21.14	23.68	30.39
July	12.16	19.07	24.08	22.71	34.35
August	13.60	16.11	26.78	32.25	36.14
September	27.07	18.00	19.67	37.90	43.26
October	23.66	21.48	18.00	29.76	50.37
November	42.78	23.16	20.46	20.79	60.00
December	49.27	19.16	23.76	20.62	31.46

Source: NAERLS Monthly Commodity Prices

Appendix 9

Market prices of some vegetables in Jigawa State, 1994

MONTHS/ITEMS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
RICE (Paddy)	5,975	N.A.	7,128	7,818	8,099	9,046	8,849	7,555	8,318	7,235	7,096	
RICE (Husked)	11,186	N.A.	15,376	15,641	15,235	16,832	16,450	16,536	15,695	14,646	14,070	
COWPEA	7,494	N.A.	10,049	12,079	14,381	15,828	17,352	15,126	10,000	8,805	9,995	
G/NUT (Shelled)	10,933	N.A.	12,294	14,383	16,085	18,367	18,242	16,944	15,072	13,945	12,167	
G/NUT (Unshelled)	6,289	N.A.	6,555	9,288	9,513	11,737	11,223	9,579	9,247	8,708	7,354	
WHEAT	9,426	N.A.	6,944	7,129	7,778	8,777	9,017	8,940	10,073	9,136	9,642	
CASSAVA (Gari)	6,734	N.A.	6,971	11,000	10,482	13,686	12,667	12,186	13,185	10,999	10,892	
TOMATOES (Dry)	13,080	N.A.	13,442	12,864	14,871	16,904	17,820	17,695	18,105	23,367	27,753	
PEPPER (Dry)	40,817	N.A.	42,992	38,563	42,286	33,958	40,837	36,055	39,913	45,813	42,778	
OKRO (Fresh)	6,436	N.A.	7,826	9,732	13,235	11,071	15,943	11,332	7,366	10,567	10,145	
ONIONS	7,606	N.A.	7,280	6,213	5,987	7,803	8,226	11,340	9,470	6,749	6,753	
TOMATOES (Fresh)	5,348	N.A.	7,225	6,291	10,450	11,368	10,594	9,780	11,667	10,969	9,548	
PEPPER (Fresh)	7,649	N.A.	8,980	9,289	13,129	12,649	11,759	13,284	12,290	15,288	16,157	

NOTE: N.A. Means not available
N.A. in February is due to nationwide strike.

