An Analysis of Some Agricultural Commodity Prices in Selected Markets in Kano State, Nigeria.

by

DAMISA MAIYAKI

A thesis submitted to the Postgraduate School,
Ahmadu Bello University, in partial
fulfillment of the requirements for the
degree of Master of Science
in Agricultural Economics

Department of Agricultural Economics
and Rural Sociology
Faculty of Agriculture
Ahmadu Bello University
Zaria, Nigeria

DECEMBER, 1998.

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 before in any previous application for a higher degree or reputable presentation elsewhere. All borrowed ideas have been duly acknowledged.

Damisa Maiyaki

150299

Date

The above declaration is confirmed

DR. D.O.A. Phillip
Chairman, Supervisory Committee

8-7-99

Date

KASHIM IBRAHIM LIBRARY

CERTIFICATION

The project thesis entitled "AN ANALYSIS OF SOME AGRICULTURAL COMMODITY PRICES IN SELECTED MARKETS IN KANO STATE, NIGERIA" by Damisa Maiyaki meet the regulations governing the Award of the Degree of Master of Science of Ahmadu Bello University, and is approved for its contributions to knowledge and literary presentation.

Dr. D.O.A. Philip
Chairman,
Supervisory Committee

8-7-99
Date

Dr. M.I. Kolawole
Member,
Supervisory Committee

8-7-99
Date

Dr. D.O.A Philip
Head of Department

8-7-99
Date

Dean, Post-Graduate School

15/05/00
Date

ACKNOWLEDGEMENT

My sincere and profound gratitude goes to the Almighty God who in His infinite mercy and grace stood by me in thick and thin. This thesis could not have come to completion without His divine intervention. I give Him all the glory, praises, honour and adoration.

My appreciation also goes to my supervisors Doctors Dayo Philip and Kolawole M.I. for their helpful suggestions throughout the period of study. Dr. Dayo Philip was more than a supervisor to me.

I am more than grateful to my beautiful and beloved sister Barrister Aisha Lawan Damisa for her unlimited support. No amount of thanks could pay for your kindness. You are a real darling. May God Almighty bless you according to the measure of His blessings. I am equally grateful to my able sister Lami Ofie (Mrs) for her dear and sisterly support, Dr. Danladi Lawan Damisa who proved to be a brother and Alhaji Ibrahim Lawan Damisa for his moral and financial support.

I can never of course forget the likes of Dr. Bala Lawan Damisa who made my stay on campus a memorable one and the JAWOM Family who made me to really know and appreciate God. I am very much indebted to Prince Aguma Emmanuel Daku and his 'Sweetee', and Mathias of I.A.R. Library. Oh! how can I thank you? Of course my beloved Jemimmah, you will never be forgotten. Silver and gold have you not but then

you are such a precious gem. A maiden among maidens. Your love and encouragement is one in a million and is highly appreciated.

Lastly, dear reader, Jesus is real. There is no way you can make heaven except by Him. Are you such a terrible sinner that you feel Jesus will never accept you or are you battling with afflictions so terrible and hopeless that you sometimes feel rejected, dejected and abandoned as if no one cares? Well Jesus is the answer. He washed my sins away and turned my captivity to freedom. He can do more for you no matter what your condition is. All you need to do is to invite Him into your life as Lord and Master. Do it now before it is too late.

God bless you all.

DEDICATION

To the Almighty God.

ABSTRACT

The existence of markets are a necessity to cater for the farmer's surplus production. This however is not enough on its own to adequately take care of the interests of the market participants. It is essential that produce must be sold at prices that would cover cost of production and leave a surplus to reward the farmer's efforts. The performance of the markets is therefore equally very important. It is desired for produce to be sold at a price that would harmonise maximising the farmer's profit and minimising the consumer's cost(s).

There are indications resulting from market imperfections of the existence of lead-lag price relationship amongst markets in the country: Some markets were found to appreciably affect the price of a commodity in other markets. This can greatly distort the pricing efficiency of the marketing system, particularly the marketing of agricultural products.

The major objective of this study was to study intra and inter commodity price relationships; to this effect, the prices of six (6) commodities were collected from five (5) markets in Kano State and then analysed using regression analysis. The results in general indicated that the mean significant effect of the prices of different commodities in the same market is about the same as the effect of the same commodity prices in other markets on the price of the commodity in an individual market and this effect is significantly very high. The mean significant effect of the prices of other commodities

in the other markets on the price of a commodity in an individual market is however very low. This implies poor inter commodity market integration and is attributed to market imperfections in the area of study. Poor market information and transport bottlenecks led to poor distribution of goods which then results in poor market integration and lead-lag price relationships among markets.

TABLE OF CONTENTS

Chapter		Page
	Title page	i
	Declaration	ii
	Certification	iii
	Acknowledgements	iv
	Dedication	v
	Abstract	vi
	Table of Content	viii
	List of Tables	x
1.	INTRODUCTION	1
1.1	Problem Statement	2
1.2	Objectives of the Study	2
1.3	Hypotheses	3
1.4	Significance of the Study	3
2.	LITERATURE REVIEW	5
2.1	The Theory of Markets and Markets Inter-relationship	5
2.2	Market Intelligence and the Farmer	7
2.3	Price Formation and Market Integration	7
3.	METHODOLOGY	11
3.1	Study Area	11
3.2	Data Collection	13

3.3 Analytical Framework 14

3.3.1 Model Specifications 15

Model 1 15

Model 2 16

Model 3 16

3.4 Assumptions 17

4. RESULTS, PRESENTATION AND ANALYSIS 19

4.1 Degree of Accessibility of Roads Linking the Markets 19

4.2 Degree of Market Information 19

4.3 Commodity Price Associations Within Markets 20

4.4 Inter-Market Price Association 29

4.4.1 Price Relationship of some Commodity in

Different Markets 30

4.4.2 Price Relationship of Different Commodities in

Different Markets 38

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS 48

5.1 Summary 48

5.2 Conclusion 50

5.3 Recommendations 50

Appendix 53

Reference 59

LIST OF TABLES

Table		Page
4.31	Regression Values of Sorghum Price Against the Price of Other Commodities in the Same Market	21
4.32	Regression Values of Groundnut Price Against the Price of Other Commodities in the Same Market	22
4.33	Regression Values of Rice Price Against the Price of Other Commodities in the Same Market	23
4.34	Regression Values of Cowpea Price Against the Price of Other Commodities in the Same Market	24
4.35	Regression Values of Maize Price Against the Price of Other Commodities in the Same Market	26
4.36	Regression Values of Millet Price Against the Price of Other Commodities in the Same Market	28
4.411	Regression Values of Sorghum Prices in different Markets	30
4.412	Regression Values of Groundnut Prices in different Markets	31
4.413	Regression Values of Rice Prices in different Markets	32
4.414	Regression Values of Cowpea Prices in different Markets	33

4.415 Regression Values of Maize Prices in different Markets 35

4.416 Regression Values of Millet Prices in different Markets 36

4.417 Significant Regression values of Sorghum Price Against Other commodity Prices in Other Markets 38

4.418 Significant Regression Values of Rice Price Against Other Commodity Prices in Other Markets 40

4.419 Significant Regression values of Groundnut Price Against Other commodity Prices in Other Markets 41

4.420 Significant Regression Values of Cowpea Price Against Other Commodity Prices in Other Markets 42

4.421 Significant Regression values of Maize Price Against Other commodity Prices in Other Markets 44

4.421 Significant Regression Values of Millet Price Against Other Commodity Prices in Other Markets 46

Chapter 1

INTRODUCTION

The goal of any commercial farmer is to get his commodities disposed off at maximum profit and theoretically this is achieved at the point where the marginal cost (mc) of production of the commodity equates with the market price of the commodity. The existence of markets to cater for the farmers surplus production is therefore an essential pre-requisite for agricultural development to take place. Produce must be sold at prices that would cover cost of production and leave a surplus to reward the farmers efforts.

The existence of markets is however not enough on its own to efficiently take care of prices. The performance of the markets is equally very important. In Nigeria, consumers generally purchase their commodities through haggling and bargaining. The bargaining power to an extent determines the price a commodity can be bought. In well developed capitalist economies, the marketing system determines the price of commodities. It is also responsible not only for the allocation of resources but also for the relaying of price information to market participants and it is believed that market participants will make more rational decisions if they are more knowledgeable about the market. Improvements in marketing system will therefore enhance a better pricing efficiency thereby ensuring a better market performance.

The inefficiency of the marketing system results from market imperfections. One of such imperfections is that of some markets being price leaders for some commodities and some other neighbouring markets being price takers for the particular commodities. This is a typical lead-lag price relationship of markets.

