"Market Organisation and Consumers' Perception of Locally Produced Rice in the Ashanti Region of Ghana"

Master's Thesis submitted to The School of Graduate Studies – Kwame Nkrumah University of Science & Technology (KNUST), Kumasi, Ghana.

In Partial Fulfillment of the Requirements for the Master of Science Degree in Agricultural Economics from the Department of Agricultural Economics, Agribusiness and Extension, Faculty of Agriculture, KNUST, Kumasi, Ghana.

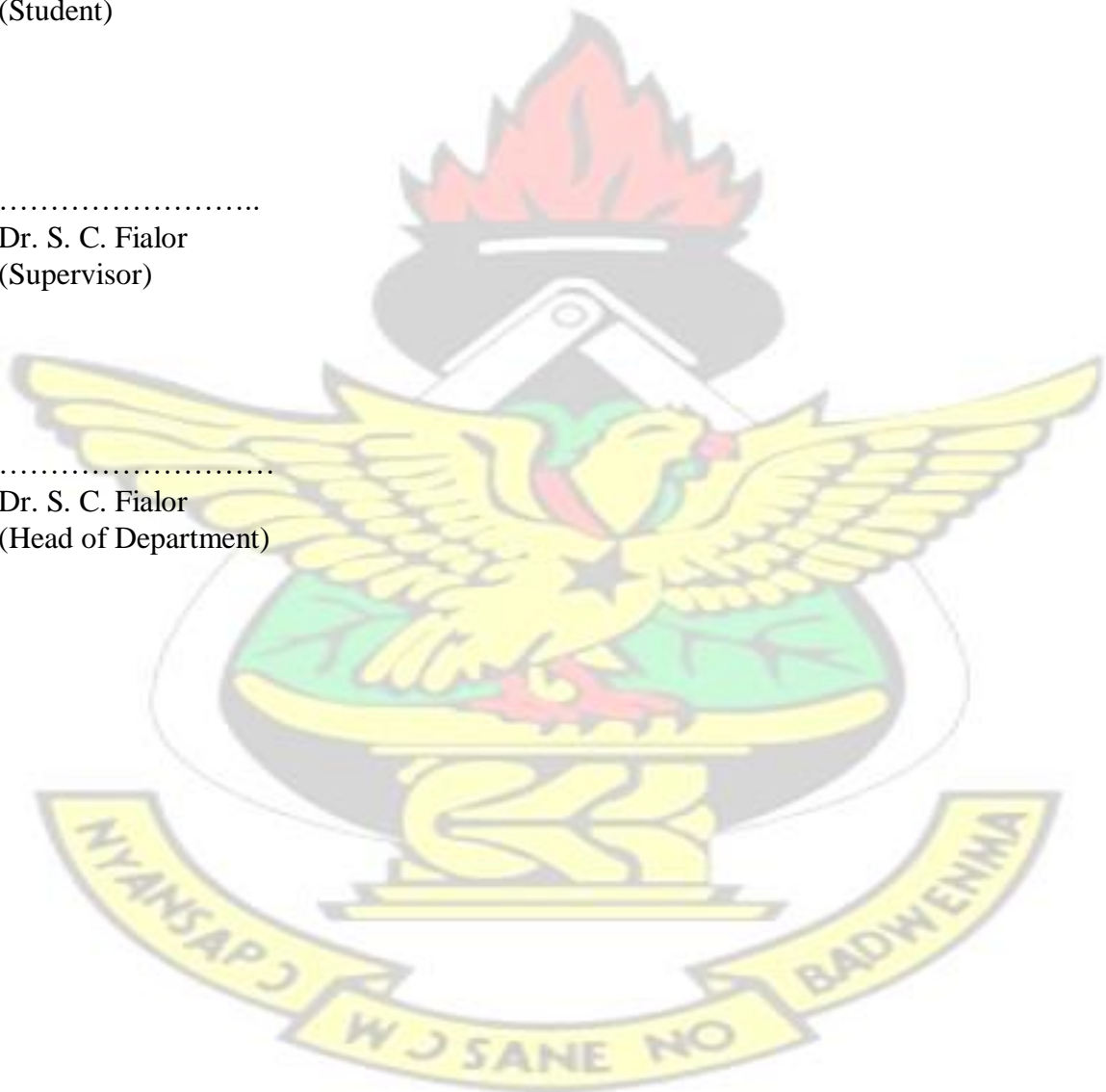**Francis Apori-Buabeng**

June, 2009.

DECLARATION

I, Francis Apori-Buabeng, the author of this thesis do hereby declare that apart from references to other people's works, which have been duly acknowledged, the research work presented in this thesis was done by me.

………………………..
Francis Apori-Buabeng
(Student)

…………………..
Dr. S. C. Fialor
(Supervisor)

………………………
Dr. S. C. Fialor
(Head of Department)

ACKNOWLEDGEMENT

ABSTRACT

Poor perception or attitude of consumers concerning local rice has adversely affected its production and consumption. It is general knowledge that there is a preference for imported rice and so local rice has a competitive disadvantage against imported rice. The question is, what factors account for the poor perception or attitude towards locally produced rice? This study was conducted to find out how the marketing of local rice was organised and coordinated in the Ashanti Region of Ghana. The study investigated the socio-economic profile of the market participants, the structure, conduct and performance of the local rice market, the perception or attitudes of consumers towards local rice. Information and data were collected from rice farmers, millers, paddy traders, wholesalers, retailers and consumers. The data were analysed using both descriptive and inferential methods. The descriptive method included the use of frequencies and percentages in analysing some of the trends or characteristics of the data. Kendall's Coefficient of Concordance (W) was used in the inferential analysis. The W was used to analyse the attributes of rice on which preferences were based by consumers. These attributes included colour, presence of stones or foreign material, taste, aroma or fragrance and cooking quality. Results indicated that at each level of the marketing chain, there were large numbers of sellers and buyers. None of the market agents controlled a sufficiently large share of the marketed volume, which they could use to influence prices to their advantage. Apart from their traditional roles, millers also provided other services such as loans and credit for farmers, and provision of storage facilities. Paddy traders also provided loans to farmers. Consumer ratings of local rice attributes that influence their choice depended on colour, aroma, stickiness, tastes, absence/presence of foreign materials, expansion and percentage of broken rice. Constraints identified were nonuniform weights and measures, inadequate information, difficulty in accessing transportation in the remote areas and difficulty in accessing loans. To help improve the system, it was recommended that the milling machines be provided with de-stoners to improve the quality of local rice. Provision of adequate market information and improved road network in the remote areas were also recommended.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Rice has become an important staple food in Ghana and per capita consumption is increasing steadily. The per capita consumption between 1980 and 2005 is estimated to have increased from 12.4 kg/year to 15.1 kg/year (MOFA, 2009).

Since the 1970s, efforts have been made by various governments to develop the rice industry. Such efforts have proved unsuccessful due to a lot of limiting factors, among them, lack of research and extension support, inappropriate production system, inadequate basic infrastructure and inappropriate marketing strategy.

Between 1989 and 1996, there was a steady increase in rice production at the rate of 13% per annum due to area expansion and yield increase from 0.9 kg/ha to 2.4 kg/ha (MOFA, 2009). Despite the increases in production, importation of rice continues to increase currently reaching the tune of $200 million per annum. It is the government's objective to reduce rice importation by 30% by increasing local production.

Since the present production levels are low, there exists a high potential for increasing the production of rice to the level of self sufficiency, considering for example, the fact that in 1976 the country achieved 99.2% sufficiency due to the Operation Feed Yourself concept by the then government (Bimpong, 1998).

The West Africa Rice Development Association (WARDA) in its bid to increase rice production in West Africa and in Ghana in particular has since the year 2000 been undertaking an extensive research into the rice industry in the Ashanti region. It is from that research that this study is derived, through investigating the marketing aspects.

1.2 Overview of the Rice Industry

Rice production has been recognized as an important factor in the development of the agricultural sector for the improvement of the overall national economy since the nation

attained independence in 1957. Various governments have supported rice production by adopting various measures with incentives for increasing food production for the achievement of food security objectives.

The trend in rice production in Ghana over the years has been influenced by changes in both the area cultivated and productivity. Below, in Table 1.1, is the trend over the period 1970 to 2008:

TABLE 1.1 AREA AND PRODUCTION OF RICE IN GHANA 1970 – 2008.

YEAR	AREA ('000 HA)	PRODUCTION ('000 MT)
1970	55.0	48.8
1971	60.7	54.9
1972	70.0	70.1
1973	66.5	62.0
1974	66.0	73.2
1975	78.5	71.1
1976	77.0	69.8
1977	61.4	62.9
1978	58.8	60.8
1979	60.7	63.0
1980	64.5	64.1
1981	46.0	43.6
1982	43.8	37.1
1983	38.6	26.9
1984	68.8	76.0
1985	87.0	80.0
1986	76.1	69.6
1987	72.0	80.7

1988	116.6	105.0
1989	74.4	67.0
1990	88.3	81.0
1991	94.9	150.9
1992	79.7	131.5
1993	77.2	157.4
1994	80.9	162.3
1995	99.9	221.3
1996	105.3	215.7
1997	117.7	197.1
1998	130.4	281.1
1999	105.3	209.8
2000	93.6	214.6
2001	88.0	253.2
2002	122.8	280.0
2003	117.7	239.0
2004	119.4	241.8
2005	120.0	236.5
2006	125.0	250.0
2007	108.9	185.3
2008	132.8	301.9

SOURCE: STATISTICS, RESEARCH AND INFORMATION DIRECTORATE, MOFA.

During the seventies, rice production was relatively stable with a peak of 73.2MT in 1974. In the early eighties, production dropped steeply but from 1984, production increased reaching a peak of 301.9MT in 2008. In spite of appreciable level of increases in the production of rice over the years, its importation has also increased as shown below in Table 1.2:

TABLE 1.2 QUANTITIES AND VALUE OF RICE IMPORTS.

YEAR	QUANTITY (MT)	VALUE ($ MILLION)
1991	218,665	59.97
1992	216,142	57.56
1993	268,937	29.87
1994	281,112	54.73
1995	104,267.2	24.36
1996	99,775	65.84
1997	76,074	53.22
1998	182,830	106.04
1999	241,610	95.00
2000	187,256	65.03
2001	311,513	72.46
2002	296,953	68.85
2003	797,705	124.66
2004	253,905	119.15
2005	484,513	138.94
2006	389,660	159.47
2007	442,073	157.86
2008	395,400	187.28

Source: Ministry of Trade & Industry, Accra.

Currently, the country has a self-sufficiency level of 30%. This is in part due to the present low national average rice yield of 2.4Mt/Ha compared to the achievable yield of 6.5Mt/Ha (MOFA, 2009). This low self-sufficiency level has caused the nation to depend on large imports to meet domestic demand.

In Ghana, two broad categories of rice are grown. These are the *Oryza glaberima* and *Oryza sativa* varieties. The *glaberima* is the common local species with many varieties, often reddish brown in colour and invariably short grained. The *sativa* varieties were imported from Asia and covers all the "improved" varieties grown in Ghana. Rice is produced under four main systems:

1) Upland System

   This system depends on precipitation without flooding of the fields. It covers an area of 10,000ha with production of 13,500mt of paddy and constitutes 7% of the total rice output. The average yield on farmers' fields is about 1.2mt/ha.

2) Midland / Hydromorphic System

   This depends on both precipitation and groundwater, with periodic flooding of the field. It covers an area of 63,000ha and yields 94,000mt of paddy, constituting 54% of the total rice output. In this system, water management is limited to field flooding. The average rice yield is 1.5mt/ha.

3) Lowland / Inland Valley Swamps / Flood Plains System

   This depends on precipitation, ground water and flooding from simple water management interventions such as bunds and canals. It covers an area of 20,000ha with the production of 36,000mt of paddy and constitutes 21% of the total rice output. The average yield is 1.8mt/ha.

4) Irrigated System

   This is dependent on intensive and often large-scale water management schemes and is capital intensive with mechanical pumping or sprinkler and gravity – command system. It covers 7,000ha with the production of 31,500mt of paddy and constitutes 18% of the total rice output. The average yield is about 4.5mt/ha (i.e. ranges from 3.5-6.0mt/ha).

The different types of farm mechanization practices in rice production in Ghana include the use of the following:

(i)   Heavy machinery such as tractors, bulldozers and combine harvesters in northern Ghana.

(ii)   Light machinery such as power tillers in the south. (iii) Animal traction with bullocks in northern Ghana.

Mechanized farming with heavy machinery for rice farming has been practiced in Ghana since 1930 and was promoted extensively in the 1960s and in the 1970s when the government of the day launched the Operation Feed Yourself Programme with the declaration of Northern Ghana as the 'Granary of the nation'. Power tillers are used for land preparation for rice cultivation in the Eastern, Greater Accra, Ashanti and Western Regions. Draught animal used by smallholders for land preparation are common in Northern Ghana.

Mechanized rice harvesting is practiced in the northern sector of the country where combine harvesters are used. In southern Ghana, the manual use of sickles or small-scale reapers for panicle harvesting dominates. The relatively low moisture content of paddy at harvest (on account of high day temperature and low relative humidity) causes grain breakage resulting in low milling out-turn; parboiling is an essential feature of rice milling in northern Ghana.

Rice mills in Ghana may be classified as small plant size mills (with less than 0.5 ton per hour capacity), medium size mills (with capacity of up to 1ton per hour), or large mills (with capacity of 1-4tons per hour). In general, the milling out-turn ratio of non-parboiled rice is about 50-60% whereas that of parboiled paddy is about 70%.

1.3 The Importance of Rice in the Economy

Dietary habits in Ghana show a shifting tendency towards rice. As such rice is becoming an increasingly important staple food consumed throughout the country. It has been estimated that between 1980 and 2005, the per capita consumption of Ghana increased from 12.4 to 15.1kg/year (MOFA, 2009). This growing trend in the consumption of rice is

attributed to increasing population, rapid urbanization, the relative ease of cooking and preservation and the development of the rice trade as a result of trade liberalization.

