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DJOSSi NKAPNANG ISABELLE

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Market Integration for Gum-arabic in Borno State of Nigeria
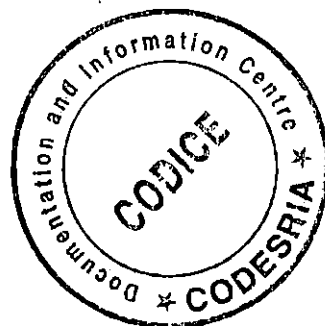
2005

MARKET INTEGRATION FOR GUM-ARABIC IN BORNO STATE OF NIGERIA

BY

DJOSSI NKAPNANG ISABELLE

(PGA/01/06105)

A DISSERTATION PRESENTED TO THE SCHOOL OF POSTGRADUATE STUDIES, UNIVERSITY OF MAIDUGURI IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE (M.Sc.) IN AGRICULTURAL ECONOMICS

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION, FACULTY OF AGRICULTURE
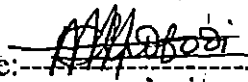
2005

CERTIFICATION

We certify that the dissertation entitled "Marketing Integration for Gum-arabic in Borno State, Nigeria", has been duly presented by Nkapnang Djossi Isabelle (PGA/01/06105) of the Department of Agricultural Economic and Extension, faculty of Agriculture, University of Maiduguri, Borno State, Nigeria and has been approved by examiners.

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Having met the stipulated requirements, the dissertation has been accepted by the school of postgraduate studies.

Dean
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27/04/05

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ABSTRACT

The study determined the market integration of gum-arabic in Borno State of Nigeria. Five markets for gum-arabic namely Maiduguri, Gubio, Monguno, Kukawa and Pulka were purposively selected for the study, based on their volume of trade flow. Ten gum-arabic sellers were randomly selected from each market, making a total of 50 respondents. Data were collected using questionnaire and interview schedule. Multiple regression and correlation analysis were used to analyse the data. The findings of the study showed that gum-arabic market in Borno State was inefficient. The market network was characterized by a long trade flow, with large number of intermediaries and, therefore, poorly integrated. Gubio, Monguno, Kukawa, Pulka and Maiduguri marketers were mostly dominated by agent middlemen. Other marketing agents such as producers, facilitative agencies, exporters and speculators were few in all markets. Analysis of access to market facilities showed that the poor distribution network resulting from the transport bottlenecks was as a result of lack of vehicles. Major sources of price information in the markets were dealers. Accessibility to storage, grading and training facilities were low, especially in rural isolated and accessible markets, while market authorisation was not always free. Analysis of price relationship between markets of gum-arabic showed that all markets of grade I and II gum-arabic were correlated ($P \leq 0.5$) among each other, except Monguno and Gubio. Time factor was positively correlated with the price in all the markets. Extent of horizontal market integration analysis revealed that for grade I, relationship between Maiduguri and Gubio, Gubio and Monguno and vice versa were horizontally integrated, while Maiduguri and Monguno were not. For grade II, Maiduguri and Pulka were horizontally integrated. Only Monguno and Gubio markets for grade I were vertically integrated ($E_p = 1.3$). Gum-arabic marketers (94%, 76% 70%) agreed that nature of market, government policy and dissimilarities in production respectively, had negative effect on both vertical and horizontal market integration. Based on the findings of the study, it was recommended that marketers should form cooperatives to improve the provision of basic market information especially on prices, as well as invest in establishment of storage, processing and transportation facilities.

DEDICATION

This research work is dedicated to the memory of my beloved late mother Mama Djossi Tchapmo Dorethée, who did not have the pleasure to see the accomplishment of her faithful work and love for me.

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(IRAD Maroua), Dr. Jomaha Charles (IRAD Maroua) who morally and financially encouraged me to chose this particular topic on gum-arabic.

My sincere gratitude to the Chapel of Grace members especially Mrs. Ubosi, Mrs Oni, uncle Barka, Mr. And Dr. Mrs. Donly for their financial and moral support. I acknowledge the great assistance and patient of my classmates and friends such as Mrs Hadiza Nuhu, Hyeladi Gaya, Shaibu Idriss, Illiasu, Mshelia, Binta and Sulumbe when I newly came to Maiduguri.

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INTRODUCTION

1.1   Background of the Study

Gum-arabic is an important industrial raw material in the world. It is the general name given to the dried water-soluble carbohydrate exudates collected from the stems, trunk and branches of many tree species. The acacia genuses produce the best quality. The gum-arabic of commercial value is produced in Nigeria from *Acacia Senegal* (Grade 1), *Acacia Laeta* (Grade I); *Acacia Seyal* (Grade 2); the closely related species (*A. nilotica, A. camplycatha, A. sieberiano, A. tortilis, A. albida A. hockii, a dudgeoni, A. polycantha,* etc.) and dried exudates from any other trees such as *sterculia setigera, Prosopis spp., Combretum spp, Commiphora spp., Anogeissus leiocarpus Ficus platyphylla, Axadirachta indica and Terminalia spp* (Grade 3) [Anonymous$_C$, 2002; FAO, 1995; Sanusi *et al.*, 2002; Maydell, 1986; Msheila and Musa, 2002; Shaibu, 2000; Yusuf, 2000].

The uses of gum-arabic for national and international markets are related to two of its main characteristics, namely, solubility and viscosity. It is mainly used in the food industries, particularly in the manufacturing of cakes and sweets, where it prevents the crystallization of sugar and gives special lustre to the surfaces. It is also an effective emulsifier, allowing a homogenous distribution of fats in different products, and purifying agent in wine and in liquors to achieve consistency, and thickens soft drinks. Its application in the pharmaceutical and cosmetic industries include face marks, hair strengtheners, skin cream and ointments as well as the coating of pills.

Gum arabic is also used for quality glue, pelleting agent, as binder in explosive, in the ceramic industries, in lithography, in plastic and textile industries, as a fixing agent and emulsifier in the perfume industries (Maydell, 1986; Anomymous_b. 2002). Gum-arabic tree is also a source of fuelwood, posture, medicine and additive for food and other substances like pink, pigment etc. Acacia tree also has the aptitude to resist harsh climate and help to fight against any form of desert encroachment or advancement (Uche, 1999; Sanusi *et al.*, 2002; Maydell, 1986).

The world supply of gum-arabic is dominated by Sudan, followed by Chad and Nigeria. Nigeria's export has been fluctuating and lost its position as the second largest exporter to Chad since 1977 (Anonymous_b. 2002; Folorunso *et al.*, 2002). The world consumption of gum - arabic reached its peak of 70,000 tonnes per annum in 1998. France alone accounted for more than 61% of world trade in re-exported gum-arabic. It was followed by United States (14%) and United Kingdom (8%). France is the largest consumer of gum-arabic and its importation has been increasing. Between 1999 and 2001, the prices of grade I and grade II gum-arabic have risen, while the demand also increased (Anonymous_a 2002)

In Nigeria, gum-arabic is one of the export items and a source of foreign exchange. It grows mainly in the gum belt between latitudes 11° and 14° North, distributed across Borno, Yobe, Bauchi, Kano, Kastina, Kebbi, Jigawa and Sokoto states. Nigeria is the third world largest producer of the commodity after Sudan and Chad. It accounts for about 20% of the world production, producing about 9000 metric tones of gum-arabic per annum (Bababe, 2002). The production is mainly for export

since 1930 (Balami and Maidugu, 1999). Exportation of gum-arabic from Nigeria is mainly done by companies such as Dangote Brothers Nigeria limited, Overseas Impex, Multi-trade Interlink and Walmama Nigeria Limited.

In Borno state, gum-arabic grade I is from the plant called *Dakwara* in Hausa and *Kolkol* in Kanuri, while gum-arabic grade II is from the plant called *Farin kaya* in Hausa and *Korawa* in Kanuri. The level of gum-arabic sold within the last 21 years in Borno State total over 1.6 million tonnes with the greatest quantity of 6423 tones and the lowest quantity of 1.500 tone sold in 1973/94 and 1969/70 seasons respectively (Mshelia, 1994). The production and commercialisation of these products help to increase farmers' revenue and to provide employment to many people during the dry season. In Borno State, gum-arabic is used mostly by households for the bidding of sauces, as glue, to produce the ink used for arabic studies, and as starch for clothes and the caps (Balami and Maidugu, 1999). *Acacia* genus plant has ecological attributes such as nitrogen fixation and its extensive root system, being a leguminous tree, increases the nutrient and structure status of the soil. Besides, gum-arabic plant has diverse natural adaptation to grow in places with drought and desertification problems. It is, therefore, mostly used as windbreak in Borno state, and other sahelien states of Nigeria. The foliage and pods is also fed to livestock (Uche, 1999).