1.1. Problem Statement

A lot of work has been done in the broad area of agricultural marketing in Nigeria. Inter-commodity market price relationships are however not widely studied in the country. There are indications of the existence of lead-lag price relationship amongst markets in the country: some markets are found to affect appreciably the price of commodities in other markets. Okereke (1988) found that the wholesale market price of some grains do significantly affect their retail market prices.

The existence of lead-lag price relationship amongst markets can greatly distort the pricing efficiency of the marketing system especially in the marketing of agricultural products.

1.2 Objectives of the Study

The major objective of the study was to study inter-market price relationships of some agricultural commodities.

The specific objectives used in attaining the major

objective were to

a) determine the degree of network of communications between the markets of the study.
b) determine the price relationships of the selected crops within and among the markets of the study
c) determine the degree of integration amongst the various markets of the study; and
d) make recommendations based on the findings of the study.

1.3 Hypotheses

a. There are no relationships among the prices of the various commodities for a given market.
b. There are no relationships among the prices of a given commodity in the various markets.
c. There are no relationship among the prices to the various commodities in the various markets.

1.4 Significance of the Study

Marketing plays an important role in the economic growth and development of any nation. It is therefore important to remove any bottleneck that threatens the effective performance of the markets.

The study gives insight into the inter-market price relationships and the level of inter-market network of communication. It also highlights price relationships within

and between markets and suggest a way to improving the performance of the markets by making recommendations based on the findings of the study.

Chapter 2

LITERATURE REVIEW

The emphasis of the study is on food marketing. This is justified by the high proportion of incomes spent on food by urban households. In the country, more than half the population is engaged in agriculture (Census 1991), hence improvements in food marketing which would lower costs to both the producers and consumers without reducing the quality and variety of food available will have widespread effects on human welfare.

2.1 The Theory of markets and market Inter-relationship

Competitive markets range from being atomistic to being monopolistic. Monopolistic competition is similar to atomistic competition except that each competitive monopolist sells a product that is differentiated from the product that is sold by his competitors. An oligopoly however exists when a market consists of a few sellers who are highly inter-dependent that one's actions directly and significantly affect another's.

Agricultural products are highly differentiated. The difference may be in the nature of the product, the quality of the product or in such aspects of packaging, branding or conditions for sale. This therefore makes the agricultural

produce markets to be very competitive. Agricultural produce are often perfect substitutes between units. The imperfect substitutes in agriculture arise from the quality difference which may or may not be associated with particular producers. The quality differences are often graded in agricultural markets so that all units within a grade are perfect or near perfect substitute (Doll et al, 1968).

The economy of any nation consist of many inter-related markets. No one of these markets function in isolation. The economy is therefore not a series of markets functioning in isolation. It is rather an interlocking system in which anything happening in one market has a profound effect on many other markets and could potentially influence every other market in the economy (Lipsey, 1971). The effects in these other markets may in turn feed back on to the original market. To predict the precise effect of this feedback is very difficult (Doll et al., 1968).

The activities of a market in a capitalist economy are co-ordinated by the price system. Changes in surplus and scarcities are reflected in price changes; these price changes signal to decision takers what is happening in other markets and they alter their decision in response to these changes. Prices rise when shortage develop and profit seeking entrepreneurs are led to increase the supply of more of the good that is in short supply. On the other hand, when

surpluses occur, prices fall and supply is contracted.

2.2 Market Intelligence and the Farmer

Market intelligence deals with market knowledge. Its meaning however go beyond gathering information on market prices. According to the Organisation for Economic Co-operation and Development (OECD, 1967), market intelligence embraces all economic and technical information about the marketing system.

Knowledge is important to both the ordering of efficient marketing systems and to successful commercial operations within a market. It is knowledge that market intelligence supplies. As long as there is buying and selling, market intelligence exists. It allows at the lowest buyers and sellers to check their prices. The farmer must therefore know a great deal about conditions, storage, domestic economy and production trends before deciding on what to produce. He must know what kind of market he expects to have (Jones, 1972).

2.3 Price Formation and market Integration

In a competitive structure, prices in different markets are expected to move together since all are influenced by the same set of forces and are tied together by transfer costs (Ejiga and Robinson, 1981). Despite this however, price disparity do occur between markets. This is because even though an individual trader may be unable to influence prices,

the conditions of perfect mobility, perfect homogeneity and perfect knowledge of products are not satisfied in actual market transactions. Prices in any terminal market can move within the range of plus or minus the transport costs in relation to a primary market without there being any movement of goods between markets as a result of costs of shipment. The larger the transport costs, the larger the range within which prices can move in relation to the other markets without there being any shipment of goods. Price disparity between markets may also occur from lack of scientific grading of the produce. Price differences due to differences in varieties often tend to be considerable in low income countries where grain is generally marketed without grading (Lele, 1967).

Large price differentials among markets did not result from planned manipulation under monopsonic or monopolistic conditions but rather they were a result of imperfections inherent in the system (Hays 1976) and according to Njoku (1981) and Lele (1967), low degree of correlation between prices in different markets exist because of lack of adequate dissemination of information. Infact, excessive price differences may occur as a result of poor dissemination of knowledge regarding market conditions. Traders may not be aware of the opportunities of making profits by exploiting price differences through movement of goods. Imperfect knowledge may therefore results in inadequate flow of goods and hence in price differences that are greater than costs of

shipment.

In this study, correlation between prices are expected to be less than perfect in different markets because of transport costs, transport bottlenecks and the resulting uncertainty about how long a favourable price difference between markets can be expected to persist as well as poor market knowledge. Price differences may also be brought about as a result of poor storage facilities. Storage may not cause markets to become price leaders but it can facilitate the price leadership role of markets. Most rural markets have little or no storage facilities like their urban counterparts. Whatever the farmer is able to store at home is purely for domestic purposes. The markets might therefore fall at the hands of the urban markets during the off season for the supply of produce. Thus, the rural markets might be forced to be price takers due to lack of storage facilities. Contrasting this view, Hays (1976) outlined that farmers can store grains to the extent of causing unpredictability in farm marketing; according to him, little storage takes place by the urban market traders and that the monthly purchases of the urban market traders are equal to monthly sales. Large amount of grains according to him is stored by farmers that ensures a continuous flow of grain to urban markets from the rural areas.

Olayemi (1973) however stated that inter-market price

disparities are deficiencies that can be linked with the problems of inadequate storage facilities, poor market information and lack of adequate feeder social system in the rural areas. Balwinder and Ijere (1985) also figured that the absence of market intelligence or inadequate infrastructure such as transportation and storage facilities also result in spatial or temporal price differences.

Chapter 3

METHODOLOGY

3.1 Study Area

The area selected for the study is Kano State. It is bounded in the North through South-East by Jigawa State, in the West by Katsina State, in the South-West by Kaduna State and in the South by Plateau State.

The major crops cultivated in the state include sorghum, millet, groundnut, maize, cowpea, rice, vegetables and spices. The crops however selected for the study are sorghum, maize, millet, cowpea, groundnut and rice. These crops are selected because they are cultivated on a wide scale all over the state. Rice is however cultivated on a wide scale only in Kura and Dambatta Local Government Areas. The crops are substitutes depending on the use to which they are intended; otherwise they are supplementary. Sorghum, millet, maize and rice are for example substitutes in the preparation of 'tuwo'. In the preparation of 'Kunu' however, sorghum, millet and groundnut are substitutes whereas only groundnut and cowpea are substitutes in soup making. It is therefore expected that an increase in the price of one of the commodities will shift consumer demand in the substitute commodities to increase so that the price of the substituted commodity will eventually fall.

There are very many markets scattered within the state

consisting of both large and small relative to the number and size distribution of participants and the range of products sold. Most of the markets are weekly held on some particular week days. A few others like the Abubakar Rimi and Dawano markets are held daily. Buyers purchase commodities in all of these markets through haggling and bargaining. The bargaining power of the buyer is an important factor in determining the price a commodity is purchased.

The markets selected for the study are the Abubakar Rimi, Kura, Dawano, Laraba Zango and Dambatta markets. These markets are chosen for the study because of the large size distribution of their respective participants, the wide range of products, the relative ease of entry into any of these markets and their proximity to each other. The farthest distance between any two (2) of the markets is not more than ninety kilometers (90km). Moreover, the markets attract participants not only from within the state but also from outside the state. In addition, some of the markets are farm gate markets for some of the commodities under study. Farm gate market is used in this study to mean the market in an area of production. By this definition, a market may be a farm gate market for a commodity but may not necessarily be for another. It is expected for prices of commodities to be lower in their respective farm gate markets. The farmers and the local traders constitute the sellers in the farm gate markets. More of a commodity may be shipped into a market

from other places despite the fact that the market may be a farm gate market for the commodity. This can happen if production do not meet with the demand of the commodity in the area.