Rice is central to Ghana's economy and agriculture, accounting for nearly 15 percent of the total Gross Domestic Product (Bimpong, 1998). Under the Vision 2020 perspective plan, rice production is expected to play a key role in achieving national food security, alleviating rural poverty and contributing to the overall economy through import substitution and conservation of foreign exchange. The value of Ghana's rice imports currently stands at $ 200million per annum. If the government's rice import substitution policy proves successful, the nation will save substantial foreign exchange apart from the job opportunities resulting from backward and forward linkages.

1.4 Problem Statement

Over the years, marketing of agricultural produce in Ghana has not been given the due attention that it requires. As Kinsey (1988) noted, marketing is undervalued and often ignored. Always consisting of intangible activities, which are difficult to quantify, marketing is frequently attacked as a parasitic function, standing between the consumer and producer and draining the system of vitality. Production is consequently considered more respectable than distribution and middlemen are regarded with suspicion. Marketing is often considered irrelevant under the product-orientation of many developing countries where there is a sellers' market and the associated characteristics of scarcity among others. Sadhu and Singh (1995) advice that, "marketing is as critical to better performance in agriculture as farming itself and should be treated with equal care". To understand the current market situation concerning local rice, its market organization must be investigated. The main questions to be dealt with are: Who are the main market participants? How are they (participants) organized? How do they conduct business? What are their functions?

Currently, the nation is only able to supply a third (1/3) of its domestic demand for rice, the remaining two thirds (2/3) being imported. Through effective marketing, output and consumption of local rice can be increased. As noted by Abbot (1993), an efficient marketing sector does not merely link sellers and buyers and react to the current situation

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of supply and demand. It also has a dynamic role to play in stimulating output and consumption, the essentials of economic development. It guides farmers towards new production opportunities and encourages innovation and improvement in response to demand and prices. Its dynamic functions are thus of primary importance in promoting economic activity and creating employment. For this reason, Drucker (1958) noted that an efficient marketing sector could be described as the most important multiplier of economic development. Under the Vision 2020 perspective plan, rice production is expected to play a key role in achieving national food security, alleviating rural poverty and contributing to the overall economy, through import substitution and conservation of foreign exchange. Currently, the nation spends $200million on rice importation annually. If the government's objective of reducing rice imports by 30% is to be achieved, the marketing of local rice should be seriously looked at and appropriate strategies adopted.

Poor perception or attitude of consumers concerning local rice has also adversely affected its production and consumption. It is general knowledge that there is a preference for imported rice and so local rice has a competitive disadvantage against imported rice. The question is, what factors account for the poor perception or attitude towards locally produced rice? As indicated by Kohls and Uhl (1990), consumers are the only ones with insight into their own preferences and values. Wierenga (1980), noted that one most important characteristic of marketing in general is its "customer orientation". For the successful marketing of agricultural and food products, knowing the consumers' perceptions and preferences is an essential requirement. Consumers can choose from a great variety of different products to meet their nutritional needs and it is important to know how these choices are made and how consumer wants and preferences can be better met. Also eating habits and tastes are constantly changing because of changes in life style, changes in occupation, consumer education, cultural trends, etc. The suppliers of food products should be well aware of these changes and detect them as early as possible.
If the perceptions or attitudes of consumers towards local rice could be positively influenced through effective marketing, its production and consumption could be significantly increased.

It is principally regarding these issues of low level of production and low consumption of local rice that the writer seeks to research into its market organization and the perception consumers have towards locally- produced rice.

1.5 Objectives of Research

The main objective is to analyze the organization and coordination of the marketing system and the perception of consumers towards local rice in the Ashanti Region.

To achieve the main objective, the following sub-objectives have been set:

(i)   To analyze the socio economic profile of respondents,

(ii)   To investigate the structure, conduct and performance of the local rice market,

(iii)   To estimate the volume of flow along the marketing chain,

(iv)   To investigate the perception or attitudes of consumers towards local rice, (v) To identify constraints faced by market participants.

1.6 Justification of the study

If the objectives of this study are achieved, it is expected that the main market players will be identified and the system will be better understood. The study will expand the knowledge base on the market organization of locally produced rice in the Ashanti region. It will also enrich the on-going policy discussions and programme initiatives directed toward the rice industry. In-depth knowledge about the participants and their respective functions will enable policy makers to know which group to target for effective implementation of interventions. As noted by Kohls and Uhl (1990), the overall ruler and coordinator of marketing activity in a private enterprise economy is the consumer. 'The goal of the food system is to satisfy consumers. The final success of food production and marketing decisions hinges on consumer choices, no matter how irrational, ill-founded, or unfortunate'. If the perception or attitudes of consumers towards locally produced rice are well understood, measures could be taken to reduce the negative ones while enhancing the positive ones. This, it is expected, will equip policy makers and marketers with the right

tools to effectively combine the marketing mix to favourably influence the demand and consumption of locally produced rice.

1.7 Organisation of the Study

The study is organised into five (5) chapters as follows:

Chapter one presents background to the study, overview of the rice industry, the importance of rice in the economy, the problem statement upon which the research was conducted, study objectives and justification.

Chapter two reviews literature relevant to the issues raised in the problem statement and related works done by other researchers in the past, while Chapter three deals with research methodology. The methodology includes method of data collection, sample and sampling techniques, and analytical procedure.

Chapter four presents the results of the analysis and discusses them while conclusions based on the results obtained and recommendations are presented in Chapter five.
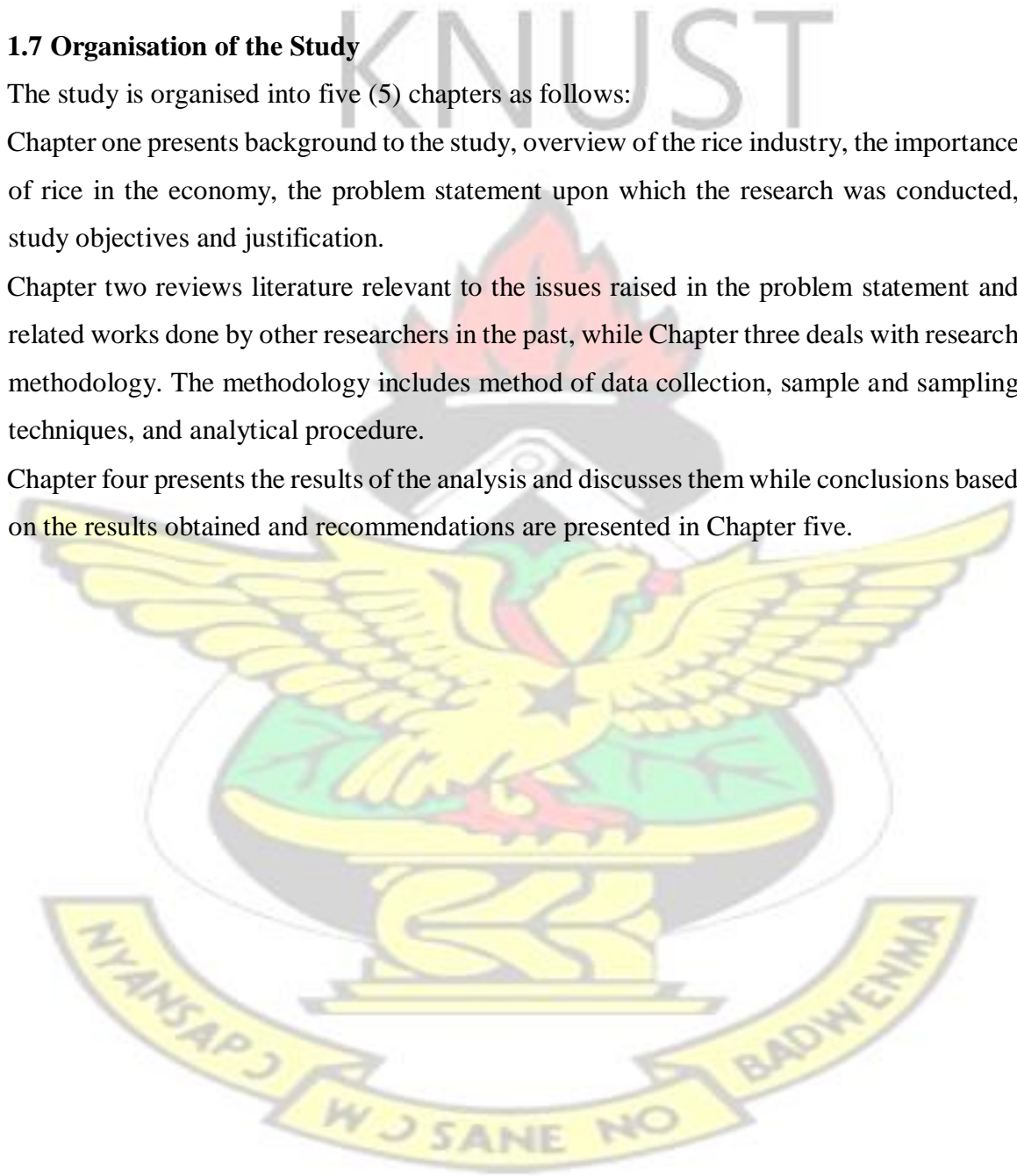
CHAPTER TWO

2.0 LITERATURE REVIEW

In this chapter, literature relevant to the issues raised in the problem statement and related works done by other researchers are reviewed.

2.1 The Importance Of Rice In An Economy

Rice, according to Singh (1985), is the foremost food of the developing world. It provides about 4/5 of the calories of the more than two billion people of Asia and 1/3 the calorie intake of the nearly one billion people of Africa and Latin America. Singh further notes that food self-sufficiency and food security in majority of the Asian countries largely depends on rice self-sufficiency and rice security. Many countries including Bangladesh, Thailand, Pakistan and Vietnam have their economies sustained largely through rice production. Such countries earn foreign exchange from the export of rice.

Brown (1993) wrote that the boosting of the rice industry in Malaysia has been an important source of foreign exchange savings as well as a means of channelling wealth to a poor sector of society and of providing against a rice shortage in the event of regional or national political crisis.

Francesco (1994) in a study about self-sufficiency in rice production notes that the growth of the Bangladeshi rice production and market development has induced positive outcomes such as the relatively stable food grain price environment and the declining incidence of poverty in the Bangladeshi economy. He further notes that the incidence of malnutrition has also shown improvement.

2.2 Definitions of Marketing

According to Barker (1981) marketing is an emotive subject, with a wide range of viewpoints concerning its scope and importance. It is the collective term used to describe exchanges between buyers and sellers, who are attempting to maximize profit or subjective

utility. It may be thought of quite simply as the process of making goods available for consumption.

There is no universally accepted definition of marketing, indicating the variety of opinions, which exist concerning the subject. Terpstra (1978) offers a very broad definition of marketing as "the collection of activities undertaken by the firm to relate profitability to its markets". Kempner (1976) is similarly vague. "Marketing is the process in a society by which the demand for economic goods and services is anticipated or enlarged, and satisfied through the conception, physical distribution and exchange of such goods and services". Kotler (1972) gives a very concise definition, in so much as "marketing is the set of human activities directed at facilitating and consummating exchange". Kotler suggests that there are three elements, which must be present in order to define a marketing situation. These are:

(i) two or more parties potentially interested in exchange; (ii)

    each party possesses things of value to the other(s); (iii)

    each party is capable of communication and delivery.

Rodger (1971) offers a definition of marketing which is applicable to most marketing systems. "Marketing is the primary management function which organises and directs the aggregate of business activities involved in converting consumer purchasing power into effective demand for a specific product or service and in moving the product or service to the final customer or user so as to achieve company-set profit or other objective".

Agricultural marketing is often regarded by observers as having a certain associated mystique. The definition of marketing, which is most applicable to agriculture, is given by Kohls (1968). "Marketing is the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the ultimate consumer".

Kohls and Uhl (1990) have narrowed it down to food marketing as "the performance of all business activities involved in the flow of food products and services from the point of

initial agricultural production until they are in the hands of consumers". According to them, food marketing is the physical and economic bridge which links raw material production and consumer food purchases. It involves a set of interdependent decisions, investments, institutions, resource flows and physical and business activities.

Abbot (1987) also defined marketing as "the business activities associated with the flow of goods and services from production to consumption". According to him, the marketing of agricultural products begins on the farm, with the planning of production to meet specific demands and market prospects. Marketing is completed with the sale of the fresh or processed product to consumers. Agricultural marketing also includes the supply, to farmers, of fertilizers and other inputs for production. Marketing tasks and responsibilities may be summarized as follows:

     (a) finding a buyer and transferring ownership;

     (b) assembling and sorting;

     (c) sorting, packing and processing;

     (d) providing the finance for marketing and risk-taking; (e) assorting and presenting to consumers.

Abbot (1987) asserts that enterprises must be able to arrange assembly from farms; packing and presentation in appropriate containers; sorting according to buyers' requirements; transport to buyers' depots or markets which they attend; storage to extend the availability of seasonal commodities and processing to extend the time and range of sales outlets.

2.3 Organization of Marketing

The marketing chain in West Africa, according to La-Anyane (1988), has been short but operation of a more efficient system, which would involve the elimination of duplicated retail services and high cost of credit, consumption will be enhanced through the lowering of retail prices, without any comparable reduction in the prices received by the farmers. The problem is not only one of eliminating unnecessary services; but it relates also to cost of required services. These costs are unduly high because of poor roads, inadequate transport, lack of credit and knowledge of supplies.

La-Anyane (1988) notes that in areas where it is difficult to obtain transport, farmers have no choice but to sell to any private buyer who approaches them. The private trader's hold on the farmer is strengthened by his role as a supplier of credit. From this vantage position, he can often dictate to the farmer the time and place of sale and the price of the commodity. All these conditions have tended to raise costs to the consumer and lower prices to the farmer, thus discouraging increased production. Contrary to the generally accepted view that inadequate infrastructure, transport and credit facilities are the main handicaps in marketing foodstuffs, it is claimed that the problems of agricultural marketing that really require scrutiny are not those related to the reduction in the costs of transportation, storage and processing, but rather how best to help the existing marketing system to perform its pre-eminent task of allocating scarce resources, i.e. roads, transport and capital or credit. The effort should be focussed on improvement of the marketing system in areas of concentration of production, that is, in areas that derive natural comparative advantage from the production of particular food items.