Source: JARDA (1995) Monitoring and Evaluation Department Prices per tonne

Appendix 10

Prices of some vegetables in Kano State first quarter 1994

Crops	JANUARY		FEBRUARY		MARCH		1st Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorgum	3368.09	3337.79	3220.10	3062.91	3124.45	3164.37	3237.55	3188.36
Millet (Eriy)	3980.49	3920.55	3897.52	3491.61	3812.78	3546.73	3896.93	3652.96
Millet (Late	4023.84	3940.60	3957.97	3821.22	3989.77	3654.90	3990.52	3805.58
Maize	3848.66	3713.23	3576.69	3493.76	3573.01	3800.25	3665.45	3669.08
Rice (Paddy	10338.34	8042.52	9148.38	8919.31	11001.79	8658.97	10162.84	8540.26
Rice (Husked)	14547.21	14293.99	15014.06	15435.36	15756.94	15405.51	15106.07	15044.96
Cowpea (TVA)	13547.35	12193.71	12938.70	12892.25	14334.51	12542.25	13606.85	12542.74
Cowpea (G/Gr)	14959.14	13932.67	14687.71	14096.85	15699.11	15380.48	15081.98	14470.67
Cowpea (D/40)	14275.83	13784.74	14656.39	14536.87	15502.33	15206.86	14811.52	14509.49
G/Nut (Shild)	11828.86	11608.50	11300.84	12082.55	13323.48	12404.78	12151.06	12031.94
G/Nut (UnShld	8332.05	5754.54	9158.39	7329.29	7781.87	7130.83	8424.10	6738.22
Wheat	8930.90	8729.21	8485.82	9285.74	9600.52	8967.66	9005.75	8987.54
Cassava Root	5305.84	3206.00	3810.29	4970.99	6033.90	3966.95	5050.01	4047.98
Cassava (Gari	10645.86	10299.54	10478.19	10731.22	9896.40	9516.86	10340.15	10183.20
Cassava (Flour	6632.30	6203.45	6070.36	6869.14	6289.19	6861.02	6330.62	6644.54
Yam	6436.30	4406.91	7680.58	16151.64	9498.32	7876.70	7871.73	9478.42
S Potatoes	4469.92	3434.69	5788.99	6250.03	5960.04	5197.25	5406.32	4960.65
I Potatoes	10127.90	9562.50	9516.80	2500.00	6591.21	3787.88	8745.30	5283.46
Tomatoe (Fresh	4442.70	3505.88	7130.43	4790.99	7261.25	7216.66	6278.12	5171.18
Tomatoe (Dry)	43383.82	37482.08	35846.99	40460.11	37993.28	41810.78	39068.03	39910.99
Pepper (Fresh	14104.38	8812.18	9925.71	7730.01	12719.47	10504.60	12249.85	9015.59
Pepper (Dry	53319.90	40130.47	49510.95	31759.19	37377.76	41610.31	46736.20	37833.32
Hot Pepper	46296.65	35859.71	47808.98	33867.96	43979.05	34041.01	46694.89	34589.56
Onions	9559.20	6980.72	9670.70	7983.31	7672.10	8072.11	8967.33	7678.71
Leaf Fresh	20505.66	17092.09	19694.79	10597.83	15042.90	28571.43	18414.45	18753.78
Garg (Dry	44432.67	32579.23	43868.41	31970.71	49408.98	30744.25	45903.35	31764.73
Cotton	21428.57	42359.86	14785.73	16964.29	9090.91	15469.83	15102.74	24931.32
Sugar Cane	2801.72	2117.83	2607.43	3395.97	4999.45	2137.13	3469.55	2550.24
Live Chick (Imp	32500.01	28210.98	31015.62	28284.09	27434.06	31305.56	30316.56	29266.87
Live Chick (Lo	32415.55	34922.57	29157.78	38817.40	30227.41	33173.28	30600.25	35637.75
Meat (Ky/Dagga	41244.29	30500.07	30697.16	38490.81	47919.42	30543.47	39953.62	33178.11
Beef	43453.90	40651.68	40970.13	49029.06	45172.11	40906.16	43198.72	43528.97
Fish Fresh	44444.45	11428.57	25853.70	11132.82	42442.38	7857.15	37513.51	10139.51
Fish (Dry)	45974.41	25463.01	50834.89	18727.81	25572.57	29183.68	40793.96	24458.16