The close proximity of the markets is important because the study is of the view that when two (2) markets are quite a distant apart, the degree of their integration becomes too limited. It is difficult for a market to exert an appreciable influence on another market that is a far distant away. This does not however mean that no influence can be exerted at all.

The mode of transportation of farm produce from the farm to the farm gate market is purely by animals and humans; although occasionally lighter vehicles (such as pickup vans) are used when and where possible. The transportation of the farm produce to other markets entails the use of heavy and light vehicles as the situation warrants. There are minimal storage facilities at the markets. There is also lack of public information media for disseminating information on market intelligence. Market information can therefore only be on individual basis.

3.2 Data Collection

Data collected were purely from primary source and it was retail price. This is because in the long run, it is the

consumer demand that is the decisive and dorminant factor in determining food prices (Waugh, 1964). This therefore implies that in the long run, it is the retail price that is more important than either the whole sale or farm gate price. Unstructed questionnaire was also administered to the traders. A total of fourty -four (44) weeks was used in collecting the data. Commodity prices were collected on individual market days in all of the market of the study.

3.3 Analytical Framework

The degree of communication between the markets was determined in terms of road communication and market information networks. The degree of road network of communication was determined in terms of types and quality of network linking the markets. The roads were classified as freeways (express ways), arterial streets (high-ways), collectal streets, local access streets, trunk or feeder roads. The degree of road worthiness is accessed by the number of pot-holes present/absent on the roads. market information was gottened from past literatures.

Regression analysis was used to analyse the price relationships of the selected commodities within and between the markets. It was also used to determine the degree of market integration amongst the various markets. Three (3) model types were used to run the regression.

3.3.1 Model Specifications

In models 1,2,3 below,

a. the suffixes do not represent powers but the various markets covered by the study, and x could take on any of the markets at a particular time at which time the total independent markets will be reduced by one;

b. P represents price;

c. the numbers (1,2,3,4,5,and 6) represent the various commodities selected for the study and i could take on any of the commodities at a particular time;

d. t represent current period and t-1 is the current time period lagged one week.

The notation P^x_{it} (below) can thus be interpreted as the current price of commodity i in market location x. Same interpretation modality to the rest notations in the three (3) models.

Model 1:

In this model, the price of commodity i in market location x is regressed with the current prices of other commodities in the same market location x such that

$$P^x_{it} = f(P^x_{it}, P^x_{2t}, \ldots, P^x_{m-1t})$$

Model 2:

In this model, the price of commodity i in market location x is regressed with the price of commodity i in other market locations lagged by one week such that

$$P^{x}_{it} = f(P^{A}_{it-1},\ P^{B}_{it-1},\ P^{C}_{it-1},\ P^{D}_{it-1},\ P^{E}_{it-1})$$

Model 3:

In this model, the price of commodity i in market location x is regressed with different commodity prices in other market locations lagged by one week such that

$$\begin{aligned} P^{x}_{it} = f(&P^{A}_{it-1},\ P^{A}_{2t-1},\ P^{A}_{3t-1},\ P^{A}_{4t-1},\ P^{A}_{5t-1},\ P^{A}_{6t-1},\\ &P^{B}_{it-1},\ P^{B}_{2t-1},\ P^{B}_{3t-1},\ P^{B}_{4t-1},\ P^{B}_{5t-1},\ P^{B}_{6t-1},\\ &P^{C}_{it-1},\ P^{C}_{2t-1},\ P^{C}_{3t-1},\ P^{C}_{4t-1},\ P^{C}_{5t-1},\ P^{C}_{6t-1},\\ &P^{D}_{it-1},\ P^{D}_{2t-1},\ P^{D}_{3t-1},\ P^{D}_{4t-1},\ P^{D}_{5t-1},\ P^{D}_{6t-1},\\ &P^{E}_{it-1},\ P^{E}_{2t-1},\ P^{E}_{3t-1},\ P^{E}_{4t-1},\ P^{E}_{5t-1},\ P^{E}_{6t-1}) \end{aligned}$$

These models are modifications of Franzmann and Walker (1972), Hannan (1967), Bresseler and Brandt (1982), Tweenten (1983), Roy and Ireland (1975). In their explicit forms, the implicit models 1,2,3 can be expressed as

a. Model 1

$$P^{x}_{it} = \alpha_o + \beta_1 P^{x}_{it} + \beta_2 P^{x}_{2t},\ \ldots,\ \beta_m P^{x}_{m-1t} + \mu_{it}$$

b. Model 2

$$P^{x}_{it} = \alpha_o + \beta_1 P^{A}_{it-1} + \beta_2 P^{B}_{it-1} + \beta_3 P^{C}_{it-1} + \beta_4 P^{D}_{it-1} + \beta_5 P^{E}_{it-1} + \mu_{it}$$

c. Model 3

$$P^{x}_{it} = \alpha_o + \beta_1 P^{A}_{it-1} + \beta_2 P_2{}^{A}_{t-1} + \beta_3 P_3{}^{A}_{t-1} + \beta_4 P_4{}^{A}_{t-1} + \beta_5 P_5{}^{A}_{t-1} + \beta_6 P_6{}^{A}_{t-1} +$$
$$\beta_7 P^{B}_{it-1} + \beta_8 P_2{}^{B}_{t-1} + \beta_9 P_3{}^{B}_{t-1} + \beta_{10} P_4{}^{B}_{t-1} + \beta_{11} P_5{}^{B}_{t-1} + \beta_{12} P_6{}^{B}_{t-1} +$$
$$\beta_{13} P^{C}_{it-1} + \beta_{14} P_2{}^{C}_{t-1} + \beta_{15} P_3{}^{C}_{t-1} + \beta_{16} P_4{}^{C}_{t-1} + \beta_{17} P_5{}^{C}_{t-1} + \beta_{18} P_6{}^{C}_{t-1} +$$
$$\beta_{19} P^{D}_{t-1} + \beta_{20} P_2{}^{D}_{t-1} + \beta_{21} P_3{}^{D}_{t-1} + \beta_{22} P_4{}^{D}_{t-1} + \beta_{23} P_5{}^{D}_{t-1} + \beta_{24} P_6{}^{D}_{t-1} +$$
$$\beta_{25} P^{E}_{t-1} + \beta_{26} P_2{}^{E}_{t-1} + \beta_{27} P_3{}^{E}_{t-1} + \beta_{28} P_4{}^{E}_{t-1} + \beta_{29} P_5{}^{E}_{t-1} + \beta_{30} P_6{}^{E}_{t-1} + \mu_{it}$$

where

i. α_o is the constant term of the equation

ii. $\beta_1, \beta_2, \ldots\ldots, \beta_{30}$ are the regression coefficients

iii. μ_{it} is the residual error term of commodity i at current time period.

The Ordinary Least Squares (OLS) technique was applied in estimating the parameters as was done by Olayemi and Olayide (1981). The application of the OLS technique was however met with the problems of multicollinearity and autocorrelation. These problems were reduced by adopting a modified method applied by Hossain (1974). In this case, the models were transformed using the formula

$$P^{x}_{it} = f(P_{it}/x_t,\ P_{2t}/x_t,\ P_{3t}/x_t,\ P_{4t}/x_t,\ P_{5t}/x_t,\ P_{6t}/x_t)$$

where x_t is the independent variable with the least correlations with the dependent variable.

3.4 Assumptions

a. The independent variables are independent of each other and are measured without error.

b. Each independent variable is independent of the error term.

c. The dependent variable has a constant variance at all levels of the explanatory variables.

d. The expected value of the dependent variable values at given level of the explanatory variable of the independent is what can be obtained from a regression equation.

f. The values of the independent variable are random values that are normally distributed and are statistically independent.

g. There is price lag of a week in models 1 and 2 because it is the assumption of this research that since the markets selected for the research are weekly held, then the price information in a particular market would have been obtained with a resultant influence on neigbouring markets under a maximum period of a week.

Chapter 4

RESULTS PRESENTATION AND ANALYSIS

4.1 Degree of Accessibility of Roads Linking the Markets

A trip to the six (6) markets of study reveals good road network linking the markets. An expressway links Kura with Sabon Gari market and all the roads linking the other markets are trunk A (or highway) roads. All the roads have very minimal damage from the presence of pot-holes.

This therefore implies that poor distribution network resulting from transport bottlenecks is not as a result of bad road network but from lack of other transport facilities.