2.4 Food Wholesaling

Alexander (1960) defined a wholesaler as follows; "a business unit which buys and resells merchandise to retailers and other merchants and/or industrial, institutional and commercial users, but which does not sell in significant amounts to ultimate consumers". The chief function of the wholesaler is to assemble the output of many producers into an assortment, which is of potential interest to buyers, and breaks their bulk so as to meet the scale of the need of the customer. In agriculture, the wholesaler plays an important part in the marketing of produce, usually existing as the next link in the chain (Barker, 1981).

Food wholesaling, according to Kohls and Uhl (1990), is a major step in the dispersion activities of marketing. Essentially, the food wholesaler operates between the food processor and the retailer. The food retailer stocks relatively small amounts of items. Retailers, who are primarily interested in the problems that arise from servicing their customers, could not possibly search out and deal with the producer and processor sources

of all their products. To assemble efficiently these various products in reasonable quantities from the relatively specialized processors and sell them in smaller quantities is the job of the food wholesaler. Thus, the wholesaler is a focal point in the food distribution system.

2.5 Grading

Agricultural output is typically heterogeneous in quality, as a result of a number of factors. Grading is the process of segregating such heterogeneous supply into smaller, more homogeneous groups (Barker, 1981). The homogeneity will be in respect to specified quality characteristics.

According to Barker (1981), grading can be of benefit to both the farmer and to consumers of agricultural products. Consumers can increase their satisfaction by obtaining with certainty the particular qualities they prefer, to the exclusion of those they do not desire, and farmers can, potentially, increase their returns by taking the maximum advantage of buyers' quality preferences. Other effects of grading include the following:

(i)   grading enables selling by description to take place, providing a basis for the advertising and promotion of standardized products;

(ii)   grade standards are essential if futures trading is to take place in a commodity;

(iii)   grading is particularly useful if the produce of a number of farms is pooled and marketed collectively;

(iv)   grading provides a basis for improved market intelligence;

(v)   grading can be used to educate farmers in the improvement of output quality.

Barker goes on to indicate that it is advantageous if grades can be clearly marked on the product, and can be easily recognized at all levels of the market. Orders can be placed in advance in terms of specified grades which are important to the ordinary consumer rather than on the views of technical experts.

2.6 The Role of Government in Marketing

Governments have an important role in regulating the market mechanism to ensure efficiency, equity and macro-economic stability (Scarborough and Kydd, 1992). Abbot

(1987) has noted that a far-sighted government will orient its overall policy frame towards growth of those enterprises that are able to take on the necessary marketing responsibilities and will establish and maintain a favourable economic and political climate for this to happen. Major factors are: freedom to start up and operate a marketing enterprise, access to transport, banking and other commercial services, maintenance of reasonable law and order, and confidence in their continuity. Governments through regulatory action and support services can assist the development of a freely working marketing system. Most governments also see some direct intervention to be in the public interest.

Abbot asserts further that marketing proceeds more smoothly and cheaply when the central local government is able to protect those involved against violence, theft and extortion. The use of weights and measures and quality descriptions understood by market participants reduces the area of disagreement and allowances that must be made for risk or fraud. Public provision for the enforcement of contracts and penalties for noncompletion is a basic requirement. Provision and maintenance of roads, bridges and other needs of transport, together with communication services, are the services to marketing that are expected of a government.

Scarborough and Kydd (1992) have suggested that continual liaison between the government, the parastatal and the private sector will be required, in order that traders are able to formulate expectations on future scarcities which are rationally based, and which induce socially beneficial actions by traders. Measures will be needed to ensure that parastatals are technically and operationally efficient in performing the reduced agenda of tasks. This may involve the development of:
- Improved management within the parastatals;
- Measures to prevent their continued use as mechanism of political patronage
- Improved systems of operational and financial performance targeting and monitoring and
- The linking of management remuneration to performance.

In promoting an efficient private sector, in general, it seems that government agencies will have a role in:

- Encouraging and policing competition;
- Promoting wider availability of information;
- Maintaining appropriate quality standards;
- Strengthening the legal system to ensure enforceability of contracts;
- Providing an adequate infrastructure;
- Undertaking spatial planning to allow appropriate access by marketers and consumers to central places;
- Supporting the development of credit;
- Research into the technological problems in storage and processing experienced by the private sector; and
- Training in technical and managerial aspects of marketing, processing and storage.

2.7 Marketing Infrastructure

Marketing infrastructure include the set of transportation, communication, credit, and storage facilities that allow a smooth and reliable functioning of the markets (Singh and Sadhu, 1988). Hill and Bender (1995) also define market infrastructure as referring to those institutions, regulations, and physical facilities necessary to minimize the cost of obtaining information about market opportunities, negotiating contracts, consummating transactions, and enforcing transactions that have been consummated.

Roads, transport, storage and distribution facilities, processing technology, means of communication and information are essential if marketing initiative is to have an impact on a poor underdeveloped area (Abbot, 1993). It has been suggested that poor marketing linkages between rural producers and urban consumers due to inadequate infrastructure and inefficient market system might have accelerated imports in some developing countries (Jabber *et al.*, 1997). Although discussions about market infrastructure most frequently focus on transportation and communication systems and commodity exchanges, the concept is much broader and includes such things as pricing mechanisms, market

information, and a legal system for arbitration of disputes and enforcing contracts. Either private or public institutions may provide many of the elements of market infrastructure.

One of the important components of the infrastructure necessary for the growth of agriculture marketing is communication and transport (Singh and Sadhu, 1988). At present, there are many rural areas, which have not been connected with the main marketing centres either by road or by telephone. Unless the consumer and producer are the same person, transportation of the goods from the production point to the consumer is also an essential function. Agricultural products must be assembled from many producers located over a wide geographical area and distributed to a large number of consumers often scattered over an even greater geographical area. Berman (1980) states that by its nature agricultural production tends to be dispersed, so access to market and inputs is often a constraint. For market development to occur, rural areas must be effectively linked, in terms of information and infrastructure.

While it is always desirable to transport an agricultural commodity as far away as possible to a more remunerative market, it is equally important for the products to reach the consumers at the proper time. In both cases, transport plays a crucial role. An efficient transport system enables products to reach markets far and wide and also without losing any precious time (Singh and Sadhu, 1988).

2.7.1 Roads and Transport Services

Ahmed and Rustagi (1987) have stated that a major cause of marketing problems often lies in defective infrastructure, particularly roads and transport services. They further reported, "estimates show that more than half the higher marketing costs in Africa in comparison with those in Asia are due to inadequate marketing infrastructure". Many roads have been inadequately maintained with the result that transport costs have increased; many governments have been unable to provide the necessary maintenance. Feeder roads have deteriorated and truckers are refusing to go into rural areas because of the high cost involved. Singh and Sadhu (1988) have also noted that most roads in rural areas are bad

and inaccessible in the rainy season. Besides inadequate transport facilities, transportation costs are high and are beyond the reach of many small and marginal farmers and traders.

Inadequate transport facilities are largely responsible for the slow increase in marketing efficiency and for continuing subsistence farming in many areas. This problem has many dimensions. In some cases, there are insufficient vehicles to carry goods to the rural markets and from the rural markets to the towns. In other cases, transport accounts for a large proportion of marketing costs. In some instances, there are no roads or where they exist, they might be seasonal; feeder roads are usually few and, in most cases, have to be constructed and maintained by communal efforts (Adegeye and Dittoh, 1985).

Abbott and Makeham (1990) have noted that many agricultural producers are still confined to village markets, and will remain so until appropriate transport facilities make other outlets accessible. According to Coleman and Young (1989), population densities in Africa are recorded as substantially less than in Asia, hence road networks are not as intensive, transport services are less frequent and more costly, and average haulage distances are greater. Many places are cut off from markets for their produce during certain season. There are many more places where the cost of transport over bad roads and the time it takes, inhibit marketing of more valuable perishable products (Abbott, 1993). A study in Ethiopia showed truck charges over earth roads with deep gullies and wet spots five times those over tarmac. In Zimbabwe, with a relatively good road system, the limit to lower cost group purchasing of fertilizer is set by accessibility by a loaded vehicle. Hill *et al*., (1995) have reported that marketing costs would be reduced as transport service and cost between producing and consumption and processing regions improved. An improvement in transportation technology causes transportation cost to decline (Cramer *et al.,* 1979). This reduction in transportation cost translates into a fall in retail price.

Jaffee and Morton (1995) report that private processors and traders endure substantial risks, incur considerable costs, and face more general constraints in market development as a result of the inadequate, underdeveloped and sometimes dilapidated state of transport and communications infrastructure in Africa. They further state that infrastructural problems

are a major constraint on physical commodity movements and on trader communications within their own country.

2.7.2 Grain Storage

According to Kohls and Uhl (1990), one of the principal marketing decisions of the grain producer is whether to sell at harvest time or to store for sale at a later date. If it is decided to store the grain, the next questions are where and for how long it should be stored. In answering the question of whether to store, the farmer must balance the costs of storing the grain against the possible gains from a rise in price later on in the season. Two factors besides the normal seasonal price rise must be considered. One of these is the possibility of taking advantage of the government price-support programs. The other consideration is the outlook for the general movement of prices during the storage period. If the general price level is expected to move downward, sales at harvest may be much more attractive to the producer than if the general level is expected to move upward.

Another question for the farmer is where to store the grain. The growth of on-farm grain storage is a form of vertical integration for farmers. It provides them with marketing flexibility, gives them additional opportunities for earning conditioning and storage profits, and, overall, increases the farmer's role in the grain marketing process. For onfarm storage, producers face a number of costs. There are certain fixed costs that must be met whether grain is stored or not. These include the depreciation, maintenance, insurance, taxes, and interest on the capital invested in the available storage facilities and equipment. Then there are several variable costs that will occur only if grain is stored. These will include the costs of shrinkage and loss from damage, interest, insurance and taxes on the grain, any expense of treating or conditioning the grain, and the cost of the labour and transportation expenses resulting from the storage operation.

Abbot (1987) has also indicated that how long to hold produce during marketing depends on the increase in price that will be obtained by selling it later, and the cost of holding it. Storage costs are made up of three main components:

- the rent of the storage facility;

- physical losses and deterioration of the product while in storage;

- interest on the capital represented by the value of the produce in storage.

Losses on grain can be brought down to very low levels by drying before storage, use of insecticides, etc. Nevertheless, for storage of grain over eight or nine months to be economic, a seasonal price increase of 17 to 20 percent on the initial value is generally needed, depending on the conditions and interest rates applicable.

2.7.3 Distribution

Distribution, according to Meulenberg (1997), is a basic activity in the marketing of goods and services; and it has indeed been a core element of marketing theory right from the beginning. Indeed, one of the first scientific papers on marketing was entitled "some problems in market distribution" (Shaw, 1912). Distribution, Meulenberg noted has become a marketing activity which is integrated in a total marketing plan and that is concerned, among other things, with the choice of a marketing channel, logistical planning, and relationships with clients. Distribution as a marketing function is concerned with adapting supply to demand as far as time and place are concerned. In marketing commodities, such as wheat, distribution, can be considered the central marketing activity, whilst in the marketing of branded food products, distribution is a marketing instrument integrated within a marketing policy.

Distribution is particularly important in agro-food marketing for several reasons. According to Meulenberg, some of these are:

(i)   agricultural products are grown in specific climatological zones or on special types of soils, while food consumption is concentrated in urban areas,

(ii)   products are perishable and therefore require special transport and storage,

(iii) seasonal production has to correspond with a consumption pattern that extends over a long period of time,

(iv)   because there are many small product suppliers and consumers in agricultural and food markets, considerable efforts goes into collection, regrouping and dispersing products.

Distribution of agricultural products can be described according to Alderson's "sorting principle". Alderson (1965) distinguished four successive types of sorting in marketing operations:

(i)   sorting out – breaking down a heterogeneous collection of information into several homogeneous groups,

(ii)   accumulation – building up larger homogeneous collections,

(iii) allocation – breaking down homogeneous groups into smaller, homogeneous groups and,

(iv)   assorting – building up of heterogeneous collections which suit the needs of specific customers.

Fulfilling these distribution functions creates time, place and possession utilities.

The share distribution assumes in total food expenditure is increasing, partly because of increasing consumer demand for services and a growing quality consciousness amongst consumers. In the Netherlands for instance the share of distribution in total consumers food expenditure increased from 35% in 1961 to 45% in 1988.

The distribution of agricultural products differs according to the type of product and the stage of market development concerned (Meulenberg, 1997). According to him, methods of distribution are related to differences in perishability and exclusiveness as well as the processing required by some agricultural products. Fresh produce such as fruits, vegetables and fresh meat need rapid and refrigerated transport in order to preserve product quality. In less developed economies, for example, the distribution of agricultural products is primarily concerned with market transparency and the efficient performance of physical functions. Distribution serves routinized consumption by making products available to the consumer in the right time and place, and that in sophisticated markets, distribution should also stimulate demand by making products available at a specific place and time. Thus, distribution objectives are attained by performance of the exchange functions, buying and selling, the physical functions, storage and transport and facilitating functions, market information, grading, sorting and credit delivery. Performance of these market functions is

facilitated in agricultural markets by a good infrastructure of roads, railways systems communication systems and markets.

Evans (1992) identified six major channels of marketing distribution. Each channel or chains of distribution is not necessarily the route taken by the products as they pass from producer/manufacturer/importer to the final consumer but is specifically the route taken by the legal title to the product. The journey taken by the products is called the physical movement. Depending on the nature of products handled and some other factors, a firm can choose a combination of the six major channels of marketing distribution.

1. Producer/importer _____ final consumer direct
2. Producer/importer _____ retailer __ final consumer
3. Producer/importer ____ wholesaler ____ retailer ____ final consumer
4. Producer/importer ____ voluntary chains wholesaler __ retailer __ final consumer
5. Producer/importer __ agent__ retailer ___ final consumer
6. Producer/importer ── industrial distributor ── final consumer

2.7.4 Market Information

Brein and Stafford (1968), have defined market information or intelligence as the collection, interpretation and dissemination of large variety of data, necessary for the smooth running of the market system. Adequate information on demand, supply and price conditions are necessary in a form that is easily understood by traders, consumers and farmers if foodstuffs and vegetables are to be distributed efficiently.