The demand for grade I gum-arabic surpasses its supply in the state (Bababe, 2002). To bridge the supply gap, Yusuf (2000) reported that Borno State government has encouraged the establishment of more plantations, through the production of more than two million seedlings of gum-arabic. Anonymous[a] (2002) and Bababe (2002)

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noted also that various researches to improve production, tapping and harvesting, storage and the grading of gum-arabic have been carried out recently. All these practices are expected to improve supply and offer a better price, yet efficient market integration is necessary to sustain the gains.

1.2   Statement of Problem

Uche (1999) reported that gum-arabic production in Nigeria has become a booming business recently. He noted, however, that the most important factors such as marketing infrastructure, government policy, dissimilarities in production and supply shocks that mostly affect the market efficiency of the product are still the same. The marketing of gum-arabic in Nigeria, therefore, appears to be inefficient. The need for efficiency in the marketing of this product cannot be over emphasised. The more efficient the marketing system, the more rewarding it is to producers, marketers and consumers. Such a market establishes prices that are interrelated through space, by transport cost and through time, by storage cost (Bressler and King, 1970). If a market is integrated, there will be low variation in prices across space and over time, while price of commodity in spatial market will be functionally related in one form or another, thereby making the market efficient.

Although considerable research have been conducted on marketing efficiency of gum-arabic in Nigeria (Uche, 1999; Mshelia, 1994; Mshelia and Musa, 2002; Shaibu, 2000; Yusuf, 2000; Anomymous$_a$, 2002; Folunrunso et al., 2002) none attempted to determine the marketing efficiency of gum-arabic especially in Borno State, by using

the market integration approach. This study is designed to bridge the gap in the market efficiency research in Borno State, using the market integration approach.

This study was, therefore, designed to provide answers to the following research questions;

i) What is the market network of gum-arabic in Borno State?

ii) Is the market network of gum arabic integrated and to what extent?

iii) What factors affect the market integration of gum-arabic?

1.3   Objectives of the Study

The main objective of the study was to determine the level of market integration of gum-arabic in Borno State of Nigeria. The specific objectives were to:

i) examine the market network of gum-arabic in Borno State;

ii) determine price relationship between markets of gum arabic;

iii) estimate the extent of horizontal and vertical market integration of gum-arabic; and

iv) identify factors affecting market integration of gum-arabic.

1.4   Significance of the Study

With the growing demand of quality gum-arabic in the world, there is need to increase the supply and improve the market efficiency of this commodity. Gum-arabic is also a very important source of employment for the local farmers in the desert front-line states. This study will, therefore, serve as reference material for students and researchers interested in market integration, or in gum-arabic study. It will also help

agricultural policy makers in the effort to improve the markets and the marketing of gum-arabic, especially now that Nigerian economy is export-driven.

1.5   Scope and Limitations of the Study

The study covered market integration of gum-arabic in five markets in Borno State. Data collection was, therefore, limited to these markets located in Borno State and to the year 2003 and 2004. The markets include Maiduguri, Gubio, Monguno, Kukawa and Pulka.

CHAPTER TWO

LITERATURE REVIEW

2.1   Conceptual Framework

Olukosi and Isitor (1990) defined market integration as the grouping of firms that perform similar functions under one management. It enables marketing firms and agricultural firms to grow in size and increase their market power. There are two types of market integration -vertical and horizontal. Vertical integration is one in which a firm combines activities which are not similar to its present function but related to them in sequence of marketing activities. Horizontal integration is one in which a firm gains control over other firms performing similar activities at the same level in the marketing sequence.

Laping (2001) explained market integration from two aspects. First, it refers to vertical integration and horizontal integration. The former is infact the industry integration that reflects the nature of agribusiness, while the latter mainly is spatial market integration. Second the integration includes spatial market integration, temporal market integration, integration across price form and integration across product form. Spatial market integration includes long-run stable relationship between two markets. Short-run integration shows that the price change in one market in one period will bring "in the next period" (i.e. immediately) the price change in another market. This reflects the sensitivity of the spread of product prices between markets. Integration across marketing stages reflects the effects of price in on marketing stage on the price change in the next stage. If the prices in different marketing stages meet the condition of "next

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stages price= this stage price + market charge", therefore, there exists integration between market stages. The integration between wholesale and retail markets is one example of integration across marketing stages.

Temporal market integration reflects the effect of present price change on future prices. When prices meet the condition of "future price = present price + storage cost", it is called temporal market integration.

Integration across product form reflects the effect to price change of one product on price change of other related product, which usually refers to the price relationship between a primary product. If the condition that processed "product price = primary product + processing cost" is met, the markets are integrated.

Lele (1967) viewed market integration as the interrelationship between price movements in two markets. Bressler and King (1970) considered market integration as an approach to measure marketing efficiency. Based on that, an efficient (commodity) market will establish prices that are interrelated through space by transportation cost and through time by storage cost.

Despite the controversy centred on the use of the market integration to infer marketing efficiency, it has nevertheless been shown that market integration analysis using appropriate methodologies determines the efficiency of price transmission between markets (physical market) (Ravailllon, 1986; Heyten, 1986). That means, the more integrated a (commodity) market is, the greater the marketing efficiency, for the variation in price across space and over time will be lower.

2.2   Market Network and Structure

Market network is a complicated system of markets connected to each other, which allows the flow of product from producers to consumers. It is compared to market channel, which is the alternative route of product flow from producers to consumers (Kohl and Uhl, 1972).

Hays (1988) defines a market as a group of buyers and sellers which facilitates trading with each other. For Adekanye (1988) market serves the purpose of bringing buyers and sellers of foodstuff and non-foodstuff) together in certain fixed location for the purposes of exchange. The location for such transactions is sometimes the basis for classification of markets as isolated rural markets, accessible rural markets, regional urban markets, and non-regional urban markets.

Isolated Rural Markets: are inaccessible to motor traffic, and most common modes of transport to these markets are foot, bicycle and animals (donkey, horse). Storage is minimal in these markets. Most of the supply of agricultural produce comes from the nearby area.

Accessible Rural Markets are located on/or near a motorable road.   Such markets hold once or twice a week. Farmers, local marketers, producers, assemblers, transporters and village retailers participate in product exchange.

Regional Urban Markets are defined as those markets in relatively large cities, and located in the immediate geographical regions producing the crops marketed, while non-regional urban markets are those markets which are outside the regions or areas of production of crops marketed. The distinction is because movement of products from

regional to non-regional urban market usually involves at least one more marketing intermediary. The functioning and features of these markets are almost similar. The supply of agricultural products comes from a much larger area than at rural market and from many different locations. There are more permanent physical facilities (storage facilities) than rural market.

2.3 Marketing agencies

Middlemen are agents who perform the various marketing functions as products move from producers to consumers. Four main groups of middlemen can be distinguished. These are assemblers, commission agents, wholesalers and retailers.

Wholesalers and retailers are merchant middlemen, who take title to and, therefore, own the product they handle. Wholesalers buy in large quantities and sell in bulk. They occupy a strong bargaining position, especially when compared with groups of middlemen. Retailers constitute the final link in the chain of middlemen moving stuff from producers to consumers.

Assemblers are sometimes called bulking middlemen. This is because they buy in small lots but sell in larger quantities to wholesalers, retailers and other assemblers. They obtain their supplies from farmers in villages and rural markets. Agent middlemen act only as representatives of their clients. They do not take title to (Commission agents, brokers) and, therefore, do not own the product they handle. Speculative middlemen are those who take title to products with the major purpose of profiting from price movement. They are sometime called traders, scalpers, spreader, and hoarders.

Processors and manufacturers primarily exist to undertake some action on products to change their forms. They also take an active part in other institutional aspects of marketing. Facilitative organizations aid the various middlemen in performing their tasks. They may also aid in grading, arranging and transmitting payment (Adekanye, 1988).

Goletti and Tsigas (1995) examined the concept of market integration using 3 approaches. They described the market network using information obtained by a rapid appraisal. Basic information were collected about (i) the number and type of participants in each regional markets as well as the volume of their transaction; (ii) trade flows among different markets; (iii) the access to marketing infrastructure such as trucks, rail ways, river transportation and telephones; (iv) degree of price information by market participants; (v) the degree of information concerning export promotion program and structure of marketing cost.