Source: KNARDA (1994) Monitoring and Evaluation Department, Kano

Appendix 11

Prices of some vegetables in Kano State
Second quarters 1994

Crops	APRIL		MAY		JUNE		2nd Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorghum	3378.86	3352.70	3638.99	3469.83	4036.13	3687.61	3684.66	3503.38
Millet (Erly)	3948.15	3947.16	4405.98	4191.26	5022.42	4696.99	4458.85	4278.47
Millet (Late)	4154.94	4275.92	4516.63	4295.61	5221.68	4918.57	4631.08	4496.70
Maize	3601.10	12808.58	4000.89	3885.02	4378.97	4307.26	3993.65	7000.29
Rice (Paddy)	10503.82	12157.79	12843.76	11516.05	12156.57	16155.58	11834.72	13276.47
Rice (Husked)	16787.20	16722.27	17780.63	17075.61	14602.17	18462.47	16390.00	17420.12
Cowpea (TVX)	15606.46	20016.67	13891.26	13173.61	16936.10	16534.89	15477.94	16575.06
Cowpea (G/Gr)	16551.83	12591.32	16727.52	15433.46	18280.40	17831.38	17186.58	15285.39
Cowpea (D/40)	16411.19	15513.90	16919.12	15790.95	16992.17	17413.80	16774.16	16239.55
G/Nut (Shild)	13856.44	13796.88	15275.09	14408.58	15784.78	16194.41	14972.10	14799.96
G Nut (UnShld)	9534.75	9921.76	10393.79	9725.29	11068.23	11217.37	10332.26	10288.14
Wheat	8359.14	8220.46	9746.69	8874.08	9302.21	9071.23	9136.01	8721.92
Cassava Root	6950.55	7993.53	8276.70	5383.78	7003.51	8078.13	7410.25	7151.81
Cassava (Gari)	9888.00	9487.27	9717.45	9197.82	10113.68	8977.52	9906.38	9220.87
Cassava (Flour)	6428.43	5871.83	6627.32	6141.11	6369.20	6493.34	6474.98	6168.76
Yam	10392.22	10963.69	12557.45	8307.44	13381.32	8136.01	12110.33	9135.71
S/Patatoes	7097.07	8049.64	11344.90	5051.26	8180.88	11538.12	8874.28	8213.00
I/Patatoes	9784.62	13157.90	19545.08	3125.00	12241.08	3500.00	13856.92	6594.30
Tomatoe (Fresh	6921.55	8285.29	11805.03	7873.17	11986.28	17607.51	10237.62	11255.32
Tomatoe (Dry)	53452.53	35136.29	40545.03	33639.55	41985.94	50359.93	45327.84	39711.92
Pepper (Fresh)	14080.82	14546.55	16695.96	14846.30	20189.61	22044.89	16988.79	17145.91
Pepper (Dry)	46583.05	43629.50	57345.10	46932.83	43380.50	48889.30	49102.88	46483.87
Hot Pepper	49510.70	34896.52	47747.12	41399.68	55093.04	39538.69	50783.62	38611.63
Onions	6963.56	7475.98	8808.64	9281.95	7290.54	10270.85	7687.58	9009.59
Okro (Fresh)	9467.12	11437.35	9255.01	10617.90	8228.30	12099.08	8983.48	11384.78
Okro (Dry)	51951.85	32333.82	59727.25	44113.57	43838.57	38202.44	51839.22	38216.61
Cotton	8750.00	20348.84	14800.00	12955.56	17471.27	12431.30	13673.76	15245.23
Sugar Cane	3373.08	5165.87	3955.48	6114.61	8738.74	7510.06	5355.77	6263.51
Live Chick (Imp)	31270.62	22879.31	48753.84	27724.06	28177.17	26379.21	36067.21	25660.86
Live Chick (lo)	31582.92	29120.44	40624.83	38483.61	33747.88	37216.95	35318.54	34940.40
Meat (F/Dabba)	44459.51	33400.40	46828.48	40084.33	35901.42	35632.60	42396.47	36372.44
Beef	46017.59	55802.51	48439.49	50016.66	42498.85	49269.88	45651.98	51696.35
Fish Fresh	20845.07	12929.90	13901.10	16924.02	21526.26	26704.92	18757.48	18852.94
Fish (Dry)	34040.92	29173.56	27184.21	36092.31	31661.23	36176.48	30962.12	33814.12