Market information tells producers and traders where and when there is a demand for a specific product (Meulenberg, 1997). As such it is an essential ingredient in every distribution operation. In less developed economies, Meulenberg asserts that this information is scarce and setting up market information services is often a first step towards effective and efficient distribution.

According to Schiefer (1997), the prime focus of the market information systems was, and very much still is, the support of market analysis for policy development. However, moves towards market deregulation and increasing competition in the saturated markets of the agro-food sector make the sector's industry increasingly dependent on its own marketing management activities and the availability of Market Information Systems (MAIS) which could provide appropriate marketing decision support. Traditionally, the provision of marketing information for companies in the agro-food sector is not limited to the institutionalised MAIS but incorporated information from a variety of additional sources like, for example, information from national or international organizers of panels among households and food distributors or information collected at market places and through advertising activities.

Additionally, companies might derive marketing information from the internal analysis of their customers and competitors (in-house marketing information systems) or might even employ their own groups for general market analysis. Presently, the organization of business-oriented MAIS and Marketing Support Systems (MASS) has to deal with two major developments. The first relates to an ongoing change in business management concepts, and the second to the widespread implementation of computer-based information and communication technologies. To meet the "need to remain generally informed" is the most critical element in the design of information systems for executive management (Schiefer, 1997).

Empirical studies, according to Kelling (1994), suggest that most of the information needed in this respect refers to market information which should be served by a MAIS/MASS. The difficulty, however, according to Schiefer (1997), is the type of market information that is required which differs from the traditional transaction-oriented monitoring information sometimes referred to as "soft" information and includes impressions, vague information about development tendencies, changes in the political environment and its potential marketing consequences, etc. The general interest in information about "market potentials", he asserts, translates into information about customers, competitors, and structural market developments. Information about customers supports the identification

of a general market potential and complements traditional market analysis based on econometric methods of analysis. Information about competitors could provide a better understanding of the attainable market potential.

Established market information organizations, according to Schiefer, follow a stepwise approach to adapt to the new situation in information and communication technology. The focus during the first phase in on the utilization of the new technologies for efficiency improvements in traditional market information services. Such improvements include, for example, the integration of telefax technology into data collection or the provision of market information through videotex or Internet online services. The second phase involves effort to utilize the potential of the new technologies for quality improvements and could focus on data collection or the improved linkage of data to user's individual information needs.

Essential for effective marketing also at the smallholder level, are convenient means of communication and access to reliable information. Market information is crucial to producers, wholesalers and consumers to help them make decisions on what and whether to buy and sell. An effective market information system reduces risks to traders, eventually reducing market costs. When reliable information is not available, traders increase their margins to protect themselves from risk. Improving the provision of reliable market information may be the important government role in marketing (ILRI, 1995).

Deficient communications limit the range of marketing, and confine sales to nearby consumers. Post, telephone and telephone services are important for efficient marketing. Some marketing problems can be traced to lack of information about production. For instance, sellers may not be able to identify sources of supply of commodities, while producers may curtail their production as a result of poor sales (Adegeye and Dittoh, 1985). There must therefore be an information system where buyer and seller can be aware of each other's problems.

2.8 Marketing Costs

Marketing institutions perform a variety of functions including assembly, transport, storage, processing, financing, distribution and grading. All these functions share two prime characteristics; (1) that they add value to the product, and (2) that they require a variety of inputs to perform, and so incur costs. Provided that the value-added (return for the product minus the cost of all inputs) in each function is positive, firms or individual entrepreneurs (including farmers) will find it profitable to compete to supply the service entailed.

Marketing costs, whether great or small gives little or no indication of the efficiency with which the marketing job is accomplished (Kohls and Uhl, 1998). Mittendorf (1989) holds that distribution and marketing costs are largely determined by transportation costs, dealer margins and overheads. Cramer *et al.* (1979) state that "Marketing costs include those associated with assembly, transportation, processing, and distribution of farm produce to the consumer. Increases in the marketing costs have been due primarily to increases in the cost of providing marketing services". Transportation costs tend to be high in developing countries. Marketing costs would be reduced as transport cost and service between producing and processing regions improved (Hill and Bender, 1995). A developed market system requires transportation infrastructure which is either tightly controlled to prevent monopoly abuses, or which the costs are converted to viable costs to reduce the economic barriers to entry to allow a competitive industry to develop.

While it is very difficult to measure exactly the cost of marketing, many official and nonofficial studies made in many countries have confirmed the contention that distribution costs are relatively higher in agriculture (Singh and Sadhu, 1988). The inherent nature of agricultural production and products makes for an expensive transportation situation. The great distances between production and consumption areas will still exist in a large country, the job of assembling the production from scattered small production units will remain an expensive operation, and many commodities will still be perishable, resulting in high spoilage and extensive use of refrigeration (Kohls and Uhl, 1998).

Transportation charges account for about 12 percent of the total marketing costs for food products (Kohls and Uhl, 1972). According to ILRI (1995), transport costs are both direct and indirect. While the direct costs may be obvious, indirect costs include spoilage and spillage in transit, forced sale or loss of grade at sale, etc., causing conflict or the need for cash compensation and the costs of government services to help avoid these costs. Since transport costs increase with distance, there is a certain distance from a market at which it is no longer profitable to transport goods. The further producers are from the consumer market, the greater the transport costs and the lower the producer's profit (all costs of transportation are passed from the trader to the producer).

Compared to most other products, agricultural products are both bulkier and more perishable. A perishable product is often more costly to market than one that is less perishable (Kohls and Uhl, 1972). Much of the difference may be due to the greater difficulty in the performance of the transportation, storage, and risk bearing functions. Bulk affects marketing functions concerned with physical handling. Products that occupy a lot of space in relation to their value almost automatically raise unit transportation and storage costs.

2.9 Market Analysis

There are two basic approaches to analysing markets (Berg, 2003). The more traditional approach focuses primarily on market structure to explain firm conduct and structure and conduct to explain market performance. The second approach focuses on strategic behaviours of firms to explain market performance. The first approach is called "structure, conduct, performance (SCP)". It is sometimes simplified both in name and substance to "structure, performance." The second approach is called "strategic" or "game theoretic". The two approaches differ a great deal, but are basically compatible with each other as analytical methods.

2.9.1 The Structure-Conduct-Performance (SCP) School

This, according to Scarborough and Kydd (1992), provides a broadly descriptive model of the nature of various sets of market attributes, and the relationship between them and performance. The emphasis is not on internal organization of firms, but on the relationships between functionally similar firms, and their market behaviour as a group. Its basic tenet is that, given certain basic conditions, the performance of particular industries depends on the conduct of its sellers and buyers, which in turn is strongly influenced by the structure of the relevant market.

SCP is a descriptive way of organizing information about a market or industry and a paradigm about how one works (Berg, 2003). According to the paradigm, a competitively structured market should lead to competitive conduct by suppliers in terms of pricing, quality, service, and efforts to innovate and to favourable economic performance. Uncompetitive structure could be expected to be less competitive and possibly lead to collusive conduct and poorer performance. Gwin (2001) has also stated that the "Structure-Conduct-Performance" paradigm is a road map for identifying the factors that determine the competitiveness of a market, analyzing the behavior of firms, and assessing the success of an industry in producing benefits for consumers.

Harris (1993) observed that the structure-conduct-performance methodology is an attempt to compromise between formal structures of economic theory and empirical observations of organizational experience in imperfect markets. According to Bateman (1975), the methodology has been a standard tool for market analysis in the United States and the United Kingdom. However, Lutz and Tilburg (1997) have used the structureconduct-performance approach in assessing the performance of food commodity marketing systems in developing countries.

2.9.2 Market Structure

Bain (1968) has defined market structure as the characteristics of the organisation of a market, which seem to influence strategically the nature of competition and pricing behaviour within the market. Market structure refers to certain characteristics of the market that are believed to influence its nature of competition and the process of price formation. Structural characteristics may be used as a basis for classifying markets. These characteristics include: size and number of buyers and sellers ensuring an adequate intensity of price and quality competition; freedom of entry and exit; and adequate size of sellers so as to encourage increased investment.

A good definition, according to Berg (2003), is that "market structure" comprises all conditions affecting the market that are fixed in the short- to medium-run. Because they do not vary, these conditions are said to be "exogenous" or outside the control of agents in the market in this time frame. They include the minimum efficient size of operation (economies of scale), legal restrictions such as patents or regulations affecting competitive behaviour, barriers to entry to the market or costs of exit, and the size distribution of buyers and sellers. Some would add to this list product differentiation, meaning the degree to which products competing within the market vary in some characteristics.

According to the ILRI (1995), the functioning of services can be seen in the structure of the market. Large numbers of intermediaries in the market indicate a lack of capital and risk-avoidance services such as banking and insurance. Without capital, traders are forced to deal in small quantities at a time. This leads to a preponderance of small traders in the market.

2.9.3 Market Conduct

Market conduct refers to the pattern of behaviour that firms or enterprises follow in adapting or adjusting to the markets in which they sell or buy (Bain, 1968). Bain names two closely interrelated aspects of market conduct: "the manner in which, and the devices and mechanisms by which, the different sellers coordinate their intrinsically rivalrous decisions and actions, adapt to each other, or succeed in making them mutually consistent as they react to demands for their products in a common market"; and "the character of

pricing policies and related market policies that the sellers in the industry adopt, assessed in terms of the individual or collective aims or goals that they pursue as they determine their selling prices, their sales promotion outlays, the designs and qualities of their products and so forth". In particular, these include methods employed to determine price, sales promotion and coordination policies and the extent of predatory or exclusionary tactics directed against established rivals or potential entrants.

Market conduct, according to Berg (2003), refers to behavioural characteristics of firms or enterprises that are variable in the short as well as long run. These include pricing, capital investments, research and development and other efforts to innovate, advertising, promotions, differentiation of products, and mergers and acquisitions between firms. The SCP paradigm suggests that market structure greatly affects firm conduct, and the two together determine market performance.

2.9.4 Market Performance

Performance is defined variously and much debated (Scarborough and Kydd, 1992). Commonly the following characteristics of an industry, and its markets, are referred to: productive and allocative efficiency, progressiveness, equity and employment. Market performance represents the economic results of structure and conduct, in particular the relationship between distributive margins and the costs of production of marketing services. Lutz and Tilburg (1997) included level and seasonality of prices, and level and distribution of profits among market participants. According to them, performance attributes regard flexibility of marketing institutions and organisations to adapt to changes in external factors such as government intervention, devaluation of the currency, the supply of public goods and services, consumer preferences and the supplying of substitutes. Market performance can be assessed on different levels. The analysis of market performance can be restricted to the functioning of a specific market place where traders complete transactions. Market places can be part of marketing channels as well as spatial market networks. A good performance and markets, as part of a marketing channel or a

spatial network, is an essential condition for a proper functioning of food commodity marketing systems.

The "performance" of a market is the net value it generates (Berg, 2003). More net value-better performance. Net value is the collective benefits above costs generated for consumers and suppliers in the market, absent any external effects. Writing on "Evaluating Industry Performance", Gwin (2001) noted that evaluating industry or market performance from the perspective of the consumer is tricky. Performance must be weighed between value-creation and market power. Superior performance based on value-creation generally benefits consumers whiles that based on market power generally hurts consumers. Value-creation can be based upon superior differentiation or superior cost. Superior differentiation may be evidenced by high product quality and/or service and rapid technological advancement.

Writing on "Performance criteria in agricultural marketing", Bateman (1975) notes that the specific issues that are important include range of products (grading, quality, product range). At the consumer end, the question of product range is particularly important. One performance criterion here is to regard more choice as necessarily good, so the extent of quality competition is measured by the number of available products and qualities of product on the market. Equity is also important, with particular reference to the level and stability of farm incomes.

2.10 Kendall's Coefficient of Concordance (W).

The Kendall's Coefficient of Concordance (W), test for agreement or association between sets of rankings. When there are more than two judges, this statistic is used to measure the extent to which all judges agree. It is defined as "the ratio of the variability among columns to the maximum possible variability". The W is based on the variance in the rank per object and determines the amount of communality in the rankings. It measures the degree of agreement on a zero to one scale, the larger its value, the greater the agreement in the rankings.

2.11 Previous Rice Marketing Studies

A lot of studies have been conducted into the rice industry in Ghana. Below are the highlights of some of the previous studies into rice marketing.

Okoso-Amaa (1975) after conducting a study of rice market power and concentration of the business in Ghana indicated that there was some degree of concentration and oligopolistic pricing at the wholesale level. Nyanteng (1976) also noted that in general, there was not much vertical or horizontal integration in the rice market in Ghana. However there were some attempts at collusion, discriminatory and monopolistic pricing. Ardayfio (1977) also asserted that when the norms of a perfect market and perfect competition were used as the measuring standard or criterion, the marketing system for rice in the country appeared inefficient both in terms of markets and pricing.

Derigubaa (1979) conducted a study into rice marketing in selected areas of the then Upper region. He noted that in Wa and Lawra, mainly women dominated the rice and paddy market but in Bolgatanga mainly men were the wholesalers. In describing the marketing channels and systems, he wrote that the sequence of market channels through which paddy and rice passed from producer to consumer was found to depend on a number on factors. These factors included: the scale of production of the farmer, social and educational position, distance from urban centres, availability of transport and storage facilities and other financial commitments. He identified three systems:

(i) traditional bartering of paddy,

(ii) state trading agencies – these provided financial and credit and/or technical assistance to farmers who agreed to sell their produce to them at government stipulated prices,

(iii) the private sector – middlemen buy the paddy, mill it and then retail it.

On storage, he identified three methods. The first involved weaving heads (or ears) of paddy together into bundles and hanging them over heaths and sitting rooms. Most peasants to store their rice seed for the next season used this method. In the second method, the grains were threshed and put into granaries and pots. Sometimes wood ash was added as a

preservative. The third method involved packing the paddy into jute sacks and storing in sheds and barns.