4.2 Degree of Market Information

The works of Jone (1968), Olayemi (1973), Hays (1976), Adekanye (1977), Balwinder and Ijere (1985) and Okereke (1988) reveal that there is poor dissemination of knowledge regarding market conditions. Traders lack information about other market conditions. They are not aware of the opportunities for making profits by exploiting price differences through movement of goods. This therefore results in the existance of price differentials arising from inadequate flow of goods.

Market information gottened is purely on individual basis. There is no major source of information but truck drivers are one good minor source.

4.3 Commodity Price Associations Within Markets

The magnitude of the regression coefficients gives the extent to which the price of an individual commodity is influenced by the prices of other commodities within the same market. The T-ratios are indications of the percentage (%) level of confidence significant effect.

In this analysis, commodity prices with T-ratios greater than or equal to ninety-five percent (i.e $T \geq 95\%$) are considered as having significant effect on their corresponding dependent variables. An otherwise T-ratio implies that the effect of the commodity price (having that T-ratio) on the dependent variable is not significant.

Table 4.31: Regression values of sorghum price against the price of other commodities in the same market.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Cowpea	3.777	7.763*	-18.379	6.702*	11.293*
Rice	0.2745*	-1.791*	0.391	5.003*	-3.549*
Groundnut	-1.228	-7.152*	5.361*	0.295	-61.528
Millet	69.675*	3.912	12.263	44.200	87.088*
Maize	-71.061*	-2.732	1.264*	55.200*	-32.224
(Constant)	-22.845*	3.166	39.130	-27.348	-0.893

* Significant at 5%

Source: Computed from field

The empirical result on Table 4.31 shows that sorghum price in a particular market is significantly affected by some of the prices of other commodities in the same market. In Kura market, sorghum price is significantly affected by the prices of rice, millet and maize. In Sabon Gari market however, it is only maize and millet prices that do not significantly affect sorghum price. In Laraba Zango market, it is millet and rice prices that do not affect sorghum . In Dambatta market however, only the prices of maize and groundnut do not affect sorghum price significantly.

Contrary to apraori expectation, the price of sorghum is not significantly influenced by the price of rice in Laraba Zango market. This is possibly due to the fact that rice is not a staple food in Laraba Zango, hence it is not of high demand there.

Table 4.32: Regression values of groundnut price against the prices of other commodities in the same market

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Cowpea	26.449*	85.490*	-72.743*	54.550*	9.634*
Rice	-5.710	0.011	9.335*	0.177	-6.175*
Sorghum	-1.119	-129.779	37.335*	0.224*	-14.608
Millet	-68.995	-60.633	-1.743*	-39.235	38.585
Maize	50.375	105.911	-117.360*	-14.696	27.783
(Constant)	130.222	59.824	201.178*	-37.542	44.902*

* Significant at 5%

Source: Survey data 1997.

Table 4.32 indicates that the effect of the prices of other commodities on the price of groundnut in the same market is not much; except in Laraba Zango market where the prices of all the other commodities significantly influence the price of groundnut, only the price of one (1) or two (2) commodities influenced the price of groundnut in other markets. This is

possibly due to the fact that groundnut has a greater demand in Laraba Zango market where it is used in the preparation of a variety of local foods. It is therefore a substitute commodity in Laraba Zango unlike in other places where it is more or less a supplement to the other commodities. A change in price in the other commodities will therefore significantly influence only the price of groundnut in Laraba Zango.

Table 4.33: Regression values of rice price against the prices of other commodities in the same market

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Cowpea	34.990*	24.159*	-192.378	35.056*	25.530*
Sorghum	-2.340*	129.947*	5.818	155.656	21.469
Groundnut	-9.985*	-12.598	74.186*	-0.371	-10.054
Millet	-124.294*	-184.810*	96.578*	-239.203	-193.695*
Maize	102.629	-43.302	14.796*	49.856	157.750
(Constant)	240.026	159.011*	-6.603*	165.230*	237.244*

* Significant at 5%

Source: Survey data 1997.

Contrary to apraori expectation, the empirical result on the above Table 4.33 reveals that even though maize is a close substitute for rice, its prices do not significantly influence the price of rice in any of the markets (with the

exception of Laraba Zango market). This may be due to the fact that maize unlike rice is a staple food in the area of study and it has a fairly constant price all the year round. The constant price of maize may be as a result of the highly high integration of the maize market.

Table 4.34: Regression values of cowpea price against other commodity prices in the same market

	Market				
	Kura	*S/Gari*	*L/Zango*	*Dawano*	*Dambatta*
Rice	51.486*	-9.417	-276.928*	-1.754	22.181*
Sorghum	-215.871*	276.386*	55.731	189.510*	108.421
Groundnut	15.395	11.896	68.231*	58.304*	-80.620*
Millet	-44.192	-15.482	12.402	-133.156	411.156
Maize	194.182	-262.329	141.564	-111.904	-460.138
(Constant)	183.800*	55.042	-684.640*	17.899	-274.840*

* Significant at 5%

Source: Survey data 1997.

In Dambatta market, it is only price of groundnut that significantly affects cowpea price. This is expected since groundnut and cowpea are substitutes. Contrary to apraori expectation however,,groundnut price has no significant impact on cowpea prices in Kura and Sabon Gari markets. This may possibly be due to the fact that the high demand for groundnut

in Kura and Sabon Gari areas is mainly by vegetable oil companies in the state rather than from the inhabitants. Millet and maize prices have no significant influence on the price of cowpea in all of the markets. This is expected since they are not only supplementary products to cowpea, they are of different nutritional value with cowpea; however rice which is a cereal crop has a significant effect on the price of cowpea in Kura and Laraba Zango markets. This may be due to the dietary importance associated with rice. It may also be due to sample error since rice price has no significant impact on the price of cowpea in Sabon Gari, Dawano and Dambatta markets.

Table 4.35: Regression value of maize price against other commodity price in the same market.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Cowpea	31.632*	-0.015*	-0.782*	0.016*	7.277*
Rice	-29.906*	-46.889*	-18.856*	10.200*	-2.347*
Sorghum	19.365	370.206	28.610*	14.932	14.479
Groundnut	-17.535	-110.052	-0.263	37.906	-76.021
Millet	-2.556*	-212.250	18.398	13.758	57.612*
(Constant)	166.374*	375.195*	40.112*	48.820*	-2.968

* Significant at 5%

Source: Survey data 1997.

Cowpea and rice prices significantly affect the price of maize in all of the markets. The significance of cowpea price effect on the price of maize is contrary to apraori expectation. This is because both cowpea and maize are supplementary commodities. They are put into different uses; hence their prices are expected to move independent of one another. A Change in the price of one should therefore not affect the demand of the other significantly. The significant effect of cowpea price on the price of maize could only be explained by the fact that there may be other factors that affect the price of a commodity that this research failed to

conduct. Another important factor is that cowpea is harvested at a time many households have become tired of foods prepared from maize. The harvest of cowpea therefore lowers the price of maize as some able income earners lower their demand for maize for cowpea. The significant effect of the price of rice on maize price is expected since both commodities are good substitutes. That the prices of millet and sorghum, have no significant effect on maize price may be due to the fact that even though they are substitutes, their prices are about the same; moreover, maize is harvested earlier and has a dietary preferential importance among the populace than the other commodities.

Table 4.36: Regression values of millet price against other commodity prices in the same market.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Cowpea	20.169*	6.145*	-4.512	2.002*	10.406*
Rice	-10.523*	-4.473*	-10.108*	-3.903*	-8.311
Sorghum	-9.351*	12.380*	29.110*	22.465*	49.897
Groundnut	-3.294*	-4.780*	-13.915*	-1.720	-44.258
Maize	4.000*	-8.272*	-19.791*	-17.844	-6.734
(Constant)	33.532*	37.230*	31.403*	30.678*	-15.323*

* Significant at 5%

Source: Survey data 1997.

It can be seen from Table 4.36 that nearly all the prices of the other commodities in all of the markets significantly affect millet price. This may be due to millet being an inferior commodity to the others. A change in the price of the other commodities significantly affects the price of millet in the individual markets. Contrary to expectations however, cowpea price significantly affects millet price in all of the markets but Laraba Zango. This significance can be explained by the fact that local foods prepared from cowpea are taken along side those prepared from millet. A change in the demand for cowpea will therefore result in a change in the demand for millet. A high demand results into high price and

a low demand results into low price. This idea is supported by the fact that the regression coefficients for cowpea are all positive in all of the markets except in laraba Zango where the effect of the cowpea price on millet price is not significant.