Dittoh (1994) in the study of market for vegetable in Nigeria analysed marketing integration using marketing channel. He reported that the number of groups of intermediaries between the producers and consumers were not constant. He logically believed that the more groups of intermediaries the higher the price that will be paid by consumers. The implication is that the more groups of intermediaries, the less integrated the vegetable markets across space.

2.4   Market Integration and price relationship

Price correlation measures the co-movement of prices that underline the intuitive idea of market integration. The problem is that this co-movement sometime can not be

separated from long-run linear relationship among prices in different localities. If such a relation is found, then these price series are said to be co-integrated. The presence of co-integration between two price series is indicative of integration (Goletti and Tsigas, 1995).

Assuming that the markets under consideration are integrated, it is important to know the extent of integration. The degree of integration is then related to price transmission overtime. Within this dynamic adjustment process it is possible to distinguish a short-run and long-run transmission. This process leads to the computation of magnitude and speed (i.e. how much time is need for price to be transmitted from one location to another). In other to understand why, markets are integrated, (or not), there is need to consider the factors that affect market integration (Goletti and Farid, 1994).

Adekanye (1988) in a work on spatial price analysis in western States of Nigeria used different interpretations of correlation coefficient (R) and regression among prices in order to investigate the degree of integration among markets. With the coefficient (R) it was found that four markets were highly integrated with each other, while market integration was low for others. Using regression, 71% relations among price series were found to be significantly co-integrated. Dittoh (1994) analysed market integration using also regression model, and index of market concentration (IMC).

Laping (2001) in the study of food price differences and market integration in China used the co-integration approach. The study also tested the market integration of main agricultural products in China. Both long- run market integration and short-run

market integration of the main products was tested and analysed. He reported that the major agricultural product market in china was integrated in long-run, but the degree of short-run market integration was very low.

Golleti and Tsigas (1995) in analysing market integration explicitly captured the price co-movement using correlation and co-integration coefficient. The study also used a model to test the degree of horizontal market integration.

2.5   Extent of Market Integration

To know the extent of market integration of different rice markets in Bangladesh and the different maize markets in Malawi, Golleti and Tsigas (1995) used, long term multiplier, and composite indices. This was to capture the dynamic aspect of price integration. Short-run and long-run was distinguished and dynamic aspect of price integration. Short-run and long-run was distinguished and dynamic multipliers computed. He considered dynamic multiplier as the effect of a price change due to a random shock or a shift in a exogenous variable while the composite index which involve both magnitude and speed of adjustment allows to study the speed of price transmission.

In other to have the overall impression of the extent to which the grain crops (rice, maize, and cowpea) are integrated, Okereke (1988) calculated the bivariate correlation coefficient of their retail prices in every pair of market in Anambra and Imo States, in Eastern Nigeria. He also used different interpretation of regression to show the direction of the vertical integration between wholesaler and retailers. He found out

that, while there were generally high price correlation in the markets for rice and cowpea, the correlation price of maize was rather low.

Laping (2001) calculated the index of market connection (IMC) to measure the connection degree of market integration of the main agricultural product in China. He reported that in agricultural product markets in China, transmission of price information is very slow and price changes across regions are not responsive. However, in most research work only data on price are available, hence only the extent instead of the causes of integration can be estimated.

2.6 Factors Affecting Market Integration

Goletti and Tsigas (1995) trying to understand why some markets in Malawi and rice market in Bangladesh were less than perfectly integrated liked the measure of integration (i.e. co-integration and correlation, dynamic adjustment and composite indices) to structural determinants of market integration. This factor of integration involved marketing infrastructure, price stabilization policy, the degree of dissimilarity in production in different areas as well as supply shock.

Adekanye (1988) in her work on spatial price analysis in Western states of Nigeria explained the less than perfect market integration by, lack of standardised measures of quantity for rice, lack of officially reliable and up-to date market information, lack of effective arbitrating in the rice marketing, transportation bottlenecks, including difficulty of access of some supply areas and inadequate supply of lorries and other transport facilities; different types of market (primary, producer, feeder, central) and the existence of different supply sheds. Laping (2001) reported that

transportation, followed by spread of price information; seasonal factors, inflation and intervention of government are the most important factors affecting market integration.

CHAPTER THREE

METHODOLOGY
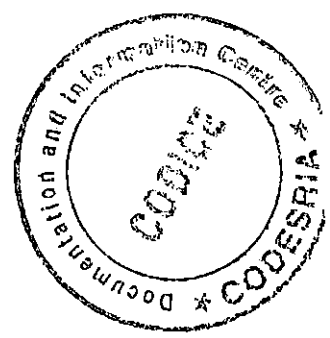
3.1 Study Area

The study area comprised five important gum-arabic local markets in Borno State of Nigeria, namely, Maiduguri, Gubio, Monguno, Kukawa and Gwoza. The market days vary from Monday to Sunday. The market meet only during in the day time. Urban markets like Maiduguri have better facilities such as permanent shops with lock-up and storage facilities than rural ones. Most rural markets like Gubio, Monguno, Kukawa, Pulka have few shops or permanents stalls. Marketing activities are usually in the open with traders displaying their goods in bags or in various other units of measurement. Borno State is located in the north-east corner of Nigeria between latitudes $10°2'$ and $14°$ North and longitudes $11°$ and $14°45'$ east (Figure1). The projected population of the State in 2003 was about 3.5 million with density of 38 persons per square kilometre, based on the 1991 population census and annual growth rate of 2.8% (Iheanacho et al., 1992). Majority of the people are farmers, herdsmen and fishermen.

3.2 Sampling Technique

The major markets of gum-arabic were purposively selected for the study, based on the volume of trade flow of each market. Gum-arabic is also commonly grown in these areas because of its adaptability to the areas. From each market, 10 gum-arabic sellers were randomly selected, making a total of 50 respondents.

3.3   Data collection

Both primary and secondary data were collected. Primary data were collected from retailers and wholesalers of gum-arabic Grade I and Grade II in the markets, using questionnaire and oral interview schedules. Secondary data were obtained from sources such as relevant annual reports of FAO, Borno State government and gum-arabic marketing agents in Borno State. Data were collected on a number of variables such as structural factors affecting market integration of gum-arabic, number and type of participants as well as trade flow among different markets, accessibility to marketing infrastructure, the degree of price information by market participants, the degree of information concerning export promotion programs, and structure of marketing cost, as well as fortnightly price series for a period of 6 months.

3.4   Data Analysis

Descriptive statistics such as mean, frequency distribution, and percentages were used to analyse the market network and the main factors affecting market integration of Gum arabic in Borno State.
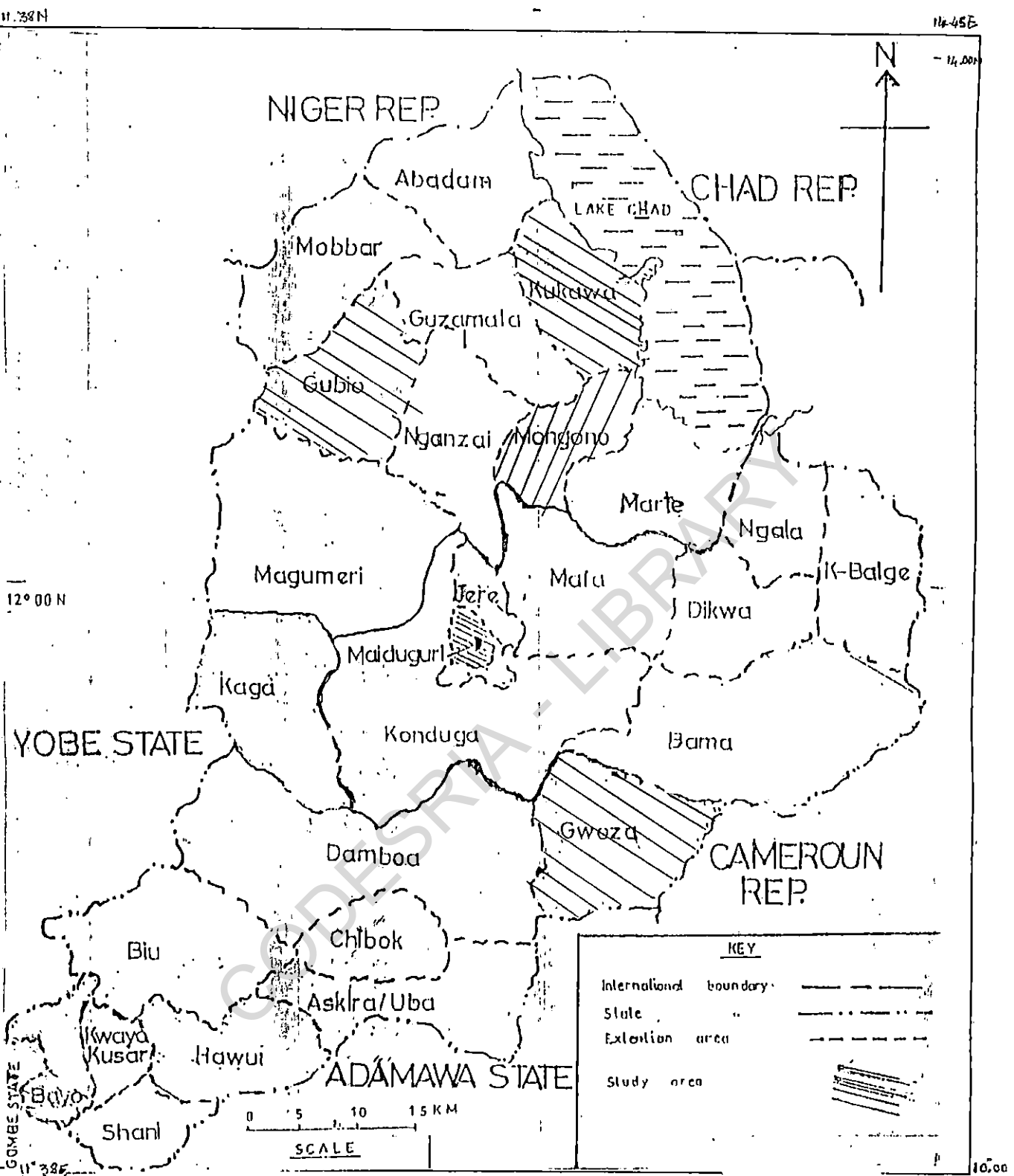
FIGURE 1: MAP OF BORNO STATE SHOWING THE STUDY LOCAL GOVERNMENT AREAS