In their study into rice production and marketing in Ghana, Praka-Asante and Nyanteng (1979) projected that Ghana could have been about 90 percent self sufficient in rice production in 1980 and should have been a net exporter of rice by 1985, assuming the expansion of cropped area and yield increases had continued as in the early 1970s. This projection, however, did not materialize as noted by Asuming-Brempong (1987) and is evident to all. The country could not achieve the projections made by Praka-Asante and Nyanteng and Goodman (1985) stated that up to 1985, Ghana was able to produce onethird of its total rice requirement and rice had to be imported to fill the "food gap".

Studying the effects of commercial rice imports on Ghana's rice production, Yelibora (1996) concluded that imported rice lowers the price of local rice. He identified three channels through which local producers market their rice. The first is through the rice mills to retailers who on-sell to the final consumers. From the rice mills local rice is also sold to the erstwhile Ghana Food Distribution Corporation, restaurants and hotels. The second channel for marketing local rice is through the Ghana Food Distribution Corporation. The third is through paddy buyers who in turn market it through the rice mills and retailers.

After conducting an econometric analysis of the demand for cereals in Ghana (19701999), Glover (2001) concluded that the general trend in local rice consumption has been increasing in quantity. There has been an increase in quantity from 48800MT to 281100MT over the 1970-1999. According to Glover, the increase can be attributed to the influence of the price of imported rice on the quantity of local rice demanded. As the price of imported rice keeps increasing, the demand for imported rice declined, so the quantity of local rice demanded has been increasing.

Portuphy (2001) conducted an economic analysis of small-scale Irrigated rice farming using the Ashaiman Irrigation Project as a case study. He concluded, among others, that small-scale irrigated rice farming is profitable. The return on investment being greater than one indicated a good level of profitability. Some of the major problems and constraints

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facing small-scale irrigated rice farming included: lack of sufficient institutional credit facilities and competition with imported rice on the market.

Timmins (1991) goes so far as suggesting that locally produced rice can in some respects be regarded as a different commodity to imported rice. In the north, the parboiled rice is preferred for "waache" and can "satisfy" the consumer in a way that the polished raw white rice does not. Informal surveys by Timmins showed a preference for the locally produced rice amongst rural inhabitants, northerners and lower income groups.

Aderibgbe (1996) undertook a study on behalf of WARDA into rice marketing in Nigeria. After interviewing 200 consumers, he found that the order in which consumers rated importance of factors in buying rice were as follows:

- cooking quality (notably expansion and speed of cooking)
- absence of stones
- taste
- colour
- percentage broken
- absence of mould
- aroma
- size of grain • storability
- low price.

The SOFRECO/GLG study (1997) into rice marketing in Ghana thought that the market for the local glaberima rice was separate from that of the imported rice, as the price varied greatly matching the supply characteristics of the variety. The sativa varieties, on the other hand, are seen as substitutes for imported varieties, so that price variation due to seasonality is less, due to the dampening effect of imports. The study also felt that there was little distinction in the market between parboiled and non-parboiled rice.

Drawing on what has been presented in this chapter, the methodology used for the study is presented in the next chapter. Issues relating to data type and method of collection, survey

samples and sampling technique, framework of analysis and the method of data analysis are dilated upon.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Data Type and Method of Collection

This study is based on data obtained from both primary and secondary sources. Primary data used for the study were collected from the farmers, millers, paddy/rice traders and consumers. The author and others carried out the field data collection between September 2007 and August 2008. Structured questionnaires were used in collecting information from the various categories of respondents through personal interviews. Secondary data were gathered from publications of the MOFA, and other appropriate sources. Direct observation of rice marketing, weight and measures used and prices also provided important sources of information for the study.

3.1.1 Questionnaire Design and Pre-Test

For each category of market participant, an initial informal survey was carried out to get a grasp of the issues pertinent to the study. After the initial surveys, formal questionnaires were developed. Prior to the administration of the questionnaires in the main surveys, they were pre-tested to detect flaws and the necessary adjustments were made.

3.1.2 Main Surveys

For the farmers, the main survey was carried out between September – December 2007. Between December 2007 and August 2008, follow ups were done to capture information on the marketing behaviour of farmers and sale of paddy. Data relating to ownership of physical assets, access to land and type of land tenure, rice variety cultivated, access to credit, storing and selling practices, etc., were collected. On the part of millers the main survey was between January – March 2008. Data relating to access to loans, provision of loans and credit, services rendered to buyers and sellers, etc., were collected. The rice/paddy traders survey was done between June – July 2008. Data collected related, among others, to ownership of business, access to credit and market information, storing, buying and selling practices. On the part of consumers, the main survey was done between

October – December 2008. Data collected were basically on the attributes of rice on which they base their preferences. These attributes include colour, presence of stones or foreign material, taste, aroma or fragrance and cooking quality as they compare with imported rice.

3.2 Survey Samples and Sampling Technique

Fifty-eight (58) farmers were selected from four (4) villages (Hwereso, Gyaenkontabuo, Duampompo and Mfensi) used for the survey. The 4 villages used for this study were selected because they have high intensity of rice farmers. In each of the village, an initial census survey was conducted to provide a database on the inhabitants. From the census, a list of rice farmers was generated for each village out of which a computer-generated random sample of farmers was obtained. Depending on the sampling size of the rice farmers in each village, 13, 10, 17 and 18 farmers were respectively selected from Hwereso, Gyaenkontabuo, Duampompo and Mfensi.

Sixty-three (63) millers were interviewed for the study. The millers' sample was obtained from the locations of mills reported by the farmers as where they took their paddy for milling(see Appendix A). For the paddy traders and rice wholesalers, thirty (30) respondents each were interviewed. They were randomly sampled at the mills. Seventyfive (75) rice retailers were purposively sampled and interviewed from various markets in Kumasi and other towns (see Appendix B). Those selected dealt in both local and imported rice.

Hundred (100) consumers were randomly selected and interviewed in the various markets indicated. The 100 consumers provided general information on the attributes of rice on which they based their preferences. Out of the 100, 50 also provided information on the attributes of five selected local varieties of rice.

3.3 Theoretical Framework Of Analysis For Investigating The Marketing System

The framework was built on the methodology of Industrial Organization Theory. The "structure-conduct-performance" paradigm as a road map was used for identifying the factors that determine the competitiveness of the local rice market, analysing the behaviour of firms/traders, and assessing the success of an industry in producing benefits for consumers (Gwin, 2001).

The following criteria were selected for investigating and describing the market structure, conduct and performance:

(a) **Structure**
- Size distribution of sellers and buyers
- Degree of Market Transparency
- Presence or absence of entry barriers facing new traders

(b) **Conduct**
- Buying and selling practices/strategies
- Pricing behaviour

(c) **Performance Indicators**
- Consumer ratings of local rice quality and standards
- Labelling/branding
- Percentage of producers who market their own produce
- Range of Products Available

3.4 Method of Data Analysis

The data were analysed using both descriptive and inferential methods. The descriptive method included the use of frequencies and percentages in analysing some of the trends or characteristics of the data. The characteristics of the market participants were analysed using frequencies and percentages. Some of the data analysed using frequencies and

percentages included farmers' data relating to access to land and type of land tenure, rice variety cultivated, access to credit, storing and selling behaviour, etc. On the part of millers, data relating to access to loans, provision of loans and credit, services rendered to buyers and sellers, etc., were analysed using frequencies and percentages. The rice/paddy traders' data analysed this way related to access to credit and market information, storing, buying and selling behaviour. Some of the characteristics of the consumers, such as occupation, income levels, ethnic origin and religious affiliation, were also analysed using frequencies and percentages.

The volume of rice flows through the chain were estimated and diagrammatically presented based on the reported volumes from the farmers and millers. In the inferential analysis, use was made of the Kendall's Coefficient of Concordance (W). The W was used to analyse data (the attributes of rice on which preferences were based) collected from consumers. These attributes included colour, presence of stones or foreign material, taste, aroma or fragrance and cooking quality.

3.4.1 The Kendall's Coefficient of Concordance (W)

The Kendall's Coefficient of Concordance (W) was used to test for the agreement or association between sets of rankings provided by consumers. It measures the degree of agreement on a zero to one scale, the larger its value, the greater the agreement in the rankings.

Consumers ranked the attributes of rice on which they based their preferences and also provided rankings for the attributes of local rice. These rankings were used to obtain the W between the judges (consumers). For a given set of rankings, the W is given by:

$$W = \frac{12\sum T_j^2 - 3K^2 N(N+1)^2}{K^2 N(N^2 - 1)} \qquad \ldots\ldots\ldots\ldots(1)$$

where: T_j = Column totals,

   N = Number of variables ranked,

   K = Number of judges/consumers doing the ranking.

Since K is greater than 7, the following quantity is approximately normally distributed as a chi-squared on N-1 degrees of freedom:

$$\chi^2_{(N-1)} = K(N-1)W \dots\dots\dots\dots\dots\dots(2)$$

Using equation (2), the W obtained was used to calculate the χ^2 to determine whether the rankings agree or not at the 5% or 1% level of significance. For this test, the hypotheses were:

   Null hypothesis   (Ho): the rankings disagree.

   Alternative hypothesis (H₁): the rankings agree.

The Ho was rejected if the calculated test statistic (TSc) > (TSt) i.e. tabulated test statistic or – TSc < – TSt, otherwise it was accepted. Alternatively, the asymptotic significance level could be used. This is based on the asymptotic distribution of a test statistic. Typically, a value of less than 0.05 is considered significant.

In the next chapter, results obtained from the methods described in this chapter are presented. Results of the analysed data on the farmers, millers, traders and consumers are presented and discussed.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

In this chapter, results of the analysed data on the farmers, millers, traders and consumers are presented and discussed. The results also include whatever was found in the study area and the activities of the various market participants. Direct observation of rice marketing, weight and measures and prices also provided important sources of information for the study.

4.1 The Study Area

The study was conducted in the Ashanti Region. The Ashanti Region is located within the semi-deciduous forest zone of Ghana. It is characterised by bimodal rainfall distribution pattern. The double maximal rainfall comes between April and September with a mean annual rainfall of between 800mm and 1500mm. The climate in this region is described as hot and humid with mean temperatures of 32ºC in February and 22ºC in May. The average relative humidity is 74% at 0900hrs. Even though the dry season is experienced, some rain occurs in each month of the year, with precipitation of less than 50mm each month. All these climatic conditions and the availability of low lands (swamps) make it suitable for the cultivation of rice.

4.2 Infrastructure And Facilities In The Study Area.

The major road network in the Ashanti Region is generally good. Good roads serve villages that are near the main towns and as such transporting produce from those areas to the marketing centres is not difficult. However feeder roads that serve remote villages suffer during the rainy season and can make produce transportation difficult.

Mills in the study area are not well distributed. Majority are concentrated in Kumasi whiles the rest are sparsely distributed in the other towns and villages. Of the 63 mills surveyed, 26 representing 38.1% are located in Kumasi. Majority of the mills outside Kumasi are of

the simple "huller-type" machines. All the mills in Kumasi and a few outside are of the more advanced Satake type machines.

4.3 Socio-economic Characteristics of Respondents

4.3.1 Characteristics of Rice Farmers

As indicated in table 4.1(a) below, the age group of majority of the farmers (36.2 %) is between 30-39. On the whole, the bulk of farmers (93.1%) are aged between 20-49. This is understandable as rice cultivation is quite hectic and so most of the farmers are within the younger age group.

TABLE 4.1(a) AGE GROUPS OF FARMERS

Age of Respondents		
Age Group	Freq.	Percent
16 – 29	14	24.1
30 – 39	21	36.2
40 – 49	11	19.0
50 – 59	8	13.8
60 – 79	4	6.9
Total	58	100.0

Source: Study Survey

As shown in table 4.1(b) below, majority of farmers (44.8 %) are from the Ashanti and Kusasi ethnic groups. Rice cultivation in Ghana is quite popular in the northern parts. The northern ethnic groups have traditionally dominated rice farming in the Ashanti region. Over the years, the indigenes (Ashantis) have learnt the art of rice cultivation from the migrant farmers and are gradually becoming important in rice farming. On the whole, migrant farmers dominate rice-farming, forming 77.6% of the respondents.

TABLE 4.1(b) ETHNIC GROUP OF FARMERS.

Ethnicity					
Group	Freq	Percent	Group	Freq.	Percent
Ashanti	13	22.4	Frafra	3	5.2
Kusasi	13	22.4	Bimmoba	3	5.2
Grushie	5	8.6	Wangara	2	3.4

Ewe	4	6.9	Chokosi	2	3.4
Gonja	3	5.2	Others	10	17.2
Total				58	100.0

Source: Study Survey

TABLE 4.1(c) EDUCATIONAL LEVEL OF FARMERS

Education		
Level	**Freq.**	**Percent**
Illiterate	25	43.1
Primary	9	15.5
Middle/JSS	20	34.5
Sec./Tech.	4	6.9
Total	58	100.0

Source: Study Survey

On formal education, twenty- five (25) farmers, representing 43.1% have had no formal education as shown in table 4.1(c) above. The remaining 56.9% have had between 8-18 years of formal education. On the whole, 50 % of the respondents have had up to basic school level education. This result indicates that Ghanaian agriculture is still in the hands of the have higher aspiration and to be more innovative in adopting new technologies including new varieties. Years in formal education is a factor critical to decision-making related to farming strategies as education enhances the farmer's ability to search for alternatives of support measures. All things being equal, it is expected that an educated farmer would be more knowledgeable about improved methods of farming and the accurate use of agro-inputs, and hence obtain better yields.