4.4 Inter-Market Price Association

The regression coefficients indicate inter-market price relationships. To this effect, prices with coefficients having significant T-ratios greater or equal to ninety-five percent (i.e $T \geq 95\%$) have significant influence, so that markets having influential prices are considered as price leader markets.

4.41 **Price relationship of some commodity in different markets.**

Table 4.411: Regression values of sorghum prices in different markets.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	-	0.477*	-0.185*	0.091*	1.976
S/Gari	-36.037*	-	-0.455*	-0.692	0.341*
L/Zango	55.737*	0.634*	-	0.401*	-2.745
Dawano	-19.852	-0.002	-0.014	-	1.428*
Dambatta	1.152*	0.845	-0.197	1.200*	-
(Constant)	-19.396	-13.476	16.672*	7.946	-34.684

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

Nearly all the regression coefficients are significant at five percent (5%),. This is an indication of strong sorghum price association amongst the different markets and a strong association implies strong market integration. Contrary to apraori expectation, there are some coefficients that are negative, meaning that an increase in the price of sorghum in one market leads to a decrease in its price in the other market. These coefficients (with negative signs) are however not significant at the ninety-five percent (95%) confidence

interval except in three instances. Their significance may be due to sampling errors It could also mean that commodities in areas of surplus do not get to areas of deficit on time. Contrary to expectation also, the sorghum price in Dambatta market is not significantly affected by the price of sorghum in Kura market even though the price of sorghum in Dambatta market significantly affects the price of sorghum in Kura market. This indicates poor integration of the Kura and Dambatta markets and it also implies that Dambatta market leads Kura market in the setting of sorghum price. This may largely be due to poor information channels.

Table 4.412: Regression values of groundnut prices in different markets.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	-	73.543*	-0.524	64.202*	71.216*
S/Gari	-25.611	-	-0.140	-65.776*	-84.530*
L/Zango	196.499*	39.826	-	54.438	48.685
Dawano	-141.563	-48.787	0.638*	-	-34.371
Dambatta	-28.325	-63.582	0.006	-51.864	-
(Constant)	58.580	23.648	-1.776	35.680	51.613

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

The empirical results on table 4.312 indicates a low price association between groundnut prices in different markets. In all of the markets, only one (1) or two (2) coefficients are significant at the five percent (5%) level. The price of groundnut in Kura market however, affects significantly groundnut price in all of the markets; groundnut price in Dambatta market has no significant influence on any of the groundnut prices in the other markets: This may be due to the fact that Dambatta market receives its supply of groundnut from other markets even though Kura is a major producer of groundnut, it still receives its supply from Laraba Zango. The significant negative coefficients in Dawano and Dambatta markets may be attributed to sample errors.

Table 4.413: Regression values of rice prices in different markets

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	-	-0.026*	0.003	0.136*	-0.092
S/Gari	120.822*	-	-0.611	0.492	0.835*
L/Zango	28.207	-0.614*	-	-0.128	0.547*
Dawano	148.666*	0.504	0.270	-	-0.290
Dambatta	0.637*	1.136*	1.338*	0.500	-
(Constant)	-129.111	-3.067	-5.329	11.359	-17.916

* Significant at 5%
- De[endent variable
Source: Survey data 1997.

The inter-market association of rice price is very low. This is evident in the number of significant coefficients: Out of twenty-five (25) regression coefficients, only nine (9) are significant. This may be due to poor market information available to the market participants. The significant negative coefficient in Kura and sabon Gari markets may largely be associated with poor marketing operational terms. According to Adekanye (1977), there was not much vertical or horizontal integration in the rice market and the marketing system for rice appears inefficient both in operational and pricing terms.

Table 4.414: Regression values of cowpea prices in different markets.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	-	9.335	0.142	21.590	93.527*
S/Gari	0.111	-	0.396	-200.134*	0.652
L/Zango	0.278	193.628*	-	-164.090*	-93.917*
Dawano	0.084	17.270*	0.424	-	0.738
Dambatta	0.527*	-219.233	0.032	15.454	-
(Constant)	10.833	200.307*	-21.416*	197.340	-4.350

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

The table 4.414 shows that the price of cowpea in Laraba Zango is not significantly affected by cowpea prices in other markets. It however significantly affects cowpea prices in other markets (with the exception of Kura market where the price of cowpea is only affected significantly by the price of cowpea in Dambatta market). This may be due to the fact that Laraba Zango apart from being a major producer of cowpea, it is also an important cowpea market in the state. On a general note, Table 4.414 indicates a weak cowpea market price association. This is however in contrast to the findings of Ejiga and Robinson (1981):- that cowpea markets are highly integrated. The reason may be due to omission of vital variables. The study did not include any of the border markets from which large quantities of cowpea are being shipped into the state from the neighboring states and countries; as such the effect of the prices in these markets on the markets of study is not captured. It may also be due to the fact that Ejiga and Robinson failed to correct for multicollinearity in their study. Infact the works of Jones (1968) reveals that grain markets in Nigeria are weakly integrated. The negative significant values in Dawano and Dambatta markets may largely be due to market imperfections since the price increase of cowpea in one market cannot result into a decrease in the price of cowpea in another market when all the cowpeas are of the same variety.

Table 4.415: Regression values of maize prices in different markets.

	Market				
	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	-	0.943*	0.968*	-0.710*	1.618*
S/Gari	1.055*	-	-0.011*	0.763*	-1.712*
L/Zango	0.252*	-0.236*	-	0.369*	-0.330*
Dawano	-0.433*	0.417*	0.862*	-	1.120*
Dambatta	0.404*	-0.382*	-0.315*	0.458*	-
(Constant)	-15.855*	14.823*	20.937*	3.424*	-19.186*

* Significant at 5%
- Dependent variable
Source: Survey data 1997.

Table 4.415 above shows that the price of maize in any one individual market is significantly affected by the price of maize in other markets. This imply a high integration of the individual maize markets. This may account for the even price witnessed in all of the markets. The negative coefficients associated with some of the markets are however contrary to expectation and may largely be due to the variation in the harvest period. It may possibly be also due to errors in sampling and other factors not considered by this research but which is inherent in the economic system affecting prices.

coefficients associated with some of the markets and may in addition stand for the reason why the price of millet in Laraba Zango market is not affected significantly by the prices of Kura and Sabon Gari markets.

4.42 **Price Relationships of Different Commodities in Different markets**

Table 4.421: Significant* regression values of sorghum price against other commodity prices in other markets.

		Market				
	Commodity	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Rice	-	-	-	0.489	0.189
	Maize	-	-	-	-	0.391
S/Gari	Cowpea	0.116	-	-	-	-
	Maize	0.384	-	-	-	-0.256
	Rice	-	-	-	-	0.109
	Groundnut	-	-	-	-	-4.497
L/Zango	Cowpea	-	-	-	-0.104	-0.096
	Rice	-	-	-	4.596	-
	Maize	0.427	-	-	-	-
Dáwano	Cowpea	-	-	-	-	0.069
	Rice	-	-	0.124	-	-0.096
	millet	-	0.215	-	-	-
Dambatta	Maize	-	-	-	-	0.387
	Rice	0.116	-	-	-	-
	Groundnut	6.600	-	-43.156	-	-

* Significant at 5%
\- Not significant
Source: Table 1 Appendix 1.

Sorghum prices in individual markets are significantly affected by some of the prices of other commodities in other markets (table 4.421 shows which commodity price(s) and market(s) are affected). Table 4.321 shows that maize and rice are the major commodities whose prices influence that of sorghum in some of the other markets. This is not surprising since the three (3) commodities are good substitutes. The choice of purchasing any of them depends on the income of the consumer. There are however some of their coefficients that

carry positive signs as in Kura and Dambatta markets. This can be explained by the fact that since the commodities are substitutes, an increase (or decrease) in the price of the influencing commodity will make consumer demand to shift to (from) the influenced commodity. A significant shift in demand will therefore result in a significant change in prices if the shift in demand is not backed by significant shift in supply.

The regression coefficient of Dawano rice price on Dambatta sorghum price carries a negative sign and may largely be due to the variation in the harvest periods of the commodities. It may also be due to imperfections inherent in the system resulting from features of production and marketing which make effective response to inter-market price differentials difficult (Hays, 1976).

Table 4.422: Significant* regression values of rice price against other commodity prices in other markets

		Market				
	Commodity	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Maize	-	-	3.200	-	-
S/Gari	Cowpea	-	-	-0.615	-	-
	Maize	-	-	-2.475	-	-
L/Zango	Cowpea	0.717	1.001	-	0.645	1.145
Dawano	Cowpea	-	-	-	-	-0.875
	Maize	-	-	-2.069	-	-
Dambatta	Cowpea	0.164	-	0.298	-	-

* Significant at 5%
- Not significant
Source: Table 2 Appendix 1.