Correlation analysis of price series at different markets were used to measure price relationship among markets. The correlation price series between two markets i and j is expressed as follows:

$$R_{ij} = \frac{\sum(x_i - \overline{x_i})(x_j - \overline{x_j})}{\sqrt{\overline{\sum(x_i - x_i)}} \sqrt{\overline{\sum(x_j - x_j)}}}$$

where,

x_i and x_j are prices of 1 kg of gum-arabic grade 1 or 2, at markets i and j

$\overline{x_i}$ and $\overline{x_j}$ are means of price of 1 kg of gum-arabic grade 1 or 2, at markets i and j

The price analysis model, using ordinary least square regression technique, was used to determine the extent of horizontal market integration. The models are expressed implicitly as follows:

$P_i = f(P_2, P_3, P_4, P_5, X, U)$ where $i = 1, 2, 3, 4, 5$

Explicitly the models are expressed as follows:

$P_1 = a + b_2 P_2 + b_3 P_3 + b_4 P_4 + b_5 P_5 + b_6 X + U$

$P_2 = a + b_1 P_1 + b_3 P_3 + b_4 P_4 + b_5 P_5 + b_6 X + U$

$P_3 = a + b_1 P_1 + b_2 P_2 + b_4 P_4 + b_5 P_5 + b_6 X + U$

$P_4 = a + b_1 P_1 + b_2 P_2 + b_3 P_3 + b_5 P_5 + b_6 X + U$

$P_5 = a + b_1 P_1 + b_2 P_2 + b_3 P_3 + b_4 P_4 + b_6 X + U$

where, P_1, P_2, P_3, P_4, and P_5 are prices of 1 kg of gum arabic (grade 1 or grade 2) in markets 1, 2, 3, 4, and 5 respectively. The prices are measured in naira.

$a, b_1, b_2, b_3, b_4, b_5,$ and b_6 are the parameters to be estimated.

X=time variable. Dummy variable was used to represent the two seasons that affect gum-arabic prices. These include the dry and cold season (December to February) represented as zero (0)and the dry and hot season (March to May) represented with (1).

U = Error term.

<u>A priori</u>, it is expected that $a, b_1, b_2, b_3, b_4, b_5, b_6 > 0$

The extent to which price in one market responded to change in price in another was estimated using inter-market price elasticity. It is expressed as follows:

$$E_{P_{d, in}} = \partial P_d / \partial P_{in} \cdot \overline{P_{in}} / \overline{P_d}$$

where,

$E_{P_{d, in}}$ is the responsiveness of price in one market due to a unit change of price in another market. $\overline{P_d}$ and $\overline{P_{in}}$ are mean prices of 1 kg of gum arabic grade 1 or grade 2 in dependent and independent markets respectively. This measures the vertical market integration among markets.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

• The socio-economic characteristics of the gum-arabic marketers were examined with respect to gender, age, level of education, years of marketing experience and nature of occupation, primary occupation. The results are presented in Table 4.1. Out of the 50 sampled marketers, 98% were male while only 2% were female (Table 4.1). The high capital outlay and the socio-cultural and religious environment can explain this low participation of women in gum-arabic market. Among the Kanuris, Shuwas and Mandaras which live in the study area, women are always kept away from exposing jobs, which bring them in contact with the outsiders, especially men. Their main activities in gum-arabic are, therefore, indoor functions such as sorting, grading and packaging. This is due to the practice of seclusion in marriage and also lack of capital outlay to start gum-arabic business. Gender analysis is important because it helps to determine the type of activity that can be undertaken by marketers.

The age of a marketer determines the type of activities he or she can perform (Djossi, 1998). The analysis of the ages of the respondents shows that the mean age was 44.90 years with majority (48%) of marketers in the age group of 21- 40 years. Respondents in the age bracket of 41-60 and 61-80 constituted 26% and 24% respectively. The minimum age of the respondents was 18 years, while the maximum was 80 years. There were more adults in the business.

Analysis of the educational status shows that majority of the marketers (56%) had Quranic or adult education, while 16% had no formal education. Also 6% each had degree and secondary education, while 8% had OND/HND/NCE.

Table 4.1 Socio-economic characteristics of gum-arabic marketers (n=50)

Socio-economic Variables	Frequency	Percentage	Mean
Gender			
Male	49	98	
Female	1	2	
Age (years)			44.90
≤ 20	1	2	
21-40	24	48	
41-60	13	26	
61-80	12	24	
Educational level			
No·formal	8	16	
Primary	4	8	
Secondary	3	6	
OND/NCE/HND	4	8	
Degree	3	6	
Quranic or Adult education	28	56	
Marketing Experience (years)			12.22
≤ 10	14	28	
11-20	25	50	
21-30	8	16	
31-40	2	4	
41–50	0	0	
51- 60	1	2	
Nature of occupation			
Full time	10	20	
Part-time	40	80	
Primary occupation			
Farming/herding	25	50	
Fishing	7	14	
Trading	3	6	
Civil servants and politicians	5	10	

Source: Field survey, 2004.

Majority of the marketers were, therefore, literate, having attempted one form of education or the other. Educational level is very vital for marketing efficiency as well as market integration. The positive influence of education on marketer lies in the ability to acquire knowledge and use relevant information more efficiently.

Distribution of the marketers based on years of experience shows that 50% were between 11-20 year with a mean of about 12 years a minimum of 4 and maximum of 60 years. This is long enough for the marketers to be characterised as experienced. The marketing experience of farmers to a large extent affects their managerial know-how and decision-making It influences the farmers understanding of climatic and weather conditions as well as socio-economic policies and factors affecting marketing. However, it sometimes negatively affects marketing, as marketers with more years of experience tend to be more conservative and less willing to adopt new practices, thus leading to low efficiency in marketing.

Analysis of the result also shows that only 20% of gum-arabic dealers were in full time, while 80% of them were on part time basis. This could be explained by the fact that gum-arabic business, especially in rural market, is mostly seasonal. The season varies strictly from the beginning of harmattan till the first rain. This six months harvest period is characterised by best quality gum arabic production.

The primary occupation of part time dealers include farming/herding, fishing, trading and civil servant /politicians which were respectively represented by 50%, 14%, 6%, and 10% of the respondents. This result shows that gum arabic market as

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mentioned is mainly considered as a secondary activity that helps the producer and marketers to increase their annual revenue.

4.2   Market Network

4.2.1   Type and Number of participants

The types and number of participants in gum-arabic market are important in breaking down the marketing process into functions and in defining major specialized activities performed in accomplishing the market process. Table 4.2 shows the types and number of participants by market.