Source: KNARDA (1994) Monitoring and Evaluation Department, Kano

Appendix 12

Prices of some vegetables in Kano State Third quarter, 1994

Crops	JULY		AUGUST		SEPTEMBER		3rd Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorghum	4474.84	3904.68	4782.92	3949.58	4715.58	4267.79	4657.78	4040.68
Millet (Early	5330.11	4804.22	5479.75	4982.33	2598.56	4609.51	4469.47	4798.69
Millet (Late	5606.04	5029.00	5645.43	5067.31	5778.11	4935.07	5676.52	5010.46
Maize	5483.85	4502.37	5358.87	4432.23	5566.06	4559.22	5469.53	4497.94
Rice (Paddy)	13463.06	10990.42	13851.53	16431.82	13914.53	12078.29	13743.05	13166.84
Rice (Husked)	20798.11	19512.04	22495.24	22264.98	21670.36	17161.4	21654.57	19646.13
Cowpea (TVU)	17786.50	19387.76	18778.37	17559.53	13570.76	13749.03	16711.87	16898.77
Cowpea (G/Gr)	20277.38	19610.66	20035.98	19247.62	15957.64	4557.71	18757.00	17805.33
Cowpea (D/Ac)	19457.12	19176.16	19390.48	18590.45	13875.18	13743.56	17574.26	17170.06
Groundnut (Shelled	16853.27	14516.22	18816.96	14257.37	19068.29	16330.23	18246.18	15034.67
Groundnut (UnShelled	10792.34	9712.69	11608.74	10383.19	11155.23	11202.64	11152.10	10432.84
Wheat	9286.09	8062.19	13053.43	10145.35	13900.13	15941.78	12079.88	11389.77
Cassava Root	5947.09	4152.68	5114.27	7750.00	7316.79	3615.51	6459.38	5172.73
Cassava (Gari	10624.49	9737.36	10419.18	8259.53	10026.55	10872.85	10423.41	9623.24
Cassava (Flour	6203.07	5641.29	6369.87	5113.64	6343.62	7590.23	6312.19	6115.05
Yam	15106.53	7723.56	15407.23	0.00	15821.09	11244.06	15445.62	9483.81
Sweet Potatoes	10814.43	10498.22	6753.94	17343.78	8372.75	4972.69	8580.38	10938.23
Irish Potatoes	11548.25	0.00	16277.31	0.00	16372.98	25701.75	15399.51	25701.75
Tomatoe (Fresh)	19540.65	5659.41	14337.66	12432.13	7992.54	0.00	13956.95	9045.77
Tomatoe (Dry)	49652.64	55063.22	61115.65	53295.78	51846.73	41391.49	54205.00	49916.83
Pepper (Fresh	37292.79	19452.45	27730.99	16285.03	21329.76	18593.2	28784.51	18110.23
Pepper (Dry)	70861.64	44333.34	70499.78	59603.37	61539.68	51151.42	67633.70	51696.04
Red Pepper	39084.69	64531.25	70083.33	43311.05	66692.37	43965.32	58620.13	50602.54
Onions	8722.12	12927.93	14505.82	5950.29	14141.12	18065.7	12456.35	12314.64
Okra (Fresh	10742.65	5223.79	19327.39	6927.29	7117.21	6356.81	12395.75	6169.23
Okra (Dry	46171.68	40659.54	81921.59	43026.32	37563.6	23415.21	55885.62	35767.02
Locust	0.00	42857.15	0.00	25000.00	38931.82	35957.45	38931.82	34604.87
Sugar Cane	3620.69	1756.85	23148.15	2174.44	9703.57	2639.13	13824.14	2190.14
Live Chick (Imp	58777.79	23796.30	69738.85	42500.01	48859.89	34350.47	58391.50	33548.93
Live Chick (Loc	44851.06	26935.62	41282.05	35470.09	53187.54	28629.25	46440.22	30345.05
West Kid Gaboa	57482.29	52588.24	58771.93	38964.29	39527.43	40718.87	51920.55	43423.80
Beef	55479.83	45576.92	64868.43	65000.00	48269.09	38767.62	56205.78	49781.51
Ram Fresh	43106.62	8695.85	25573.77	0.00	30869.57	76298.71	33183.32	42497.18
Ram Dry	45957.45	45760.00	90277.78	65384.62	44085.3	34950.98	60106.84	48698.53