TABLE 4.2(a) LAND TENURE OF RICE FARMERS

Land Tenure		
Land Tenure	**Freq.**	**Percent**
Rented	40	69.0
Own land	2	3.4
Family land	7	12.1

Share Contract	1	1.7
In return for some work	6	10.3
In-law's land	1	1.7
Other	1	1.7
Total	58	100.0

Source: Study Survey

Table 4.2(a) (previous page) shows the land tenure of the respondents. Forty (40) respondents representing 69.0% rented land. Of those who rented land, 29.3% paid cash, 34.5% paid with milled rice, 5.2% paid with paddy and 1.7% paid a combination of cash and milled rice (see Table 4.3, page 44). Seven (7) respondents, (12.1%) cultivated family land, 10.3% used land provided by landlord in return for some work. These included those who were caretakers of landlords' cocoa farms, those taking care of young palm-plantation and citrus farms. One respondent cultivated in-law's land, with 1 each cultivating on land on which tenant was engaged in share contract of other crops and government land (others). With the majority of farmers cultivating on rented land, the tenure was on annual basis and so were cautious about undertaking land improvement methods. This has implications regarding yields from such lands.

TABLE 4.2(b) RICE VARIETY PLANTED BY FARMERS

Rice Variety Planted		
Variety	**Freq.**	**Percent**
Uncle Ben's	10	17.2
Long grain	3	5.2
Chinese rice	1	1.7
Asante Broni	14	24.1
Sikamo	1	1.7
Asante	13	22.4
Improved (Unknown)	12	20.7
Both (Improved & local)	4	6.9
Total	58	100.0

Source: Study Survey.

Table 4.2 (b) shows the rice varieties cultivated by respondents. The highest number of 14 respondents planted Asante-broni, 13 planted Asante, 12 planted improved (unknown), 10 planted Uncle Ben's, and 4, 3, and 1 each respectively planted both (improved & local), long grain, Chinese rice and Sikamo. As shown below in Table 4.3 (page 44), only 12.1% of the farmers sought for professional advice on the rice variety cultivated. The remaining 87.9% planted what their friends and other farmers were cultivating without seeking advice on consumer preferences on the market. This points to the lack of market extension service in the system that guides farmers in taking production, storage and marketing decisions.

The average number of months paddy is held in storage by farmers is also shown below in Table 4.2(c). Seventeen farmers representing 29.3% stored paddy for 1-2 months. Sixteen farmers (27.6%) stored paddy for 3-4 months. On the whole, 69% of the farmers stored paddy for up to 4 months, the remaining 31% storing paddy for 5-10 months. Most of the farmers who store use bagged storage but sometimes also use bulk storage. Farmers are forced to sell their paddy or rice within the first 4 months after harvest, when prices are generally low, in order to meet their cash needs for covering weeding and other expenses and for repaying loans. Only 6 (10.3%) farmers stored paddy for 7 – 10 months. Fifty (50) percent of the farmers sold their produce in two consignments, 22.4% sold at a go while the rest sold in bits several times, as and when they needed cash. Most of the farmers are not able to store for longer periods to take advantage of price increases during the lean period.

TABLE 4.2(c) AVERAGE MONTHS OF STORAGE OF PADDY

Average Months of Storage (Paddy)		
Months	Freq.	Percent
< 1	7	12.0
1 – 2	17	29.3
3 – 4	16	27.6
5 – 6	12	20.7
7 – 8	5	8.6
9 – 10	1	1.7

Total	58	100.0

Source: Study Survey.

TABLE 4.3: OTHER CHARACTERISTICS OF RICE FARMERS

Characteristics	Frequency	Percent
Type of Rent Payment		
Cash	17	29.3
Milled Rice	20	34.5
Paddy	3	5.2
Cash & Milled Rice	1	1.7
NA	17	29.3
Total	58	100.0
Professional Advice on Variety		
Yes	7	12.1
No	51	87.9
Total	58	100.0
Field Size (ha)		
0.100 – 0.500	24	41.4
0.501 – 0.750	14	24.1
0.751 – 1.000	8	13.8
1.001 – 1.250	5	8.6
1.251 – 1.500	5	8.6
1.501 – 1.750	1	1.7
2.251 – 2.500	1	1.7
Total	58	100.0
Marital Status		
Married	46	79.3
Single	11	19.0
Separated	1	1.7
Total	58	100.0
Gender		
Male	58	100.0
Female	0	0

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Religious Affiliation		
Christian	28	48.3
Moslem	24	41.4
Others	6	10.3
Total	58	100.0

Source: Study Survey.

Table 4.3 summarizes the other characteristics of the farmers: type of rent payment, professional advice on variety planted; field size, marital status, gender and religious affiliation.

4.3.2 Characteristics of Millers

Age groups of the millers covered by the survey are shown in Table 4.4 below. The age group distribution is concentrated between 31-60 years. The highest percentage of 28.6 is between 41-50 years. The ethnic groups of the millers are also shown in Table 4.4 below. A high proportion of the owners (44.4%) are Ashantis. After the Ashantis, the next major ethnic group is Gonja (9.5%). Then come Kusasi, Ewe and the rest as shown in table below.

On formal education, eighteen (18) millers, representing 28.6% have had no formal education as shown in Table 4.4. Ten (15.9%) of the respondents have had up to primary school level education. The remaining thirty-five (35) have had between 9 – 18 years of formal education.

Table 4.5 indicates the countries of origin of the rice hullers and motors or engines found at the mills surveyed. Twenty-one (21) of them had Ghana/India combination, 8 had Ghana/England, 2 had Japan/Germany and 1 had Japan/India combinations. Combination means that the huller and motor or engine come from different countries. For those with the Ghana combination, the hullers are locally manufactured. With such hullers paddy has to be passed through them twice or three times to get clean rice. The use of the very simple "huller-type" machines for milling paddy also appears to result in a lower quality of milled product with the presence of chaff and paddy grains. Out-turn is estimated at 55 to 60% and the grading equivalent to 35% broken or higher (Day *et al*, 1997). With machines from Japan, China and England, paddy was usually passed through once. These more advanced Satake type machines use rubber rollers and separate the chaff from the bran. The rice produced is therefore cleaner and better and does not require further winnowing. Also a better out-turn of 62 to 65% can be expected. The mills with locally manufactured hullers were mostly in the villages. In Kumasi and other towns the hullers were mostly the Satake type.

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TABLE 4.4 CHARACTERISTICS OF MILLERS

Age of Respondents			Ethnicity						Education		
Age Group	Freq.	Percent	Group	Freq	Percent	Group	Freq.	Percent	Level	Freq.	Percent
21 – 30	2	3.2	Ashanti	28	44.4	Kotokoli	3	4.8	Illiterate	18	28.6
31 – 40	15	23.8	Gonja	6	9.5	Grushie	2	3.2	Primary	10	15.9
41 – 50	18	28.6	Kusasi	5	7.9	Chokosi	2	3.2	Middle/JSS	26	41.3
51 – 60	15	23.8	Ewe	4	6.3	Others	10	15.9	Sec./Tech.	9	14.2
61 – 70	6	9.5	Wangara	3	4.8						
> 70	7	11.1									
Total	63	100.0	Total				63	100.0	Total	63	100.0

TABLE 4.5 MANUFACTURING COUNTRY / SERVICES PROVIDED BY MILLERS

Country of Origin			Storage of Paddy on Behalf of Farmers / Traders			Loans Provided for Farmers		
Country	Freq.	Percent	Storage	Freq.	Percent	Loan Provided	Freq.	Percent
Ghana / India	21	33.3	Yes	22	34.9	Yes	29	46.0
Japan	11	17.5	No	41	65.1	No	34	54.0
Ghana / England	8	12.7	Total	63	100.0	Total	63	100.0
China	7	11.1						
England	6	9.5	Average No. of Months			Interest on Loans (%p.a.)		
India	4	6.3	1 – 2	7	11.1	0	26	89.7
Germany	3	4.8	3 – 4	13	20.6	11 – 20	1	3.4
Japan / Germany	2	3.2	5 – 8	2	3.2	41 –50	1	3.4
Japan / India	1	1.6				100	1	3.4
Total	63	100.0	Total		100.0	Total	29	100.0

Source: Study Survey.

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4.3.2.1 Services Provided by Millers

The millers play a pivotal role in the marketing of rice. They serve as the link that connects farmers or paddy traders and rice traders. The mills serve as the main buying and selling centres for locally produced rice. The millers coordinate buying, selling and pricing activities. Apart from rice milling, other services millers provide include selling of rice on behalf of farmers and paddy traders, storage of paddy for farmers and paddy traders, and provision of loans and credit for farmers. The millers render these other services to encourage trading on their premises, the use of their mills and also to retain their customers. Millers render milling services at a fee to farmers and paddy traders. The milling fee charged is generally on per tin (locally called "grawa") basis. The farmers and paddy traders generally credit the fee and pay after their rice is bought. In some cases, farmers and paddy traders entrust the sale of the rice to the millers and they sell on their behalf. Some traders also give money to the millers in advance to procure rice on their behalf.

On storage, 22 millers representing 34.9% reported that they stored paddy for farmers and paddy traders (Table 4.5). The paddy were bagged and stored in the milling houses. The owners of the bagged paddy marked the sacks to distinguish them. Of those who stored for farmers and paddy traders, 7 stored for between 1-2 months, 13 stored for between 3-4 months and 2 stored for between 5-8 months. No fee is charged for storage.

Table 4.5 also shows the characteristics of loans provided for farmers. Twenty-nine (29) millers representing 46% provided loans for farmers. Of the 29 who provided loans for farmers, 26 charged no interest. The only other condition was that they (farmers) would bring their paddy to them for milling. One miller each charged between 11-20%, 41-50% and 100% on the loans they provided. Of these three, two had no other condition attached to the loan while for one, the farmers paid in terms of paddy. For the payment in paddy, the money that is given to the farmer is calculated in terms of the number of paddy bags at the time the loan was issued. During payment, the farmer pays the same number of bags of paddy irrespective of the price change of the paddy.

Loans taken by farmers are mainly used in buying pre-planting and post-planting weedicides. Apart from loans given to farmers by millers to enable them buy inputs, some

of the millers also grant them credit facilities by paying for the transportation of the paddy to the mill. Payment is made after the rice is sold.

TABLE 4.6: OTHER CHARACTERISTICS

Stone Remover	Freq.	Percent	Milling of Other Crops	Freq.	Percent
Yes	0	0	Yes	41	65.1
No	63	100.0	No	22	34.9
Total	63	100.0	Total	63	100.0

Source: Study Survey.

Of all the 63 mills, none had a de-stoner or stone remover (Table 4.6). As such there are high levels of stones in locally milled rice. The presence of stones in local rice seems to be one of the main reasons why most consumers shy away from patronising it. The absence of de-stoners has also resulted in a major expense for the millers. The filters are frequently damaged from stones and have to be replaced every one to two weeks. In contrast, ICOUR which has de-stoner machines change their filters or screens every six months (Day *et al*, 1997).

Twenty-two (22) of the millers processed only rice while the remaining 41 processed other products in addition to the rice. These other products were mainly maize, dried cassava and palm kernel.

4.3.3 Characteristics of Paddy Traders

This group of market participants buy paddy from the villages and transport them to the main towns for processing after which they sell mainly to wholesalers and retailers. Most of the traders buy paddy from the Brong Ahafo region (Kwame Danso, Abaase, Gambia, Mim, Yeji, etc) and others buy from the remote villages in the Ashanti region. Some also

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buy from the Eastern and Volta regions. Shown in Table 4.7 (next page) are the characteristics of the paddy traders.

As shown in Table 4.7, the age of respondents was between twenty and fifty years. Sixteen respondents representing 53.3% were within the 31-40 year group, eleven were within the 41-50 year group and three were within the 20-30 year group. Gender of the respondents was evenly distributed – fifteen males and fifteen females. This is quite a departure from the gender distribution of the wholesalers and retailers who were all women. The gender distribution is also a departure from a study conducted by Derigubaa (1979) in which he reported that mainly women dominated the paddy market.

Almost all the respondents were Ashantis (Table 4.7). Twenty-seven representing 90% were Ashantis, and one each was Ewe, Wassa and Guan. On the level of formal education, two were illiterate, two had primary education, twenty-one had Middle/JSS education and five had Secondary/Technical education.

As shown in table 4.8, eighteen respondents representing 60% reported that they used their own savings as start–up capital while the remaining twelve reported that they took informal loans. The informal loans were from relatives and friends and attracted no interest. Out of the thirty, twenty indicated that they were also engaged in other businesses while the remaining ten were not engaged in any other business apart from the rice trade. Of the twenty also engaged in other businesses, three were in agriculture, thirteen were wholesalers of other foodstuffs and four were artisans.

For the 2007/2008 season only three out of the thirty respondents indicated that they borrowed funds for their activities (Table 4.8). For these three, the funds were borrowed from informal sources at no interest. Almost all the respondents indicated the need for credit or loan facilities. As to why they did not apply for loans from the rural banks that are more accessible and will meet their demands at the small-scale level, respondents complained about the cumbersome nature of application procedures.

TABLE 4.7 CHARACTERISTICS OF PADDY TRADERS

Age of Respondents			Gender			Ethnicity			Education		
Age Group	Freq.	Percent	Gender	Freq	Percent	Group	Freq.	Percent	Level	Freq.	Percent
20-30	3	10.0	Male	15	66.7	Ashanti	27	90.0	Illiterate	2	6.7
31-40	16	53.3	Female	15	33.3	Ewe	1	3.3	Primary	2	6.7
41-50	11	36.7	Total	30	100.0	Wassa	1	3.3	Middle/JSS	21	70.0
Total	30	100.0				Guan	1	3.3	Sec./Tech.	5	16.7
						Total	30	100.0	Total	30	100.0

TABLE 4.8 FUNDS / OTHER BUSINESSES

Funds for Start-Up			Engagement in Other Business			Type of Other Business			Borrowed Funds/Source		
Source	Freq.	Percent		Freq	Percent	Type	Freq	Percent		Freq.	Percent
Own Savings	18	60.0	Yes	20	66.7	Agric.	3	10.3	Yes	3	10.0
Informal loan	12	40.0	No	10	33.3	Foodstuff	13	43.3	No	27	90.0
Total	30	100.0	Total	30	100.0	Artisan	4	13.3	Total	30	100.0
						NA	10	33.3	Source		
						Total	30	100.0	Informal loan	3	10.0

TABLE 4.9 STORAGE / LOAN FOR FARMERS

Storage of Paddy at Collection Points			Loan Provision for Farmers			Interest on Loans		
	Freq	Percent		Freq	Percent		Freq	Percent
Own Facility	3	10.0	Yes	19	63.3	0%	16	53.3
Rented Facility	15	50.0	No	11	36.7	26-50%	3	10.0
Not Permanent	9	30.0	Total	30	100.0	Other Condition		
Milling House	3	10.0					19	63.3

Total	30	100.0				Sale of Paddy to him/her	

Source: Study Survey.