Rice prices in individual markets are also significantly affected by some of the prices of other commodities in other markets. Out of a total of a hundred (100) regression coefficients, only ten (10) are significant. Table 4.422 above indicates that only the prices of maize and cowpea in some of the markets significantly affects the price of rice in some particular markets. Contrary to expectation some of the significant coefficients are negative implying that a price change of the influencing commodity will result in an opposite direction price change of the influenced commodity. This is mainly attributed to market inefficiencies and sample errors (Ejiga and Robinson, 1981).

Table 4.423: Significant* regression values of groundnut prices against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
L/Zango	Cowpea	-	-0.508	-	-0.235	-
Dawano	Cowpea	-	0.518	-	-	0.393

* Significant at 5%

- Not significant

Source: Table 3 Appendix 1.

Groundnut price in any individual market is not much affected significantly by the prices of other commodities in other markets. Table 4.423 reveals that out of a total of a hundred (100) regression coefficients, only four (4) are significant. The price of Laraba Zango cowpea affects both sabon Gari and Dawano market groundnut prices. The fact that cowpea price is the most significant commodity price that affects the price of groundnut in some of the markets may be due to the substitutability of the two commodities. The fact that the price of groundnut in individual markets move independent of the prices of the other commodities in other markets may be due to the fact that groundnut and the other commodities have a supplementary kind of relationship.

Table 4.424: Significant* regression values of cowpea price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Rice	-	-	-	-26.502	-
S/Gari	Rice	-	-	-	-30.207	-
	Maize	30.100	-	-	-	-
L/Zango	Rice	12.788	27.329	-	35.116	50.092
	Groundnut	37.288	-	-	-	-
Dawano	Rice	25.407	-	-	-	56.563
Dambatta	Maize	-	-	-2.017	-	-

* Significant at 5%

- Not significant

Source: Table 4 Appendix 1.

Table 4.424 indicates that cowpea prices in some individual markets are significantly affected by some other commodity prices in other markets. Out of a hundred (100) regression coefficients, eleven (11) are found to be significant and rice price appears to be the major commodity price that influences the price of cowpea in the markets despite the fact that the two (2) commodities are of different nutritional composition and are supposed to be supplementary in the use to which they are put. This can be explained by the dietary importance many households place on rice; with a significant increase in the price of rice, more households

increase their consumption of cowpea. However, with an increase in the real income of the household, more of rice is demanded.

It is important to note that the price of rice in Laraba Zango market significantly affects the price of cowpea in all of the markets despite the fact that Laraba Zango is not an important producer of rice. This may be due to the fact that Laraba Zango may be a collectal market for rice and it may be due to inefficiencies inherent in the marketing system. One of such inefficiencies is the fact that there is very little market information available to the market participants (Adekanye, 1974) and according to Jones (1968) traders are not aware of prices of the commodities they trade in, in neighbouring towns.

Table 4.425: Significant* regression values of maize price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kúra	Rice	-	-0.385	-	-	33.554
	Sorghum	-	1.754	-	-	-
	Millet	-	-	-	-	-183.553
L/Zango	Sorghum	-	30.015	-	-108.793	-
	Millet	-	-	-	-	77.918
Dawano	Rice	-	-	3.935	-	-41.661
Dambatta	Rice	-	-	-	152.449	-
	Sorghum	431.317	-	0.756	-	-

* Significant at 5%

_ Not significant

Source: Table 5 Appendix 1.

Table 4.435 indicates a fairly significant effect of some of the prices of other commodities in some of the markets on the price of maize in individual markets. It is however the price of sorghum in Dambatta market that affects significantly the price of maize in all of the markets. This is not surprising considering the fact that Dambatta Local Government Area is a high producer of sorghum and sorghum is a close substitute for maize in the diets of most of the populace in the state and environs. The prices of groundnut and cowpea

have no impact on the price of sorghum in any of the markets. It is not only the price of sorghum in Dambatta market that significantly affect maize price, Laraba Zango sorghum price also affects maize price in sabon Gari and Dawano markets; the price of rice in Kura market also significantly affects the price of maize in Sabon Gari and Dambatta markets. Since the price of sorghum in Dambatta market also affects significantly the price of some of the commodities whose prices significantly affects maize price, it may partly account for the slight variation in maize prices during the seasons and between markets.

Table 4.426: Significant* Regressions Values of Millet Prices Against Other Commodity Prices in Other Markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Sorghum	-	-10.723	-	-	-
	Groundnut	-	-	-	54.023	-
	Maize	-	-	-	-	0.557
S/Gari	Sorghum	-	-	114.457	-	-0.688
	Groundnut	-	-	-	-60.713	-
	Maize	-	-	-	-	-0.571
L/Zango	Rice	-	3.263	-	-	-
	Sorghum	-	-	-	-	0.469
	Maize	-0.382	-	-	-	-
Dawano	Groundnut	-10.657	-	-	-	-
Dambatta	Groundnut	-	8.821	-	-	-

* Significant at 5%

_ Not significant

Source: Table 6 Appendix 1.

Table 4.426 above indicates that only twelve (12) out of a hundred (100) regression coefficients are significant thereby implying that the price of millet in an individual market is not too significantly affected by the prices of other commodities in other markets. The low significant influence of the prices of other commodities in other markets

on the price of millet in particular markets can be explained considering the fact that millet is not given the same dietary importance as sorghum, rice or maize. It is considered as an inferior substitute to those other commodities. Due to low demand, the price of millet in relation to the prices of the substitutes is always low, so that unless there is a very high significant change in the prices of the substitutes, demand for millet remains unaffected and the price is therefore stable.

Chapter 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

The main objective of this study was to study intra and inter commodity market price relationships; to this effect, the prices of six (6) commodities were collected from five (5) markets in Kano State and then regressed using three (3) different models. The results were tabulated and analysed.

The empirical results of the study revealed that the price of a commodity in an individual market is significantly affected by the prices of other commodities in the same market. This therefore invalidates the hypothesis that in a given market, there are no relationships among the prices of the various commodities. The magnitude of the price associations however vary with the market location. This is evident in the variation in the frequency distribution of the significant T-ratios of the regression coefficients in the markets. The empirical result of the study also infer that the price of a commodity in an individual market is not only significantly affected by the prices of same commodity in other markets but also by the prices of other commodities in other markets. This therefore negates the hypothesis that for a given commodity, there are no relationships among the prices of the commodity in the various markets. Different commodity prices in the same market location however have a greater

influence on the price of a particular commodity in an individual market than either the price of other commodities in other markets or the price of the commodity in other markets; but sorghum and maize have their prices in individual markets more significantly influenced by their prices in other markets than by the prices of other commodities in the same market. This may be due to the high integration of the maize and sorghum markets.

Generally, the mean significant effect of the different commodity prices on a particular commodity in the same market is about the same as the effect of the same commodity prices in other markets on the price of the commodity in an individual market and this effect is highly significant. The mean significant effect of the prices of other commodities in the various markets on the price of a commodity in an individual market is however very low, thereby implying poor inter commodity market price associations which also signifies poor inter commodity market integration. This could be as a result of market imperfections in the area of study. In fact Jones (1968), Hays (1976) and Okereke (1988) alluded poor market knowledge to be highly responsible for market imperfections in the country among other factors. The existence of significant effects on the prices of some commodities in some markets by the prices of same or some other commodities in other markets show that price movements in a single market are significantly influenced by some prices

in other markets. This is typical of lead-lag price relationships existing among the markets.

It is revealed by the empirical result of the study that some significant constant coefficients have negative signs associated with them. This according to Ejiga and Robinson (1981) may be due to the fact that there are some other factors inherent in the economy not included in the study but which significantly affects some of the commodity prices. Such factors include mainly government policies and activities.

5.2 Conclusion

Poor market information and transport bottlenecks lead to poor distribution of goods which then results in poor market integration and lead-lag price relationships among markets. Public policy makers should therefore be concerned with the operational aspects of food distribution system. Prices will be reasonably integrated in relation to cost if the distribution system is well handled. This study suggests that Government should direct her efforts towards providing market information to the market participants and ensuring adequate transport facilities.

5.3 Recommendations

There is poor dissemination of knowledge regarding market conditions (Jones 1968, Balwinder and Ijere, 1985 and Okereke,

1988). This therefore implies that traders lack information about other markets. They are therefore not aware of the opportunities for making profits by exploiting price differences through movement of goods. This hence results in price differences resulting from inadequate flow of goods. Government should therefore establish market information channels that will supply market information to both traders and consumers (FAO 1967, Adekanye 1970) and according to Adekanye (1970), an important method of disseminating market information is the use of mass media; radio, television and newspapers.