Source: KNARDA (1994) Monitoring and Evaluation Department, Kano

Appendix 13

Prices of some vegetables in Kano State
Fourth quarter, 1994

Crops	OCTOBER		NOVEMBER		DECEMBER		4th Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorghum	4635.37	3875.02	5089.37	4801.24	5369.14	4668.84	5031.29	4448.37
Millet (Early)	5000.51	4458.36	5695.38	5561.67	6082.46	5652.34	5592.78	5224.13
Millet (Late)	5758.11	5185.48	6083.68	5571.53	6224.46	5726.30	6022.09	5494.44
Maize	5291.96	4618.69	5158.43	5165.52	5954.64	5212.16	5468.34	4998.79
Rice (Paddy)	12460.49	11085.73	13455.31	11644.71	12431.32	13668.24	12782.37	12132.89
Rice (Husked)	17125.90	17217.74	20407.20	20683.75	21218.71	24190.77	19583.94	20697.42
Cowpea (TVX)	13188.46	12473.17	13005.20	15212.96	14272.37	13668.39	13488.68	13784.84
Cowpea (G/Gr)	14774.00	12246.57	16389.23	14793.53	16924.48	15755.68	16029.23	14265.26
Cowpea (D/40)	13236.98	12557.27	14640.93	13707.06	15565.02	13809.55	14480.97	13357.96
G/Nut (Shilo)	18315.60	14132.00	21242.00	17326.30	21572.94	25331.68	20376.84	18929.99
G/Nut (UnShld)	9828.46	8978.32	12504.74	11075.09	14159.17	12074.10	12164.12	10709.17
Wheat	14511.97	9315.60	18034.16	10998.88	17403.31	20081.01	16649.81	13465.16
Cassava Root	7540.96	4989.62	5863.15	4699.47	6045.87	8889.79	6483.33	6186.29
Cassava (Gari)	9549.22	7364.29	9665.66	13028.72	10872.89	9465.61	10029.26	9952.88
Cassava (Flour	7244.08	8152.69	6519.68	8495.19	6869.03	7520.44	6877.60	8056.11
Yam	12658.12	12367.06	13013.57	10350.43	19379.49	28387.49	15017.06	17035.00
S/Patatoes	7065.55	4311.84	7639.97	4037.85	5514.39	5011.63	6739.97	4453.77
I Patatoes	12644.89	4508.20	17453.90	0.00	20328.54	3225.81	16809.11	3867.00
Tomatoe (Fresh	8811.19	8482.80	11233.45	13022.49	14718.03	18346.53	10920.89	13283.94
Tomatoe (Dry)	50130.26	44657.61	54782.61	52836.20	65783.77	54343.96	56898.88	50612.59
Pepper (Fresh	15548.44	13506.88	21901.27	13608.30	32633.93	13183.51	23361.21	13432.89
Pepper (Dry	42366.08	31442.50	72048.19	63402.17	84437.55	54827.58	66283.94	49890.75
Hot Pepper	67456.30	39279.15	47851.85	55641.95	43810.61	40561.36	53039.59	45160.82
Onions	15519.37	8782.82	18343.50	14901.79	42473.82	33398.57	25445.56	19027.73
Okro (Fresh	8576.11	12470.43	14209.72	19833.33	46357.41	81428.57	23047.75	31244.11
Okro (Dry)	40549.99	37087.86	46053.47	39054.93	63111.00	39535.88	49904.82	38559.56
Cotton	44781.75	0.00	26923.08	0.00	16760.57	42857.15	29488.47	42857.15
Sugar Cane	9275.17	5645.27	13594.52	10954.54	9936.67	4870.04	10935.45	7156.62
Live Chick Imp	44478.53	24789.05	52883.41	60242.43	64162.57	32692.52	53841.50	39241.33
Live Chick Lo	50011.66	44487.84	58916.67	32513.69	53994.14	28960.68	54307.49	35320.73
Meat (N/Dacca)	47349.55	38977.94	32618.28	53056.88	65521.08	35514.84	48496.30	41849.89
Beef	57034.04	58287.84	48222.61	48157.23	85913.46	52330.14	63723.37	52925.07
Fish Fresh	84792.50	23565.22	0.00	0.00	0.00	25000.00	84792.50	24282.61
Fish (Dry)	49160.81	80860.49	0.00	67955.80	0.00	8277.02	49160.81	52364.44

Source: KNARDA (1994) Monitoring and Evaluation Department, Kano.