On storage of paddy at the collection points, only three respondents reported that they have their own storage facility (Table 4.9). Fifteen respondents representing 50% indicated that they store their paddy in rented facilities, nine did not have permanent structures for storage and three stored their paddy at mill houses at no fee. According to the respondents, due to the scattered nature of the farming communities, each trip takes between three to six weeks to enable them gather enough quantity of paddy. During these periods, the paddy is stored in the facilities mentioned and are transported at the end of the collection period to the milling centres.

Most of the traders (nineteen) indicated that they provided loans for the rice farmers. Of the nineteen who provided loans, sixteen did not charge any interest. The remaining three charged between 26-50% interest. Where loans are provided, the only other condition is that the farmers would sell their paddy to the provider of the loan.

4.3.4 Characteristics of Wholesalers

The wholesalers purchase rice from the paddy traders and farmers and on sell to retailers, cooked rice sellers and consumers. The main towns of activities of the wholesalers include Obuasi, Bekwai, Prestea, Bogoso, Asankragua, Wassa Akropong, etc. Of the thirty interviewed, fourteen were wholesalers only whilst the remaining sixteen were both wholesalers and retailers.

All the respondents were females. With regards to age distribution, twelve were aged between 21 - 30 years, thirteen were between 31- 40 years and five were between 41 –50 years (Table 4.10, next page). Ethnic wise, six were Ashantis, five were Assins, seven were Enzemas and twelve were Wassas. Majority (76.7%) of the respondents had formal education up to the JSS or Middle school level, six had primary education and one had teacher training education.

TABLE 4.10 CHARACTERISTICS OF WHOLESALERS

Age of Respondents			Gender			Ethnicity			Education		
Age Group	Freq.	Percent	Gender	Freq	Percent	Group	Freq.	Percent	Level	Freq.	Percent
21-30	12	40.0	Male	0	0	Ashanti	6	20.0	Illiterate	0	0
31-40	13	43.3	Female	30	100.0	Assin	5	16.7	Primary	6	20.0
41-50	5	16.7	Total	30	100.0	Enzema	7	23.3	Middle/JSS	23	76.7
Total	30	100.0				Wassa	12	40.0	T. Training	1	3.3
						Total	30	100.0	Total	30	100.0

TABLE 4.11 FUNDS / OTHER BUSINESS

Funds for Start-up			Engagement in Other Business			Type of Other Business			Borrowed Funds/Source		
Source	Freq.	Percent		Freq	Percent	Type	Freq	Percent		Freq.	Percent
Own Savings	12	40.0	Yes	15	50.0	Foodstuff	14	46.7	Yes	4	13.3
Formal loan	3	10.0	No	15	50.0	P.Servant	1	3.3	No	26	86.7
Informal loan	15	50.0	Total	30	100.0	Total	15	50.0	Total	30	100.0
Total	30	100.0							Source		
									Informal loan	4	13.3

TABLE 4.12 STORAGE / LOANS FOR FARMERS

Storage of Rice			Loan Provision for Farmers		
	Freq	Percent		Freq	Percent
Own Facility	18	60.0	Yes	1	3.3
Rented Facility	4	13.3	No	29	96.7
Market Store	8	26.7	Total	30	100.0
Total	30	100.0	Interest		

			0%	1	3.3

Source: Study Survey.

On the source of funds for setting up the wholesaling enterprise (Table 4.11), twelve indicated that they used their own savings; three indicated that they took formal loans and the remaining fifteen took informal loans. Of those who took the formal loans, interest rates charged were between 30-40%. No interest was charged on the funds secured from informal sources. These come from friends and relatives.

Fifteen respondents indicated that their only source of income is from the rice business. Of the remaining fifteen who were also engaged in other businesses, fourteen were wholesalers of other foodstuffs and one was a teacher. For the 2007/2008 season, four respondents reported that they took informal loans for running their enterprises. The remaining twenty-six did not borrow from any external sources. During the same period, only one respondent indicated that she provided loans to farmers. No interest was charged. The only condition attached was that the farmer would sell the rice to her.

4.3.5 Retailers

In all, seventy-five retailers were interviewed in fifteen markets (Appendix B). They traded in both imported and local varieties of rice. They purchased the imported rice from wholesale stores and the local rice from milling centres or itinerant traders and on sell to consumers. All the respondents were females. Below are the other characteristics of the retailers.

As shown in Table 4.13, majority of the retailers were aged between 31-40 years followed by those in the 41-50 years age group. Ethnic wise, majority (52) were Ashantis. The rest were from various ethnic groups as indicated. On education, twelve were illiterates; fourteen had primary, forty-three had Middle/JSS and six had secondary education.

TABLE 4.13 CHARACTERISTICS OF RETAILERS

Age of Respondents			Gender			Ethnicity			Education		
Age Group	Freq	Percent	Gender	Freq	Percent	Group	Freq.	Percent	Level	Freq.	Percent
15-30	16	21.3	Male	0	0	Ashanti	52	69.3	Illiterate	12	0
31-40	29	38.7	Female	75	100.0	Kwawu	2	2.7	Primary	14	20.0
41-50	21	28.0	Total	75	100.0	Bono	4	5.3	Middle/JSS	43	76.7
51-60	6	8.0				Sefwi	2	2.7	Secondary	6	3.3
61-80	3	4.0				Busanga	2	2.7	Total	75	100.0
Total	75	100.0				Fanti	4	5.3			
						Frafra	3	4.0			
						Mamprussi	2	2.7			
						Others	4	5.3			
						Total	75	100.0			

Source: Study Survey.

TABLE 4.14 FUNDS / OTHER BUSINESS / STORAGE

Funds for Set up			Engagement in Other Business			Storage			Borrowed Funds		
Source	Freq.	Percent		Freq	Percent	Facility	Freq	Percent	Source	Freq.	Percent
Own Savings	39	52.0	Food Pdts	62	82.7	Own Facility	3	4.0	Formal	10	13.3
Formal loan	0	0	Agric	2	2.7	Rented	3	4.0	Informal	2	2.7
Informal loan	30	40.0	NA	11	14.7	Market Stall	51	68.0	NA	63	84.0
Others	6	7.9	Total	75	100.0	At home	18	24.0	Total	75	100.0
Total	75	100.0				Total	75	100.0			
									Interest		
									0%	2	2.7
									1-25%	7	9.3
									26-50%	2	2.7
									51-75%	1	1.3

								Total	12	16

Source: Study Survey.

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Other characteristics pertaining to the retailers are shown in Table 4.14 (previous page). Generally, there are no serious entry barriers. Thirty-nine respondents indicated that they started the retailing business with their own savings whilst thirty started with informal loans mainly secured from relatives. The remaining six started with various combinations of own savings, formal and informal loans. The start up funds did not involve huge financial outlays. Some indicated that they started with as little as 1 tin worth of local rice and gradually expanded.

As indicated in Table 4.14, majority (62) of the retailers were also engaged in the retailing of other food products, two were also engaged in agriculture and eleven dealt solely in rice. The other food products mainly dealt in included cooking oils, vegetables, spices, groundnut and beans. Most of the respondents indicated that apart from increasing their profit base they included the other products to enable consumers have all they needed when they call at their stall. On funds for running their enterprises within the 2007/2008 season, twelve borrowed from both formal (10) and informal (2) sources whilst sixty-three did not borrow from any external sources as shown in table 4.14. The funds from the informal sources attracted 0% interest. The formal loans attracted various rates of interest as indicated in the table. Majority (68%) of the respondents stored rice in their market stalls, eighteen stored their rice at home, three had their own storage facilities and three used rented facilities.

4.3.6 Consumers

Table 4.15 shows the characteristics of the consumers interviewed for the study. Majority (41%) of consumers interviewed were within the 40 – 49 year group. Ashantis dominated the ethnic groups. Twenty-seven of the consumers were Ashantis. The other main ethnic groups were Sefwi, Ewe, Frafra and Busanga. With regards to formal education, majority of the consumers had had up to secondary, technical, vocational or teacher training education.

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TABLE 4.15 CHARACTERISTICS OF CONSUMERS

Age of Respondents			Ethnicity						Education		
Age Group	Freq.	Percent	Group	Freq.	Percent	Group	Freq.	Percent	Level	Freq.	Percent
20 – 29	22	22.0	Ashanti	27	27.0	Fanti	5	5.0	Illiterate	25	25.0
30 – 39	29	29.0	Sefwi	10	10.0	Kwawu	4	4.0	Basic	25	25.0
40 – 49	41	41.0	Ewe	9	9.0	Others	15	15.0	Sec/Tech/Voc/Training	36	36.0
50 – 59	5	5.0	Frafra	9	9.0				Tertiary	14	14.0
60 – 69	2	2.0	Busanga	8	8.0						
> 70	1	1.0	Bono	7	7.0						
Total	100	100.0	Mamprusi	6	6.0	Total	100	100.0	Total	100	100.0

TABLE 4.16 OCCUPATION / MONTHLY INCOME / RELIGION

Occupation of Respondents			Monthly Income			Religious Affiliation		
Occupation	Freq.	Percent	Income	Freq.	Percent	Religion	Freq.	Percent
Civil Servant	20	20.0	< 50	6	6.0	Christianity	69	69.0
Teacher/Educationist	18	18.0	51 – 1OO	15	15.0	Islam	29	29.0
Artisan	16	16.0	101 – 150	21	21.0	Traditional	2	2.0
Trader/Business	28	28.0	151 – 200	23	23.0			
Unemployed	2	2.0	201 – 250	23	23.0			
Others	16	16.0	> 250	12	12.0			
Total	100	100.0	Total	100	100.0	Total	100	100.0

Source: Study Survey.

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Table 4.16 on the previous page shows the occupations, monthly incomes and religious affiliations of consumers. The highest number (28) were traders, followed by those in civil service (20) and those in education (18). As shown in the table, the bulk of the consumers (46) had their monthly incomes in the range of GH¢151,000 – GH¢250 followed by those in the GH¢101 – GH¢ 150 range with the least of them earning less than GH¢50. With regards to religious affiliation, majority (69) were Christians, followed by Moslems (29) and only 2 were traditionalists.

4.4 Characteristics of the Structure and Conduct of the Rice Market

Thousands of farmers, marketing agents and consumers are engaged in the production, consumption and in the provision of various marketing services, namely, buying, selling, storing, processing, retailing, etc. The distribution of local rice is 'regulated' by a private market system. The government has only a limited role, mainly concerned with regulation and the provision of the necessary physical infrastructure. Both formal and informal markets exist simultaneously. Formal markets are spot markets or periodic markets that are subject to government regulations enforced by an official market organisation. Informal markets involve transactions that are carried out in unregulated market places or at the premises of one of the actors. Traders are usually active in both formal and informal markets.

4.4.1 Market Structure

The nature of the marketing channel from producer to consumer is mainly of two types:

(1) Farmer ——— Mill ——— Wholesaler ——— Retailer——— Consumer

(2) Farmer ——— Paddy Trader ——— Mill ———— Wholesaler ——————— Retailer
    Consumer

In (1), the farmer transports his paddy to the mill to be processed and then sells to the wholesaler who then sells to the retailer who in turn sells to the consumer. This channel is

sometimes shortened with the elimination of either the wholesale or retailer or both, giving rise to the following variants:

(1a) Farmer —————— Mill —————— Wholesaler —————— Consumer

(1b) Farmer —————— Mill —————— Retailer ———— Consumer

(1c) Farmer —————— Mill —————— Consumer

In (1a), the consumer bypasses the retailer and buys from the wholesaler or the wholesaler sells to the consumer. In (1b), the retailer buys directly from the farmer at the mill. In (1c), the consumer buys directly from the farmer at the mill bypassing both the wholesaler and retailer.

In (2), the farmer does not transport his paddy to the mill but sells to the itinerant paddy trader who transports it to the mill. That is the only difference between (1) and (2). From the mill to the consumer, (2) undergoes the same shortened channels just like (1). The existence of a number of alternative channels simultaneously is interpreted as a positive sign because it enables farmers and consumers to choose appropriate marketing services needed.

Relations between farmers and millers were generally flexible except instances where millers provided the farmers with loans. Where the millers provided loans the farmers were bound or supposed to send their paddy to the loan providers for milling. For the 2007/2008 season twenty-nine millers (Table 4.5) provided loans for farmers for which in the majority of cases, there were no interest charged but that the farmers would send their paddy to them for processing. Where farmers had not taken loans, they generally seek for mills where the quality of milling was better and as such the rice sold faster. Between farmers and traders, relations were along similar lines described above.

Relations between millers and paddy traders were somehow fixed. With only a few floating ones, most traders had regular millers to whom they sent their paddy. For such regular traders, the millers usually provide some credit in the form of paying for the transportation of paddy to the mill and also store their paddy for them for a period. Between the paddy

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traders and wholesalers/retailers, relations were generally flexible. The wholesalers and retailers sought the most attractive price and quality. Due to their small financial resources and limited storage capacity, most wholesalers and retailers bought small quantities on regular trips to the mill.

Relations between consumers and the other market participants were flexible. Credit did not play any major role. Consumers sought for the best quality and sometimes the most attractive price. However, some consumers were regular customers of some retailers. Such relationships were developed over a period during which the retailers were associated with good quality rice. Such regular customers were occasionally given price discounts of about say 10 or 20 Ghana pesewas per margarine tin. Such discount were however discreet.

4.4.1.1 Size Distribution of Sellers and Buyers

At each level of the marketing chain, there were large numbers of sellers and buyers. None of the market agents controlled a sufficiently large share of the marketed volume, which they could use to influence prices to their advantage.

Within the same locality, prices were the same and agents were price takers. However, for homogeneous products, there were slight price differences that may be explained by bargaining. Bargaining was in two forms; bargaining about the price given the quantity or bargaining about the volume given a certain price. Indebtedness of farmers to the traders weakens their bargaining power in most cases. Indebtedness implies that the farmer does not have the liberty to sell to the highest offer and is constrained to sell to the loan provider.