Table 4. 2: Types and number of participants by markets.

Market participants	Number of Participants in markets						
	Maiduguri	Gubio	Monguno	Kukawa	Pulka	Total	%
Producers	2	-	4	-	5	11	6.79
Merchant middlemen	-	12	16	10	6	44	27.16
Agent middlemen	18	26	20	18	8	90	55.55
Speculators	-	1	1	-	-	2	1.23
Facilitative agencies	10	-	-	-	-	10	6.17
Exporters	6	-	-	-	-	6	3.70
Total	36	39	40	28	19	162	100

Source: Field survey, 2004.

Analysis of Table 4.2 shows that in Gubio, Monguno, Kukawa and Pulka markets majority of the market participants were agent middlemen (26, 20, 18, 8), followed by merchant middlemen (12, 16,10, 6), while Maiduguri was dominated by agent middlemen (18) and facilitative agencies (10). Individual producers were very few, while processors were found to be completely absent in all the markets. The

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fewness of producer conforms with the findings of Balami and Maidugu (1999) that there is low interest to personal production. However, these groups are not mutually exclusive due to the low degree of specialisation. The 43 gum-arabic plantations in Borno State belong to the Government, and Nigeria gum-arabic are mostly from the wild and neighbouring countries (Chad and Cameroon). Each year, engagement registration is given to individuals by the Government in exchange of some prescribed fees. The contractor would take charge of the plantation till harvest. Low level of interest in gum-arabic production is also due to the fact that time taken by gum-arabic plantation or wild Acacia trees to mature and exude gum for collection is usually long – 4 to 5 years after germination (Anonymous$_a$ (2002)). Additionally, high capital outlay is needed to have a productive gum-arabic farm.

The absence of processor was expected because in Nigeria and especially in Borno State, the main activities involve sorting, grading and spray-drying. The technologies used in these activities are loosing ground, as they no longer meet the phytosanitary requirement in the industrialized countries. The absence of processor, the scarcity of speculator and facilitative agencies in all the markets is mostly due to the expensive nature of the infrastructure involved in carrying out these activities.

4.2.2   Trade flows among different markets

The knowledge of trade flow helps to determine the concentration and the distribution of marketers. This has an effect on the market of gum-arabic because the more intermediaries between the producer and consumer, the less integrated the market is, across space and time. Besides, the more the market intermediaries, the higher the

prices that will be paid by consumers. Figure 2 explains the flow of trade and price information of gum-arabic I and II among markets. The flow starts with the farmgate and neighbouring suppliers. Grade I and II are mostly desired for national and international markets. while other grades are offered for local consumption such as binding of soup, preparation of ink, glue and starch.

Gum-arabic are brought by farmers or local assemblers to rural isolated market (RIM) where rural buyers (assemblers and wholesalers) participate actively in assembling the gum from the RIM (e.g. Gumari. Izge, Sabongari etc.), the closest market to farmgate. The mode of transportation is usually head potterage, bicycles, horse, donkeys or by motor vehicles.

In the RIM, prices are determined through bargaining. The units of measurement and weight are not standardized. Prices depend on the local unit of measurement used, such as mudu, jute bag, baskets, and the quality of gum-arabic. The quality of gum product depends on such attributes as moisture content, colour and smell, which make the commodity acceptable to the buyer. At the end of the market day, the local agents pack their goods into 100 and 50 kg sacks and resell to the main assembling agents. The main assemblers are responsible for collection from various buying points and also transportation of products to the next bigger markets.
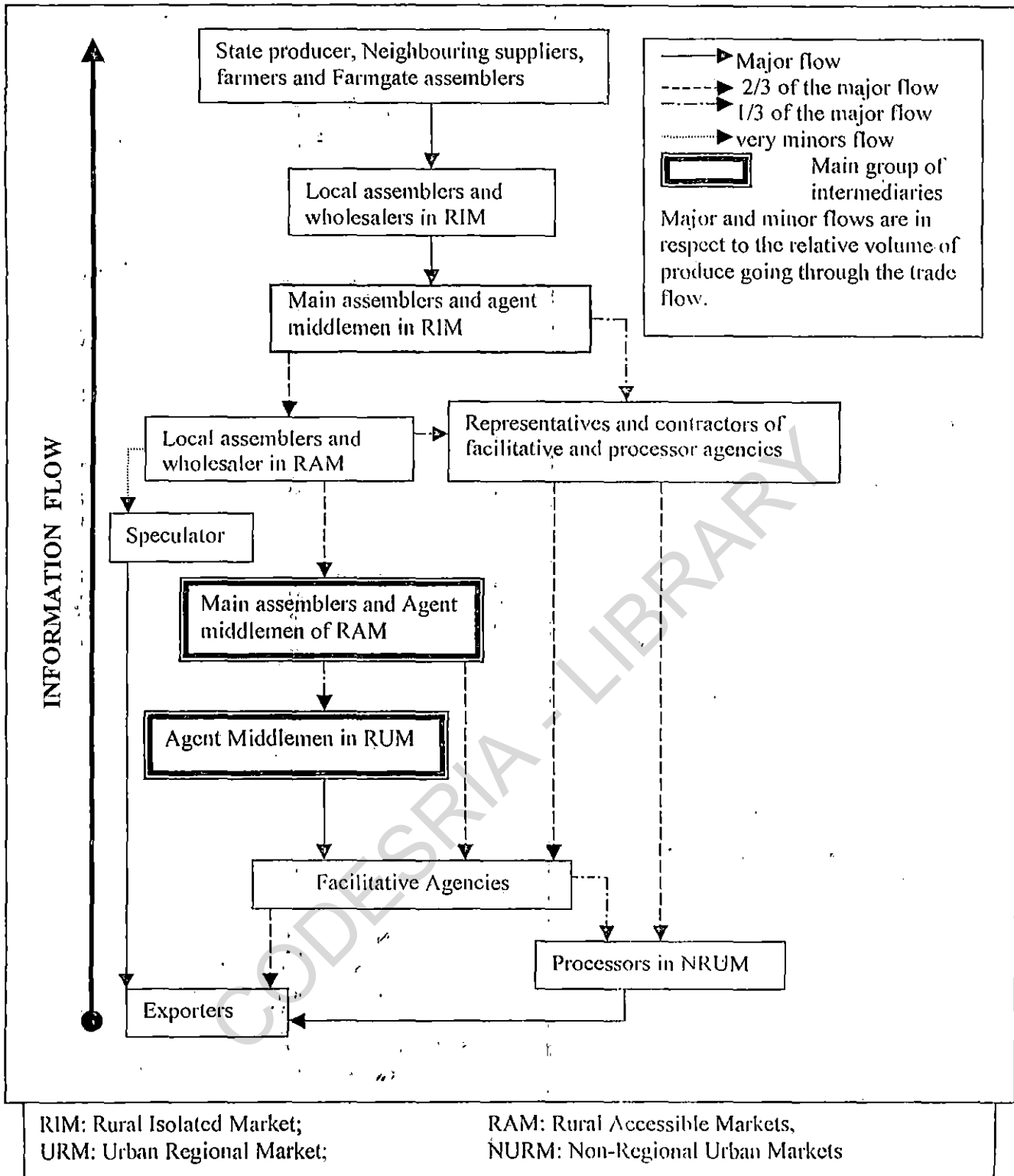
Source: **Field Survey 2004.**

Figure 2: Gum-arabic trade flow in Borno State, Nigeria

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The gum-arabic are assembled (by main agents of RIM and local agent from RAM) in big lots and transported by lorry and pick up to bigger Rural Accessible Markets (RAM) which are held periodically, once or twice weekly. Gubio, Mugono, kukawa, and Pulka markets are examples of RAM. In RAM, agent middlemen buy from the rural buyer. Few farmers bring their gum directly to these markets. In the Urban Regional Market (URM), such as Maiduguri, agribusiness firms and other processors from Non-Regional Urban Markets (NURMs) e.g Dangote, Bolori Brother Nigeria Ltd., have their commission agents buying for them in the RAM or URM. Examples of NURM are Kaduna, Lagos and Port Harcourt. In RIM and RAM markets, the gum is stored in houses for some days till the next market day. In some RAM and URM, speculators store the product, while waiting for a more beneficial time. In Borno State, only facilitative agents in URM have modern warehouses for storage of gum-arabic. Facilitative agents and exporters in URM buy the product from the various marketers of RAM. Only little quantity of gum arabic is processed at the national level. Thus, the market network for gum-arabic is characterised by large number of intermediaries and, therefore, poorly integrated.