Appendix 14

Prices of some vegetables in Kano State First quarter, 1995

Crop	JANUARY		FEBRUARY		MARCH		1st Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
[illegible]	5457.62	4901.65	5457.62	4901.65	7628.45	7493.57	6181.23	5765.62
Rice (Paddy)	11324.66	10001.99	11324.66	10001.99	16728.48	17397.48	13125.93	12467.16
Rice (Milled)	19611.16	17837.81	19611.16	17837.81	26132.85	26394.56	21785.05	20690.06
Wheat	18324.93	11247.40	18324.93	11247.40	20368.64	12140.85	19006.17	11545.22
Tomatoe (Fresh)	5945.79	3626.41	5945.79	3626.41	5531.67	7083.07	5807.75	4778.63
Tomatoe (Dry)	48919.43	42302.86	48919.43	42302.86	61133.06	45282.71	52990.64	43296.14
Pepper (Fresh)	12069.59	10260.85	12069.59	10260.85	10713.43	12925.851	11617.54	11149.18
Pepper [illegible]	52798.45	55285.97	52798.45	55285.97	107938.42	50946.14	71178.44	53839.36
Hot pepper	39574.06	40382.81	39574.06	40382.81	41861.48	49007.98	40336.53	43257.86
Onion	18096.94	7935.13	18096.94	7935.13	15768.14	9540.06	17320.67	8470.11
Okra (Fresh)	21208.48	17881.20	21208.48	17881.20	25814.59	20935.25	22743.85	18899.21
Okra (Dry)	51033.49	41988.18	51033.49	41988.18	52491.22	51200.95	51519.40	45059.10
Sugar cane	5451.30	5702.56	5451.30	5702.56	12151.00	6300.14	7684.53	5901.75

Source: KNARDA (1995) Monitoring and Evaluation Department, Kano.

Appendix 15

Market prices of some vegetables in Kano State Second quarter 1995

Crops	APRIL		MAY		JUNE		2nd Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorgnum Maize	10942.35	10042.96	11196.07	10281.97	13369.12	11186.77	11835.85	10503.90
Rice (Paddy)	28539.64	27367.82	21307.82	21851.20	21925.41	24567.24	23924.29	24595.42
Rice (Husked)	29707.39	28093.92	34906.14	34860.63	35929.08	38640.84	33514.20	33865.13
Wheat	22537.19	19696.97	25849.69	20498.68	19005.78	17920.64	22464.22	19372.10
Tomatoe (Fresh)	6561.49	3199.76	3870.71	13080.29	18171.41	17355.83	9534.54	11211.96
Tomatoes (Dry)	48723.07	39116.37	36578.35	29149.76	50501.58	41689.35	45267.66	36651.83
Pepper (Fresh)	28608.47	14114.13	36868.73	14807.74	53192.94	18995.89	39556.71	15972.58
Pepper (Dry)	50869.57	51252.21	40388.35	68314.82	54423.092	36767.01	48560.34	52111.35
Hot Pepper	71666.67	65430.71	67063.53	63533.55	65561.23	48127.36	68096.14	59030.54
Onions	21709.88	15147.08	6411.95	11109.82	9485.23	10655.12	12535.69	12304.00
Okro (Fresh)	31888.33	35416.67	13243.29	6175.24	14846.23	8597.68	19993.62	16729.86
Okro (Dry)	46799.08	42372.78	56869.97	55255.69	76994.42	53166.04	60221.16	50264.83
Sugar Cane	17819.08	709.71	47030.31	22053.45	10000.00	50000.00	24949.82	26381.39

Source KNARDA (1995) Monitoring and Evaluation Department, Kano.

Appendix 16

Market prices of some vegetables in Kano State Third quarter 1995

Crops	JULY		AUGUST		SEPTEMBER		3rd Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorghum Maize	13979.51	12296.23	10377.44	11957.29	12643.36	10714.29	12333.44	11655.94
Rice (Paddy)	31846.72	30066.76	0.00	26235.96	15131.58	22682.54	15659.43	26328.42
Rice (Husked)	35043.18	34382.98	27364.78	36642.89	34982.17	31701.80	32463.38	34242.55
Wheat	21156.30	20199.43	16491.56	17460.56	22732.53	21428.57	20126.80	19696.11
Tomatoe (Fresh)	24483.36	9262.62	17131.37	11585.21	15370.74	10533.34	18995.16	15690.58
Tomatoes (Dry)	43579.06	49272.49	0.00	30107.53	54745.87	24883.72	32774.98	34754.58
Pepper (Fresh)	73877.52	13191.06	120667.62	34840.79	34163.42	13125.00	76236.19	20718.95
Pepper (Dry)	67083.34	46293.11	54459.70	46940.56	64618.052	37596.16	65387.08	43609.94
Hot Pepper	47684.99	54523.81	0.00	54393.94	47812.50	33333.33	31832.50	47417.03
Onions	9237.468	8949.578	39401.91	10042.61	16319.65	9066.332	21653.01	9352.84
Okro (Fresh)	31020.68	5444.87	9655.78	9308.27	19395.33	5200.35	20023.93	6651.16
Okro (Dry)	52175.92	53127.76	31617.65	25037.88	37775.58	22045.46	40523.05	33403.70
Sugar Cane	28533.64	1948.05	14337.05	6750.77	8867.23	9176.06	17245.97	5958.29

Source KNARDA (1995) Monitoring and Evaluation Department, Kano.