There is also the problem of transport bottlenecks resulting not from inaccessibility of roads but rather from unavailability of transport facilities. This partly contributed to increasing price differences between markets. Traders interviewed without the aid of questionnaire complained that transport bottlenecks are quite rampant. Light vehicles are used to transport goods within the state and when they are not readily available, movement of goods within the state is affected. This leads to accumulation of goods and artificially low prices in the primary markets and to scarcity of goods and high prices in the terminal markets. Most of the transport bottlenecks arise from fuel and spareparts shortages. This is a problem that is beyond the traders control. It is a problem that has to be tackled by the Government in form of plans and policies or otherwise to

solve for the shortages. Uncertainty about how long a favouarble price difference between markets can be expected to persist is another problem closely related to transport bottlenecks. Risks in establishing business connections on a sporadic basis tend to be greater than normal as there is always a fear of loss of margin if movement of goods between markets is delayed by transport bottlenecks and according to Lele (1967), it is this risk apart from actual shortage of transport which discourages free flow of goods between markets. This could therefore result in price differences that are greater than transport costs. These differences according to him can be reduced by improving on the flow of goods between markets. This will help to tackle the problem (s) arising from poor market information.

Appendix 1

Table 1: Regression values of sorghum price against other commodity prices in other markets.

		Market				
Market	Commodity	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Cowpea	-	0.157	-0.048	0.035	-0.010
	Rice	-	0.057	0.013	0.489*	0.185*
	Groundnut	-	-0.170	12.892	1.292	3.317
	Millet	-	-4.917	8.758	8.239	1.394
	Maize	-	-0.004	-0.181	-0.018	0.391*
S/Gari	Cowpea	0.116*	-	0.041	0.049	0.039
	Rice	-0.035	-	-121.928	0.273	0.109*
	Groundnut	-5.080	-	10.028	-5.950	-4.497*
	Millet	0.169	-	62.783	-0.824	5.115
	Maize	0.384*	-	0.249	13.429	-0.256*
L/Zango	Cowpea	-0.077	-0.016	-	-0.104*	-0.096*
	Rice	-0.086	-0.014	-	4.596*	-0.033
	Groudnut	2.241	-3.779	-	3.352	-1.018
	Millet	-4.898	-7.805	-	-3.103	16.491
	Maize	0.427*	-0.120	-	-0.040	-0.108
Dawano	Cowpea	-0.070	0.030	0.122	-	0.069*
	Rice	0.049	0.051	0.124*	-	-0.096*
	Groundnut	1.835	3.098	10.560	-	2.084
	Millet	0.040	0.215*	8.896	-	9.575
	Maize	0.184	-0.085	-0.302	-	0.387*
Dambatta	Cowpea	-0.043	0.004	0.020	-0.035	-
	Rice	0.116*	0.057	0.013	-21.037	-
	Groundnut	6.600	-1.084	-43.156*	1.956	-
	Millet	0.454	-0.291	52.132	1.514	-
	Maize	0.264	0.063	0.079	-0.113	-
(Constant)		0.201	37.190*	-7.038	31.882*	-8.250

* Significant at 5%

- Dependent variable.

Source: Survey data 1997.

Table 2: Regression values of rice price against other commodity prices in other markets.

		Market				
Market	Commodity	Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Cowpea	-	-0.009	0.033	-0.176	0.390
	Sorghum	-	-0.444	0.461	1.163	1.162
	Groundnut	-	-0.655	-0.200	-0.077	-0.161
	Millet	-	0.561	2.058	-1.174	-1.951
	Maize	-	-1.036	2.200*	0.077	-0.398
S/Gari	Cowpea	-0.287	-	-0.615*	0.299	0.082
	Sorghum	0.150	-	-0.838	-0.868	-1.467
	Groundnut	1.010	-	1.655	0.531	0.379
	Millet	-0.415	-	0.837	0.028	-0.035
	Maize	0.201	-	-2.475*	-0.728	-0.466
L/Zango	Cowpea	0.717*	1.001*	-	0.645*	1.145*
	Sorghum	-0.298	-1.082	-	-0.129	3.002
	Groudnut	1.052	-0.195	-	-0.447	-0.148
	Millet	0.801	1.414	-	2.181	0.108
	Maize	0.654	1.496	-	2.085	0.641
Dawano	Cowpea	-0.168	0.995	-0.131	-	-0.875*
	Sorghum	0.558	1.085	1.745	-	2.394
	Groundnut	-1.040	0.093	-0.344	-	-0.142
	Millet	-0.445	-0.765	-0.262	-	-1.141
	Maize	-0.774	0.840	-2.069*	-	1.261
Dambatta	Cowpea	0.164*	0.080	0.298*	0.126	-
	Sorghum	2.387	-0.089	-0.461	-1.639	-
	Groundnut	-0.207	-0.069	0.518	-0.025	-
	Millet	0.709	0.902	-2.006	0.831	-
	Maize	0.389	0.750	-0.149	-0.329	-
(Constant)		-9352	-255.767	-136.830*	-20.839	-1.440

* Significant at 5%

- Dependent variable.

Source: Survey data 1997.

Table 3: Regression values of groundnut price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Cowpea	-	0.241	0.258	0.053	0.144
	Rice	-	0.186	0.137	0.042	0.194
	Sorghum	-	1.015	16.936	0.024	25.414
	Millet	-	-23.066	123.544	-14.446	2.856
	Maize	-	0.335	0.529	0.087	-16.908
S/Gari	Cowpea	0.076	-	0.039	-0.061	-0.118
	Rice	-0.425	-	-3.622	-0.033	-7.315
	Sorghum	10.178	-	51.654	0.441	-14.460
	Millet	25.024	-	187.631	16.285	78.834
	Maize	-0.148	-	0.666	0.323	26.044
L/Zango	Cowpea	0.106	-0.508*	-	-0.235*	-0.052
	Rice	0.038	-0.404	-	-0.033	-5.857
	Sorghum	-23.133	-0.360	-	-0.021	-57.985
	Millet	5.326	5.455	-	0.092	8.304
	Maize	-1.539	-0.839	-	-0.604	1.030
Dawano	Cowpea	0.103	0.518*	0.034	-	0.393*
	Rice	0.290	-0.080	-16.969	-	6.512
	Sorghum	-32.296	-1.912	136.976	-	-46.661
	Millet	34.296	22.054	35.638	-	1.110
	Maize	-0.065	-0.455	0.005	-	-0.479
Dambatta	Cowpea	0.083	-0.105	0.029	0.019	-
	Rice	0.086	0.186	0.137	0.012	-
	Sorghum	0.146	-0.418	-84.197	-0.190	-
	Millet	-17.126	-0.263	-173.876	-0.470	-
	Maize	-0.020	-0.394	-0.452	-0.046	-
(Constant)		62.006	143.650*	37.028	90.036*	14.369

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

Table 4: Regression values of cowpea price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Rice	-	14.104	0.375	-26.502*	19.716
	Sorghum	-	2.431	0.954	-67.655	-177.310
	Groundnut	-	-8.942	5.987	-20.604	75.360
	Millet	-	-69.088	-99.138	-79.701	75.260
	Maize	-	-2.395	1.034	5.325	2.237
S/Gari	Rice	-9.013	-	0.431	-30.207*	-49.577
	Sorghum	166.522	-	1.379	54.696	209.979
	Groundnut	-4.315	-	-4.130	9.337	-93.447
	Millet	13.206	-	17.166	-146.777	-3.534
	Maize	30.100*	-	-0.652	0.340	49.248
L/Zango	Rice	12.788*	27.329*	-	35.116*	50.092*
	Sorghum	-14.491	79.914	-	-37.729	-83.554
	Groundut	37.288*	29.425	-	6.671	54.695
	Millet	-158.184	-86.966	-	19.078	-191.886
	Maize	41.987	-1.335	-	-3.087	-40.961
Dawano	Rice	25.407*	14.640	-0.378	-	56.563*
	Sorghum	-0.708	55.976	38.335	-	-20.500
	Groundnut	-45.422	-0.782	33.236	-	-75.232
	Millet	-29.641	-52.538	-0.881	-	-89.000
	Maize	1.773	1.161	0.340	-	232.503
Dambatta	Rice	1.698	-13.618	0.247	24.097	-
	Sorghum	-87.578	-117.047	0.954	154.845	-
	Groundnut	21.578	15.485	2.695	52.255	-
	Millet	-3.537	140.270	2.241	52.463	-
	Maize	1.542	1.184	-2.017*	-0.961	-
(Constant)		-85.875	-68.144	-35.090	241.356	200.166*