4.2.3   Accessibility to Market infrastructures, information and export promotion

Table 4.3 shows that in Maiduguri, 80% of the marketers had access to pick up and lorries, while in Gubio, Monguno, Kukawa and Pulka only 20 % each had access. A trip to all the markets revealed that there were good network of roads linking the 5 markets. They were also all season motorable road networks within the Local

Government Areas of the purchasing centers. Thus, poor distribution network resulting from transport bottlenecks is as a result of lack of vehicles such as picks up, lorries, and motor vehicle.

Although all the marketers had information about prices in all the markets, the result shows that only 10% of the marketers in Maiduguri had information about the export promotion programs. The State Ministry of Forestry and Environment, the Ministry of Agriculture and the National Association of Gum Arabic Producers, Processors and Exporters of Nigeria (NAGAPEN) sometime issue leaflets and booklets (posters), which are mostly on gum-arabic production. The contents of such publications are limited to general statements on improved farm practices.

The major sources of information in all the markets were, therefore, dealers as indicated by 100% of the respondents in Mongonu, Kukawa and Pulka and 80% and 90% in Maiduguri and Gubio respectively. Mass media source of information was found only in Maiduguri (20%) and Gubio (10%). The highest level of education for most dealers in rural markets (Gubio, Monguno, Kukawa, and Pulka) was primary school. It is, therefore, not easy for most of them to understand the meaning of some written information. Other sources of information, such as newspaper and television, were only found in Maiduguri and few in number. Since the flow of information and price communication between markets express the level of integration, all the markets can, therefore, be described as less integrated with one another. The inadequacy of information in other markets places Maiduguri market as price leader for Gum-arabic, while other markets (Gubio, Monguno, Kukawa, Pulka) act as price taker.

Table 4.3 Accessibility to market infrastructures, transportation facilities and information on export program by market

Market Network Variables	Markets				
	Maiduguri	Gubio	Monguno	Kukawa	Pulka
Transport facilities(%)					
Pick up and lorries	80	20	20	20	20
Bicycle	20	20	20	30	30
Others (head potterage, donkey and horse)	30	60	60	70	50
Motorable roads in (Km)[a]	-	-	2600	3000	2450	180
Distance from Maiduguri (Km)[a]	-	92	120	180	115
Sources of information (%)					
Dealers	80	90	100	100	100
Mass media	20	10	-	-	-
Types of information (%)					
Prices	100	100	100	100	100
Export promotion	10	-	-	-	-
Other market facilities (%)					
Storage	40	-	10	10	10
Grading	60	-	10	-	-
Training	90	-	10	-	-
Entry Market Authorization	100	90	70	87	83

Source: Field survey, 2004.

[a]. Borno State Ministry of Urban planning and Development.

Table 4.3 also shows that in Maiduguri 60% of the marketers had access to grading facilities, while only 10% graded their gum-arabic in Monguno. In other markets such as Gubio, Kukawa and Pulka Markets, grading was absent. The reason is obvious. Marketers in rural markets were less trained to grade their products. The implication is that the rural and urban marketers sometime market adulterated mixture of superior and inferior quality of gum. This is widely practised by traders. Due to lack of grading, quality assessment is based on subjective judgment. This ineffective

grading is greatly strengthened by the existence of inadequate and lack of up to date information on the consumer needs and good storage facilities.

Analysis of the result also shows that only 40% of gum-arabic dealers in Maiduguri, and 10% each in Monguno, Kukawa and Pulka used storage facilities, though still inadequate. The reason is because adequate storage facilities, needs high investment cost and training. In most cases the gum tapers, middlemen and agent middlemen do not own any warehouse and do not have opportunity to be trained. The cultural practice is to dig large pits in the ground where gum-arabic are stored with corn and millet. This leads to the depreciation of gum color, which is very important in keeping and assessing standard quality of the product. As a result of poor storage, gum price and quality fluctuate appreciably, from one production season to another.

In Maiduguri, 90% of the respondents and only 10% in Monguno were trained on gum-arabic improvement, while none in other markets. This can be explained either by the low degree of information, as earlier mentioned, and transport bottleneck which sometimes makes accessibility to rural areas by extension agents or training teams very difficult. Gum-arabic is a Non-wood Forest Product (NWFP) traded in the international market. For the commodity to be recognized and accepted with value among similar commodities in the international market, it needs to be handled, processed and traded by experts with professional skills.

The result also shows that entry into gum-arabic market business was not always free. In Maiduguri market, 100% of the respondents were registered, while 90%, 70%, 80%, and 80%, were registered in Gubio, Monguno, Kukawa and Pulka respectively.

The high registration figures can be attributed to the fact that some registered facilitative agencies, companies and cooperatives give photocopies of their certificate to other unregistered one. This implies that the gum-arabic market system is imperfectly competitive because entry is not always free. For example, in Maiduguri, traders are not allowed into gum-arabic business until they join the association or get permission from the Ministry of Commerce as well as agree to abide by its rules and regulations. The more competitive a market is the higher the integration.

4.3   Price relationship between gum-arabic markets

Price correlation measures the co-movement of prices and underlines the idea of market integration as well as discovers if there is a stable long-run linear relationship among prices in different localities. In order to determine the market integration of gum-arabic in Borno State, bivariate correlation of weekly prices for Grade I and Grade II in Maiduguri, Gubio, Monguno, and Pulka markets collected for a period of 6 months (December–May 2003) was used. Maiduguri, Gubio and Monguno markets were involved in grade I, while Maiduguri and Pulka were considered for grade II. As a result of the inadequate data in Kukawa, the prices were not considered. The empirical results are presented in Table 4.4.

Analysis of the result for grade I gum-arabic shows that all the markets were correlated (P≤0.5), except Monguno and Gubio. The price correlation coefficients of Maiduguri and Gubio and Gubio and Monguno were above 0.8. This shows high price correlation and, therefore, high price market integration. The high level of market

integration can be explained by the availability of factors that affect price such as market facilities, government policies and supply shock.

Time factor was correlated with all the markets. There was, however, low correlation (0.452) between seasonal time variation (Harmattan and Hot season) and price of gum-arabic grade I in Maiduguri. The low correlation between time and price of grade I gum- arabic in Maiduguri can be explained by the fact that Maiduguri market price does not usually depend on seasonal supply like other markets close to the farmgate. As earlier pointed out, this is due to the presence of more storage facilities in Maiduguri. The high level of price information and the availability of market infrastructure such as storage facilities, make Maiduguri market price to vary with international price.

Table 4.4 Bivariate correlations between prices of grade I and II gum-arabic, markets and time variable in Borno State, Nigeria.

Gum-arabic grades	Maiduguri	Gubio	Monguno	Pulka
	Gum-arabic markets			
Grade I				
Gubio	0.821**	-	-	-
Monguno	0.698**	0.857	-	-
Time	0.452*	0.836**	0.665**	-
Grade II				
Pulka	0.895**	-	-	-
Time	0.665**	-	-	0.783**

Source: Field Survey, 2003.

* Significant at 0.01; ** Significant at 0.05;

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The price correlation coefficient between Maiduguri and Pulka markets for gum-arabic II was high (0.895) and positive, implying that there was a co-movement of gum-arabic price between these markets. The two markets were, therefore, very highly integrated. The high level of integration between the two markets can be explained by the closeness of Pulka to Maiduguri, which facilitates the good price communication among dealers. Time variable was found to be moderately and positively correlated with the market prices of grade II gum-arabic in Maiduguri (0.66) and Pulka (0.783) respectively. This is because as the time moves from the dry and cold (harmattan) to dry and hot season, the demand for gum-arabic increases and reaches its peak just after the first rain.

4.4   Horizontal market integration of Gum-arabic

The regression coefficients were used to indicate horizontal market integration. Gum-arabic prices with significant regression coefficients were considered to be horizontally integrated to the dependent markets (Goletti and Tsigas, 1995). The results are presented in Tables 4.5 and 4.6.

Analysis of the results of Table 4.5 reveals that when Maiduguri was the dependent market, there was significant and negative relationship between it and Gubio market, as well as time variable. The negative relationship suggests that high price in Gubio market had the effect of lowering price in Maiduguri market. It can be explained by factors other than price movements, which determine marketers' behaviours and expectations, such as nature of market, government policy and dissimilarities of production as shown in Table 4.8.