Appendix 17

Market prices of some vegetables in Kano State Fourth quarter, 1995

Crops	OCTOBER		NOVEMBER		DECEMBER		4th Quarter Avg.	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Sorghum Maize	11996.71	10861.46	11059.39	11453.39	10513.79	10488.28		
Rice (Paddy)	20903.78	8659.39	10193.60	8888.89	15967.08	20121.66		
Rice (Husked)	28278.95	26942.70	31004.76	28575.60	26490.99	31858.97		
Wheat	27017.65	20491.08	26182.96	23850.55	25361.61	23165.70		
Tomatoe (Fresh)	15453.36	10959.24	13345.07	20680.66	13413.03	31438.33		
Tomatoes (Dry)	28738.07	26023.94	42523.71	29473.69	53767.04	40597.02		
Pepper (Fresh)	27173.21	13521.04	24294.942	27315.07	26254.49	27370.00		
Pepper (Dry)	52318.22	49989.23	65464.90	42055.01	61941.472	52284.48		
Hot Pepper	49155.86	33125.01	69518.53	27777.78	48611.11	32608.70		
Onions	19700.06	11493.59	26691.75	19106.06	32809.45	25763.71		
Okro (Fresh)	14996.76	6745.59	17707.25	20711.31	29275.50	27294.17		
Okro (Dry)	34403.58	14495.43	33335.00	29292.46	71855.35	24347.83		
Sugar Cane	6567.20	14495.43	10859.46	5407.80	21246.80	4162.69		

Source KNARDA (1995) Monitoring and Evaluation Department, Kano.

Appendix 18

Estimated Costs and Benefits of Fadama Produce in Kano State, 1994

ITEMS	PEPPER	TOMATO	ONION	SUGAR CANE	PADDY RICE	GREEN MAIZE	WHEAT	GARLIC
1. Land Preparation	1000	1000	1000	1000	1000	1000	1000	1000
2. Sedd (or sets) Nursery	1200	1500	2400	10,000	1000	300	1000	8550
3. Sowing or broadcasting or transplanting	400	600	200	100	2000	200	1000	1000
4. Fertilizer	1600	2200	1600	1100	2800	2800	1600	1600
5. Fertilizer application	160	160	160	160	160	160	160	
6. Weeding and spraying	1900	2600	2300	3600	5600	2700	400	2300
7. Harvesting	720	720	720	600	600	600	600	720
8. Threshing	-	-	-	-	1000	-	1000	-
9. Transportation	1600	1600	1500	3500	6000	1000	500	250
10.Empty bags (or basket)	2000	2000	1500	-	6000	1000	375	250
11.Cost of irrigation fuel	500	500	500	500	300	500	500	250
12.Depreciation of pump	1200	1200	1200	1200	1200	1200	1200	1200
13.Depreciation of well	300	300	300	300	300	300	300	300
14.Irrigation labour	1000	1000	1000	1000	1000	1000	1000	1000
Estimated Total Cost of cultivation	13,580	15,180	14,780	23,660	14,860	16m560	9,735	18,830
B: Value of produce	200 baskets	200 baskets	150 bags	59 tonnes	60 bags	50,000 cobs	25 bags	25 bags
Price per bag	N120/ basket	N120/ basket	N150/ bag	N 1000/ tonne	N60/bag	N0.1/cob	N700/bag	N1,800/ bag
Total Income/ha	24,000	24,000	22,500	50,000	36,000	24,000	17500	45,000
C: Benefit/ha	10,420	8,820	7,720	26,340	21,140	11,440	7,765	26,170

Source: KNARDA (1994); Technical Notebook for 1993/94 Fadama Programme, NFDP, Kano State.