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

Table 5: Regression values of maize price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Cowpea	-	0.318	0.352	-0.102	-43.549
	Rice	-	-0.385*	0.779	-15.603	33.554*
	Sorghum	-	1.754*	4.505	-18.007	65.801
	Groundnut	-	-0.459	-6.971	-0.446	-7.697
	Millet	-	-6.365	-19.031	-8.777	-183.553*
S/Gari	Cowpea	-133.020	-	0.282	-1.906	12.509
	Rice	9.840	-	-1.919	-19.425	21.653
	Sorghum	-294.030	-	-1.960	4.599	128.026
	Groundnut	-61.188	-	1.195	28.480	-21.846
	Millet	-145.482	-	6.105	-11.431	51.290
L/Zango	Cowpea	6.134	-0.011	-	7.503	-26.736
	Rice	-0.163	0.386	-	-4.152	6.746
	Sorghum	147.856	30.015*	-	-108.793*	57.200
	Groundut	18.259	5.116	-	-26.140	-50.835
	Millet	96.370	1.710	-	104.137	77.918*
Dawano	Cowpea	0.183	0.087	-0.422	-	101.318
	Rice	-42.008	0.230	3.935*	-	-41.661*
	Sorghum	-134.978	-20.077	3.841	-	-17.455
	Groundnut	27.692	-16.431	0.740	-	66.561
	Millet	21.435	1.452	7.884	-	27.808
Dambatta	Cowpea	0.020	0.050	0.825	19.063	-
	Rice	10.547	-0.227	-0.062	152.449*	-
	Sorghum	431.317*	1.754	0.756*	-11.334	-
	Groundnut	8.307	-5.199	0.418	-43.931	-
	Millet	6.601	9.672	1.126	20.086	-
(Constant)		30.616	16.599	39.570*	46.248*	37.630

* Significant at 5%

- Dependent variable

Source: Survey data 1997.

Table 6: Regression values of millet price against other commodity prices in other markets.

Market	Commodity	Market				
		Kura	S/Gari	L/Zango	Dawano	Dambatta
Kura	Cowpea	-	-0.007	-9.334	0.046	0.080
	Rice	-	0.351	0.178	0.161	0.092
	Sorghum	-	-10.723*	42.607	-24.914	0.216
	Groundnut	-	3.432	20.455	54.023*	11.442
	Maize	-	-0.353	69.954	-0.014	0.557*
S/Gari	Cowpea	0.449	-	7.401	0.031	-0.055
	Rice	0.626	-	8.420	0.161	0.129
	Sorghum	-1.987	-	114.457*	44.956	-0.688*
	Groundnut	4.111	-	-5.181	-60.713*	0.495
	Maize	-20.591	-	-51.348	0.179	-0.571*
L/Zango	Cowpea	0.094	0.042	-	-0.183	-0.090
	Rice	-0.007	3.263*	-	0.170	-0.061
	Sorghum	1.078	11.222	-	-20.325	0.469*
	Groundut	1.231	4.230	-	15.045	-0.107
	Maize	-0.382	-8.783	-	0.464	-0.433
Dawano	Cowpea	-0.085	-0.077	7.763	-	0.140
	Rice	-1.708	0.305	-1.824	-	-0.088
	Sorghum	17.709	13.591	17.705	-	0.404
	Groundnut	-10.657*	-6.328	-32.150	-	0.104
	Maize	-0.007	0.016	57.451	-	0.161
Dambatta	Cowpea	0.031	-0.007	0.178	-0.132	-
	Rice	-2.873	-19.142	-16.333	0.161	-
	Sorghum	13.724	16.421	-67.406	26.507	-
	Groundnut	0.204	8.821*	-11.669	31.332	-
	Maize	0.040	-0.073	-28.768	0.031	-
(Constant)		38.616*	21.424*	8.805	-9.416	8.427

* Significant at 5%

_ Not significant dependent variable

Source: Survey data 1997.

REFERENCES

Adekanye, T.O. (1970). "The Market for Foodstuffs in Western Nigeria". Journal of African Studies, New series, No. 3, 1970, pp 71-86.

Adekanye, T.O. (1977) Market Structure for Food: Problems and Prospects for Rural Development in Nigeria. Paper presented at the conference on Rural development, University of Science and Technology, Kumasi, Ghana, April, 1977.

Balwinder, S.and M.O. Ijere (1985)" An Appraisal of the Food Market Structure in Nigeria." Journal of African Studies,. 12(1): 21.

Bresseler, D.A. and J,A. Brandt (1982)" Casualty Tests in Livestock Markets". American Journal of Agricultural Economics. 64(1): 140-144.

Buccola, S.T. (1980) "An Approach to the Analysis of Feeder Cattle Price Differentials ". American Journal of Agricultural Economics. 62(3): 574-580.

Doll, J.P. et al. (1968). "The Theory of Markets". Economics of Agricultural Production, Markers and Policy. Richard D. Irwin. Homewood, Illinois; Irwin-Dorsey Limited, Nobleton, Ontario. pp. 263-426.

Ejiga, N.O.O. and R.L. Robinson (1981). The Economics of Cowpea Marketing in Nigeria. Cornell International; Agricultural Monograph 82, Department of Agricultural Economics, New York College of Agriculture and Life Sciences.

FAO (1967). Marketing of Selected Agricultural Products in Western Region (with particular reference to staple food crops). Report to the Government of Nigeria, Rome, 1967.

Franzmann, J.R. and R.L. Walker (1972)" Trend Models of Feeder, Slaughter and Wholesale Beef Cattle Prices". American Journal of Agricultural Economics, 54 (3): 507-512.

Hannan, E.J. (1963). "Regression for Time Series With Errors of Measurement". Biometrika, 50 (Parts 3 and 4): 293-363.

Hannan, E.J. (1967). The Estimation of a Lagged Regression Relation: Biometrika, 54 (Parts 3 and 4): 409-418.

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

Hossain, M. (1974). "Farm Size and Productivity in Bangladesh Agriculture: A Case Study of Pulpor Farm". The Bangladesh Economic Review. II(I) 469-500.

Jones, W.O. (1968). "The Structure of Staple Food Marketing in Nigeria as Revealed by Price Analysis. A publication of the Food Research Institute, Stanford University, 1968, pp. 95-123.

Jones, W.O. (1972). Marketing Staple Foods in Tropical Africa, Ithaca, Cornell University, 1972.

Lele, J.U. (1967). "Market Integration: A Case Study of Sorghum Prices in Western India". Journal of Farm Economics, 49(1): 147-159.

Lipsey, R.G. (1971). An Introduction to Positive Economics. Third edition E.L.B.S. pp. 401-410.

Miller, S.E. (1972). "Lead-lag Relationships Between Pork Prices at the Retail, Wholesale and Farm Levels". Southern Journal of Agricultural Economics, 20(3): 33-41.

Monke, E. and T. Petzel (1984). "Market Integration: An Application to International Trade in Cotton". American Journal of Agricultural Economics, 66(4): 481-487.

Njoku, J.E. (1981). Marketing of Agricultural Products. A paper prepared for the FDA sponsored sorghum, millet, wheat, rice, maize. In-service training, 3rd-4th August, 1981.

OECD (1967). "The Need for Market Intelligence for Agricultural Advisers". Market Intelligence for Agricultural Advisers, Organisation for Economic Co-operation and Development, Paris: 9-11.

Okereke, O. (1988). "Price Communication and Market Integration: A Case Study for Grains in Anambra and Imo States of Eastern Nigeria". In: Adekanye, T.O. (ed.) Readings in Agricultural Marketing, Longman Nigeria limited: 148-156.

Olayemi, J.K. and S.O. Olayide (1981). Elements of Applied Econometrics, CARD. Printed by Les Shyradeen, Nigeria Limited.

Rostow, W.W. (1965). The Concept of a Nation Marketing and Economic Growth. American Marketing Association Meeting. Winter.

Roy, K.S. and M.E. Ireland (1975). "An Econometric Analysis of the Sorghum Markets". American Journal of Agricultural Economics,
57(3): 513-516.

Spriggs, J. et al. (1982). "The Lead-lag Relationship Between Canadian and United States Wheat Prices". American Journal of Agricultural Economics, 64(3): 569-572.

Tweeten, L. (1983). "Hypothesis Testing in Economic Science". American Journal of Agricultural Economics, 65(3): 548-552.

Waugh, F.V. (1964). "Demand and Price Analysis: Some Examples from Agriculture". Economic and Statistical Analysis Division, Economic Research Division, U.S. Department of Agriculture, Technical Bulletin, No. 1316.