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Table 4.5 Regression analysis of price relationship between markets for gum-arabic grade 1 in Borno State, Nigeria

Markets	Regression Estimates[†]							
	Constants	Maiduguri	Gubio	Monguno	Time	R^2	$\overline{R}^2$	F-ratio
Maiduguri	50.730*	–	0.956*	-114	-18.113*	0.866	0.846	43.17
	(5.048)		(3.381)	(0.103)	(3.381)			
Gubio	-36.511*	0.773*	–	0.244**	18.811*	0.964	0.958	177.90
	(7.617)	(0.103)		(0.078)	(2.195)			
Monguno	39.825	-505	1.336*	–	-14.806	0.758	0.722	20.908
	(24.553)	(0457)	(0.429)		(10.593)			

Source: Field Survey, 2003.

* Significant at 0.01; ** Significant at 0.05.

†. Numbers in parentheses are standard errors

When Gubio was dependent market, it had positive and significant relationship with Maiduguri and Monguno at 0.01 and 0.05 levels respectively. This suggests that increases in Maiduguri and Monguno prices were consistent with increases in Gubio price. Maiduguri market was, however, more horizontally integrated with Gubio (0.773) market than Monguno (0.244) market, because its price influenced Gubio more than Monguno price.

When Monguno was considered as dependent market, the relationship between it and Maiduguri market was found to be negative and insignificant at the specified level, while Gubio market had positive and significant relationship with it. This implies that increase in price in Gubio was consistent with increase in price in Monguno. The two markets were, therefore, horizontally integrated.

Table 4.6 shows the regression estimates of gum-arabic grade II.

Table 4.6 Regression estimates of price relationship between markets for gum-arabic grade II in Borno State, Nigeria.

Markets	Regression Estimates						
	Constants	Maiduguri	Pulka	Time	R^2	$\bar{R}^2$	F-ratio
Maiduguri	11.330	—	0.705*	6.889**	0.853	0.805	43.424
	(4.313)		(0.112)	(2.181)			
Pulka	-0.397	0.925*	—	1.896	0.866	0.787	43.424
	(5.693)	(0.147)		(3.00)			

Source: Field Survey, 2003.

* Significant at 0.01; ** Significant at 0.05.

The result reveals that when Maiduguri was considered as dependent market, it had a positive and significant relationship with Pulka market. The price of grade II gum-arabic in Pulka market, therefore, moves together with price of grade II gum-arabic in Maiduguri market. The same result was also obtained when Pulka was the dependent market. Maiduguri market was, therefore, horizontally integrated with Pulka.

Analysis of the effect of time factors on gum-arabic grades I and II, (Tables 4. and 4.6) shows that, for Grade I gum-arabic, the time coefficient was significant and negatively related with Maiduguri market price. It implies that as the time moved from harmattan to hot season, the price of gum-arabic in Maiduguri market decreased. The time coefficient for Monguno was insignificant at the specified level. Time factor regression coefficient was, however, positive and significant with price of gum in Gubio market. The reason is that Borno State gum are not competitive in the nation-

and international markets, because of the low level of quality and quantity of products. As the harvest season moves from harmattan to hot season, gum supply by other countries such as Sudan and Chad are more demanded than that of Nigeria. For grade II, time factor was significant and had positive relationship with Maiduguri market price. Time factor, however, was insignificant with Pulka market price.

4.5 Vertical market integration of Gum-arabic

The degree of price responsiveness of one market to the change in price in another market was used to measure the extent of vertical integration (Okereke, 1988). The inter-market price elasticity of demand may be positive or negative. An increase in the price of gum in one market may cause the price of gum in another market either to increase or decrease, depending on whether they are complementary and competitive markets. Table 4.7 shows the inter-market price elasticities of gum- arabic grades I and II in Borno State.

Table 4.7 Inter-market price elasticity of grade I gum arabic Market in Borno State, Nigeria.

Gum-arabic grades	Inter-market price elasticities			
	Maiduguri	Gubio	Monguno	Pulka
Grade I				
Maiduguri	-	0.86	-0.10	-
Gubio	0.86	-	0.24	-
Monguno	-0.57	1.3	-	-
Grade II				
Maiduguri	-	-	-	0.80
Pulka	0.81	-	-	-

Source: Field Survey, 2003.

Analysis of Table 4.7 shows that gum-arabic I inter-market price elasticities for Maiduguri/Gubio, and Maiduguri/Monguno were 0.86 and -0.10 respectively, and

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therefore, inelastic (less than one). Consequently, the markets were not vertically integrated. In the case of Gubio/ Maiduguri and Gubio/Monguno markets the inter-market price elasticities were 0.86 and 0.24 respectively. The prices were, therefore, inelastic and the markets were not vertically integrated. Monguno/Maiduguri and Moguno/Gubio inter-market price elasticities were –0.57 and 1.3 respectively. This shows that Monguno and Gubio prices were elastic, while that of Moguno and Maiduguri were inelastic. The low vertical market integration among the gum-arabic markets can be explained by the fact that increase or decrease in price of one market, especially in urban market (Maiduguri), was not passed on to other markets especially the rural markets (Monguno, Gubio and Pulka). Both rural and urban marketers, therefore, share in varying degree of any rise in price. Also, the reason might be the low level of price information and the transport bottleneck that hinders the flow of information from one market to another. The price elasticity between Moguno and Gubio markets can be explained by the closeness of the two markets, which facilitates communication.

The inter-market price elasticity for Maiduguri/Pulka and Pulka/Maiduguri for gum-arabic II were 0.81 and 0.80 respectively. This shows that these prices were inelastic (less than one). The markets were, therefore, not vertically integrated. The implication is that, there was no added value on grade II gum-arabic, as it moved from Pulka to Maiduguri and vice versa.

4.6 Factors Affecting Market Integration

The respondents' perception of factors affecting market integration of gum-arabic I and II were examined. The result is presented in Table 4.8.

Table 4.8 Respondents' perception of factors affecting market integration of gum-arabic (n=50).

Market Integration Factors	Percentage of respondents*
Nature of market	94
Government policy	76
Dissimilarities in production (supply shock, supply shed)	70

Source: Field survey, 2003.

* Multiple responses existed, hence total >100%

The analysis of factors affecting market integration shows that 94 % of the respondents were of the view that nature of market i.e price movement among markets affects the market integration. The lack of official, reliable and update market information, negatively affects gum market because the descriptive information on current market conditions (price, stock, demand, export promotion, training) is relevant for decision making by marketers.

The existence of different types of market also hinders market integration. Markets are classified according to the type of products (grade I, II, or III) traded, the degree of knowledge in the market, the number of participants and the ease with which marketers can enter the market. The ability of participants to influence the term of exchange depends, therefore, on these factors. For high integration between markets, there must be perfect competition. For instance, Maiduguri, Gubio, Monguno, Kukawa

and Pulka cannot be effectively compared because Maiduguri market appears to be more perfectly competitive, using the classification above than any other one.

Price instability is one of the important factors of market integration that negatively influences gum-arabic markets in Borno State. Marketers attributed this price fluctuation to the lack of information, the high fluctuation of middlemen number and the low level of government intervention. This discourages investment by gum-arabic dealers and causes income instability. Market integration is, therefore, disrupted between affected markets and other markets.

The study also shows that 76% of the respondents perceived government policy as having negative effects on price movement among markets. In Borno State, government fixes minimum price for gum-arabic. Prices of gum-arabic are not expected to fall below the ceiling price, although its implementation is still not effective. This is mostly because the arbitrating that ensures the application of rules and regulations in gum-arabic market is ineffective. This function of government or gum-arabic association is still very low or completely absent in the study area. In most cases, there is middlemen bias -a common held attitude that middlemen are not productive and frequently exploit the farmers and consumers with whom they trade. This attitude, obviously, lowers the level of market integration.

Also, 70 % of the marketers considered the dissimilarities in production as a factor that negatively affects the market integration in Borno State. These dissimilarities exist in different supply sheds and shocks of the product. The lack of homogeneity in gum-arabic quality is mainly due to the heterogeneity of its source

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(production area and species). For instance, Grade II gum-arabic produced in Maiduguri and Pulka have differences in quality, even if they are from the same specie. Soil components and other factors can explain such differences. This affects the grading and leads sometimes to the adulteration of the product. Also, gum-arabic supply in Borno State and in Nigeria in general cannot be forecasted because the production areas, quantities, capacity and quality are yet to be well estimated. The lack of knowledge in these areas, therefore, lowers the degree of market integration, since investment decisions cannot be appropriately made. Supply shocks, such as flooding, drought, cyclone, strike, diseases and pests influence the price movement among markets because these elements are found frequently in the areas, and affect the quantity of products which producers are willing to produce and sell at alternative prices.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   Summary

The study determined the market integration of gum-arabic in Borno State of Nigeria. The objectives were to determine the network, the price relationship of gum-arabic market as well as to estimate the extent of horizontal and vertical market integration and the factors affecting gum-arabic market in Borno State. Fifty marketers were interviewed in five important gum-arabic markets (Maiduguri, Gubio, Kukawa, Monguno and Pulka). The major findings of the study indicated that the market network of gum-arabic in Borno State was poor. Majority of gum-arabic marketers were agent middlemen (90) followed by merchant middlemen (44) in all the market studied. Other important intermediaries such as producers (11), facilitative agencies (10), exporters (6) and processors were very few and in some markets completely absent. The gum-arabic trade flows, therefore, had many intermediaries, but low degree of specialisation. The access to market infrastructure such as transport, information, and other market facilities were very low especially in Accessible Rural Market like Gubio, Moguno, Kukawa and Pulka.

Analysis of price relationship among markets shows that all the markets were significantly integrated. Prices in all the markets, therefore, had a long–run relationship, as they moved together. Time (seasonal variation) was significantly correlated with the price of all the markets, but the influence was very low for

Maiduguri than other markets. Time was also significantly and positively integrated with price as season moved from harmattan to hot season.

The result also showed that all the markets were horizontally integrated, except Monguno/Maiduguri and Maiduguri/Monguno markets. The extent of vertical market integration, measured by the inter- market price elasticity showed that only Moguno/Gubio for grade 1 gum-arabic market was vertically integrated. None of the grade II gum-arabic markets was vertically integrated.

Analysis of factors affecting market integration showed that 97%, 76 %, and 70% of marketers agreed that the nature of market, government policy and dissimilarities in production respectively, have negative effect on market integration in Borno State. These factors specifically include the lack of official, reliable and update market information, the existence of different types of market, and price instability.

5. 2   Conclusion

The evidence from the study shows that the market network in Borno State is very complex and poor due to the high number of intermediaries and the low level of specialization. The implication is a higher price and low quality of product as gum-arabic flows from the producer to the consumer. The lack of market network is made worse by absence of transportation facilities, flow of information, and access to market facilities such as grading, storage, training, and entry market authorization. This leads to low market integration (vertical and horizontal) among markets. The extent of market integration, which explains either long and short–run relationship between two markets, the co-movement of price in two markets and market efficiency, however,

varies from one market, to another due to factors affecting market integration such as nature of market, government policy, and the dissimilarity in production.

5.3   Recommendations

Based on the findings of the study, the following recommendations are made:

i.   There is need to reduce agent middlemen by assisting marketers with credit facilities and management advice to integrate their business vertically or by establishing strong bases in the urban centres.

ii.   There is need to improve the provision of basic market information especially on prices to motivate the private sector to invest in gum-arabic marketing.

iii. Improvement of storage, transport vehicle and other rural infrastructure in the producing areas will enhance the assemblage of produce.

iv.   Horizontal and vertical price variation will be enhanced if entrepreneurs can be encouraged to process gum-arabic.

v.   Marketers could be encouraged to engage in gum-arabic production to increase the stability of market supply shed and increase market integration.

vi.   Federal and State governments should regulate gum arabic business.

5.4   Suggestions for Further Study

i.   Researches should be conducted to estimate the quantity and the quality of gum arabic produced in Borno state to ascertain, the exact production capacity of State, Nigeria.

ii.   Researches should also be conducted to enhance and use improved varieties of gum-arabic.

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APPENDIX

DEPARTMENT OF AGRIC-ECONOMICS AND EXTENSION
FACULTY OF AGRICULTURE
UNIVERSITY OF MAIDUGURI

Questionnaire for gum-arabic sellers in Borno State

To Whom It May Concern,

Letter of introduction

I am a Master degree student of the institution named above undergoing a research on the Market integration of gum-arabic in Borno State.

I hereby seek your support and cooperation in gathering information needed for the study. The information will be treated with high confidentiality and used only for this study.

Your honest and accurate answers are, therefore, required.

Thanks for your anticipated cooperation.

Yours faithfully,

Djossi Nkapnang Isabelle

I. SOCIOECONOMIC CHARACTERISTICS

Tick as appropriate (√)

Age: ------

Gender:

a) male ( )   b) female ( )

Marital status:

a) single ( )   b) married ( )   c) widow ( )   d) divorce ( )

What is your education level?

a) primary ( )   b) secondary ( )   c) Quranic school( )   d) adult education ( )

e)tertiary ( )   f) university( )   g) no formal education ( )

II. MARKET NETWORK FOR GUM-ARABIC:

Name of market:

Are you full time gum-arabic seller ( )   a)Yes ( )   b)no ( )

What is your major occupation?

a) Farming ( ) b) Trading ( )   c) Fishing ( )   d) Others specify ( ).

How many are you in this market?...............

For how long have you been selling gum-arabic:................

a) less than 5 years ( )   b) 5-10 years ( )   c) above 10 years ( )

To whom do you sell your gum-arabic ?

a) Market ( )   b) Middlemen( )   c) Cooperative ( )

How much income can you obtain monthly for selling your produce?...... ....

Are you satisfied with the rate of you selling? yes ( )   b) no ( )

Which type of gum-arabic are you selling?

a) grade I ( )   b)grade II ( ) c)others (specify) ( )

Do you incur any transportation cost? a) yes ( )   b) no ( )

What is the main source of your product?

a) producer ( )   b)middlemen ( ) c) assembler ( ) d)others (specify) ( )

How often did the market seller visit you?

a) Daily ( )   b)Weekly ( )   c)Fortnightly ( )   d) Annually ( ) e) others
      (specify) ( )

From which market are they coming much to sell?

a) Maiduguri, ( )   "b)Gubio, ( )   c) Monguno ( ),   c) Kukawa, ( )

d) Pulka ( )   e)others (specify) ( )

From which market are they coming much to buy?

a) Maiduguri, ( )   b) Gubio, ( )   c)Monguno ( ),   d) Kukawa, ( )

e) Pulka ( ) f) others (specify) ( )

What is your monthly volume range of selling?................

III. FACTOR AFFECTING MARKET INTEGRATION

Are you aware of the information about the change of price?

a) yes( )   b)no( )

After being aware of the information what action have you taken ......

a) Seek more factual information about the idea ( )

b) Can do nothing ( )

What is the main source of you information?

a) Mass media(radio, television new paper) ( )

b) Extension service and the cooperative organization ( )

b) Friends and neighbors ( )

c) Dealer and sales man ( )

d) Others (specify) ( )
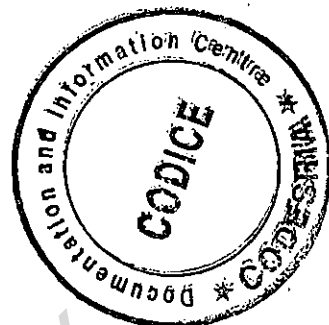
How often do you use the source of information?

a) seldom use (not often) ( )   b) often (many times) ( )   c)use it on every occasion ( )

d)do not use it ( )   e) others (specify) ( )

What are the other costs you incur?

a) storage ( )   b) grading ( )   c)packaging ( )   d)others (specify) ( )

Do you have any permission to buy and to sell gum-arabic? yes ( )   b)no ( )

Are your product supplied seasonally?

a)yes( )   b)no( )

If not what are the causes?

a) rainfall( )   b)disease( )   c)others (specify) ( )

What means of transport do you use?

a) lorries( )   b)pick up ( )   c) bicycle( )   d)Others (specify) ( )

Were you given a training course?

a) yes( )   b)no( )

If yes, do you consider the training course necessary?

a) yes ( )   b)no ( )

How often do you attain the training course?

a)Daily ( ) b)Weekly ( ) c) fortnightly ( ) d) annually ( ) e) others (specify) ( )

Below is a list of factors that affect the marketing of gum –Arabic

Please indicate your opinion by ticking the corresponding item:

1) strongly agree

2) agree

3) undecided

4) strongly disagree

5) disagree

Factors affecting market integration					
The commission agent are not cooperating with me					
Lack of persuasion by the informant					
The technology or the market infrastructure is expensive					
Instability of price policy					
Dissimilarities in production and supply shock in different areas					
Government policy					
Lack of standard measurement					
Lack of official, reliable and update market information					
Lack of effective arbitrating					
Transportation bottleneck					
Difficulty of access in supply area					
Lack of adequate lorries					
Different supplies shed					
Different type of market					