4.4.1.2 Degree of Market Transparency

This is with regards to information on supply, demand and prices. Information regarding overall harvest prospect, supply situation in the major market centres, demand for and the price of rice in various markets and mills is totally lacking. Respondents indicated that their sources of information are their own assessment and other participants. Traders reported

that sometimes they travelled to a few market centres before being able to make buying decisions. It is clear that farmers and traders generally do not get a variety of market information upon which they base their marketing decisions. Primarily, respondents depend on the market place and other farmers and traders for price information. Information on demand and prices, for instance, facilitates the timely and speedy flow of produce from producing areas to consuming markets. Thus, the lack of information leads to a very low degree of market transparency and contributes to marketing inefficiency in the system.

4.4.1.3 Presence or Absence of Entry Barriers Facing New Traders

Some of the identified barriers include the difficulty of establishing oneself in the market place. Within the well-established markets such as the Central and Asafo markets in Kumasi, the Konongo, Bekwai and the Juaben markets, finding a space to establish oneself is almost impossible. Without contacts, it is difficult to establish oneself in a new market. Usually, new entrants have to rely on the assistance of friends and relatives. This may be perceived as an entry barrier.

The cost structure of retailers indicates that they require limited funds as start-up capital. However, paddy traders needed large amounts of start-up capital. For instance, for an average quantity of about 50 – 100 "Angola" bags of paddy per trip, the financial outlay needed for purchasing, collecting or assembling and transporting would be between 1,000 – 2,000 Ghana Cedis. Obtaining such an amount from formal or informal sources is difficult for most new entrants. This serves as a barrier for potential entrants.

A barrier that is not related to capital requirement is the domination of retailing and wholesaling by females and paddy trading by males. All the retailers and wholesalers were females. It seems it would be socially out of place to come across a male rice retailer. To some extent, these may be perceived as 'sociological' barriers.

4.4.2 Market Conduct

4.4.2.1 Buying and Selling Practices

Most of the rice is sold between August and December. Most farmers sell their rice soon after harvest in order to meet their cash needs and for repaying loans. During this period, prices are generally low. Between January – July, the few farmers who are able to store for sometime sell in bits to meet their cash needs.

Farmers who are near Kumasi directly send their paddy there for processing. The paddy is usually transported bagged in "Angola" bags. In this study, 25 farmers representing 43% transported their paddy to Kumasi for processing. The main motivation for processing in Kumasi is that the quality is better and the rice sells faster. All the farmers bypassed the paddy traders and sent the paddy to the mills for processing. After processing, the rice is sold in "grawa" (kerosene tin), at the heaped capacity of between 28.5 and 52.0 kg, to wholesalers, retailers or consumers. Due to the lack of usage of weight measures in the system, depending on who fills a tin, the same tin can weigh different volumes from the same trader at different times.

Paddy traders buy paddy mainly from the remote areas of Ashanti and Brong Ahafo regions and transport them to Kumasi for processing. For the 2007/2008 season, some stored for between 1 – 5 months to take advantage of price increases. In buying the paddy, the traders normally use old bags, which can contain greater volume over new ones. For instance, in using an old bag, a trader might get an additional 5 – 7 kg after rebagging. Due to the lack of usage of weight measures in the system, it is not easy to detect the "extra weight". After processing, they also sell in tins to wholesalers, retailers or consumers.

Wholesalers buy rice from either farmers or paddy traders at the mills and transport them to the major consuming markets. Main destination markets are Obuasi and Bekwai in Ashanti Region and Prestea, Bogosu, Tarkwa, Asankragua and Takoradi in the Western Region. They usually buy with the "helping" hand and sell without it. Making use of the "helping" hand is the practice of attaching the hand to the mouth of the tin to increase the volume of rice contained. Wholesalers on sell to retailers and consumers.

Retailers buy rice from farmers, paddy traders or wholesalers and on sell to consumers. Due to their small financial resources, their storage capacity is limited and so they buy small quantities regularly at nearby mills. They, like the wholesalers, usually buy with the "helping" hand and sell without it. Their unit of sale is the margarine tin or cup at the heaped capacity of approximately 0.48 – 0.5 kg.

4.4.2.2 Pricing Behaviour

Usually they take into consideration the preceding months' prices and the "perceived level of inflation in setting the price at the beginning of the main marketing season (August – December). The different varieties sell at different prices with Asante rice (white) normally selling at a premium. For homogeneous products, price differences may be the result of bargaining. Factors that have important influence in the bargaining process include the prevailing supply and demand conditions on the market and the bargaining capabilities of the participants. Other factors that influence the prices include the price of imported rice (which has a great deal of influence), the quality of milling and the percentage broken. For the 2007/2008 season, for instance, most farmers and millers reported that high percentage of broken rice or poor quality resulted in reduction of the price of a tin.

Millers indicated that the price at which rice is sold at the other milling centres is determined by the prevailing prices in Kumasi. Millers at the other milling centres monitor the price movement in Kumasi and advice their customers accordingly. Any change in the wholesale price is transferred along the chain. Wholesalers and retailers normally raise their prices by a corresponding percentage any time there is an increase in the price.

4.4.3 Performance Indicators
4.4.3.1 Consumer Ratings of Local Rice Quality

The overall ruler and coordinator of marketing activity in a private enterprise economy is the consumer. The goal of the food system is to satisfy consumers. The final success of food production and marketing decisions hinges on consumer choices, no matter how

irrational, ill founded, or unfortunate (Kohls and Uhl, 1990). Consumers are the only ones with insight into their own preferences and values.

For the successful marketing of agricultural and food products, knowing the consumers' perceptions and preferences is an essential requirement (Wierenga, 1980). There are generally seven attributes on which consumers rate the qualities of rice. These include the colour, aroma, stickiness, taste, absence/presence of foreign materials, expansion and percentage of broken rice. The attributes of local rice were rated in comparison with imported rice. Three attributes considered here include colour, absence/presence of foreign materials and percentage of broken rice.

4.4.3.1.1 Colour

Most respondents (89%) indicated that they preferred white rice and so rated imported rice better than local rice. Though some local rice were whiter than some imported rice, the general trend on the market showed that most of the imported rice were whiter than local rice. Therefore on the basis of colour most consumers considered imported rice to be superior in quality.

4.4.3.1.2 Presence or Absence of Foreign Materials

All the respondents indicated imported rice to be of superior quality concerning this attribute. The high levels of foreign materials (stones and others) in local rice gave this result. Stones are virtually non-existent in imported rice.

4.4.3.1.3 Percentage of Broken Grains

Majority of respondents (78%) indicated that imported rice is better than local rice. The general trend showed that consumers preferred rice with low percentage of broken grains. With imported rice, the percentage broken is mostly indicated on the sack and so consumers have a choice. The high percentage of broken grains of local rice was the result of poor

processing. With the huller type mills, paddy was passed through two or three times and so gave rise to the high percentage of broken grains.

4.4.3.2 Labelling/Branding

Labelling or branding is practically almost non-existent with regards to local rice. Only one branded local rice was identified, under the brand name African Queen. This brings into focus the lack of standardized qualities and grades. This often makes the visual inspection of rice necessary. As noted by Scarborough and Kydd (1992), this increases the direct cost of buying and selling and does not encourage longer distance trade. This is a source of operational inefficiency and therefore leads to poor performance.

4.4.3.3 Percentage of Producers Who Market Their Own Produce

The percentage of rice farmers who marketed their own produce during the 2007/2008 season was almost 100%. Except those in remote areas where accessibility was a problem, almost all the farmers marketed the rice themselves. A division of labour between market participants, resulting in greater specialization, may increase the efficiency of marketing, as may increased competition resulting from a greater number of participants.

4.4.3.4 Range of Products Available

One approach is to regard possibility of choice as necessarily good, so the extent of quality competition is measured by the number of available products and qualities of product on the market (Bateman, 1975). The range of imported rice brands numbered seventy-seven (77) whilst that of local rice numbered twelve (12), of which only seven were widespread. On this score, there is much less choice with regards to local rice and partly the reason it has performed poorly on the rice market.

4.4.4 Estimated Volume of Flow of Rice in the Ashanti Region in the 2007/2008 Season.

Depending on weather and rainfall conditions, the volume of rice marketed annually fluctuates from year to year. It is thus difficult to determine precisely the volume of rice marketed annually.

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                                  FARMERS
        │             │              │                    │            │
       4%            3%            89%                    1%           3%
        ▼             ▼              ▼                     ▼            ▼
  ┌──────────┐  ┌──────────┐  ┌──────────────────┐  ┌────────────┐  ┌──────────┐
  │ Consumed │  │ Used for │  │     MILLS        │  │ Sold to Other│ │ Rent     │
  │ at Home  │  │ Planting │  │                  │  │ Farmers      │ │ Payment  │
  └──────────┘  └──────────┘  └──────────────────┘  └────────────┘  └──────────┘
                        40.05%      25.81%     23.14%
                          ▼           ▼          ▼
                   ┌────────────┐ ┌──────────┐ ┌──────────────┐
                   │ Wholesalers│→│ Retailers│ │ Cooked Rice  │
                   └────────────┘ └──────────┘ │ Sellers/Inst.│
                            25.05%             │ Buyers       │
                     15%          50.86%       └──────────────┘
                      ▼             ▼             ▼
                   ┌────────────────────────────────────┐
                   │             CONSUMERS              │
                   └────────────────────────────────────┘
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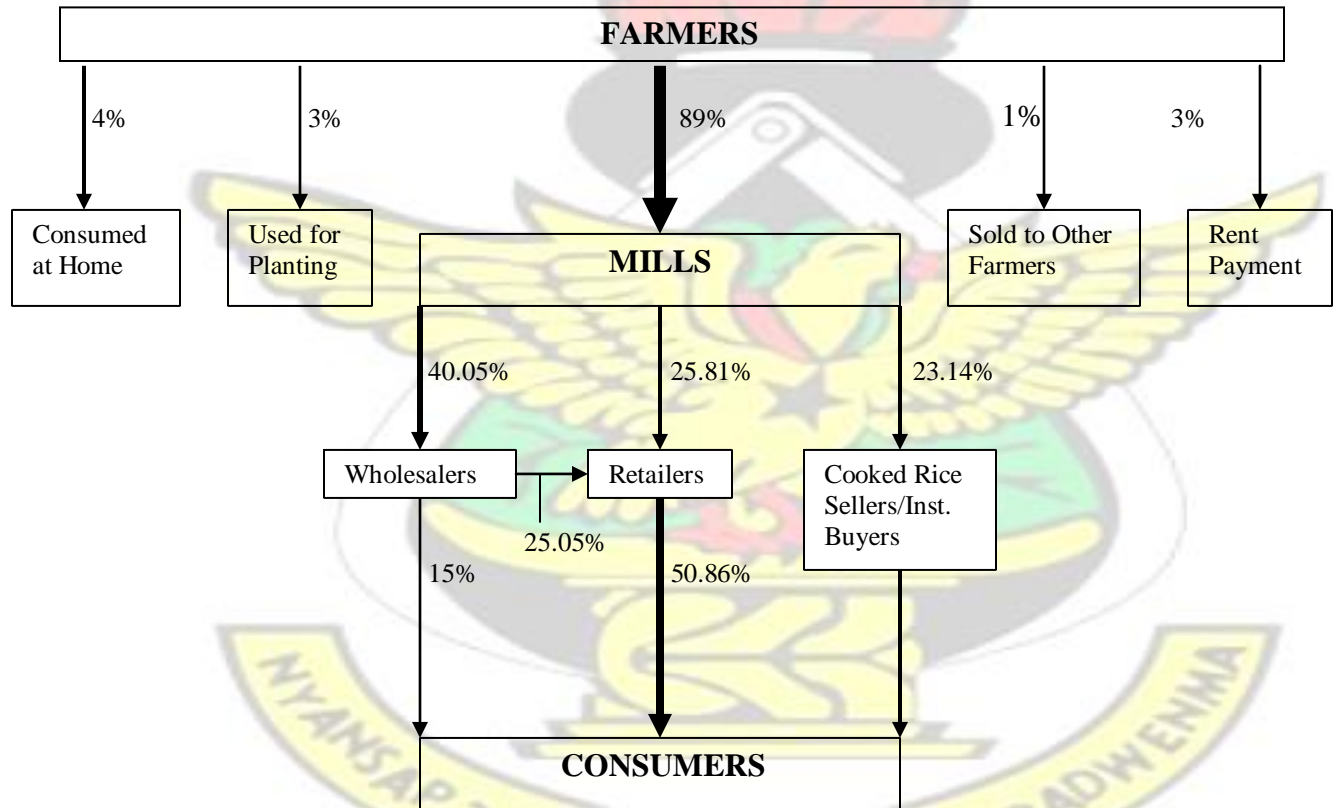
Figure 1: Volume of Rice Flow from Farmers to Consumers

For the 2007/2008 season, it is estimated that the proportion of output marketed by farmers was about 89% (shown in Figure 1 above). This proportion passed through the mills to wholesalers (40.05%), retailers (25.81%) and cooked rice sellers/Institutional buyers (23.14%). Of the remaining output, the farmers retained 4% for consumption, 3% was retained for planting, another 3% was used for paying rent and 1% was sold to other farmers as seed.

4.4.5 Consumers' Rankings of Rice Attributes

Consumers ranked the 7 rice attributes on which they based their preferences and purchasing decisions. The attributes were ranked by consumers on a scale of 1 – 7, with 1 being the most important and 7 the least important. The order in which consumers ranked the attributes came out as shown in Table 4.17 below.

TABLE 4.17 ATTRIBUTE RANKINGS OF MARKETED RICE BY CONSUMERS

Attribute	Rank Sum	Rank Position	Test Statistics
Taste	191	2	N = 100
Aroma	512	5	W = 0.785
Expansion	231	3	χ^2 = 470.75
Stickiness	603	6	Df = 6
Stones/F. Materials	190	1	Asymp.Sig = 0.000
Colour	458	4	
Percentage Broken	615	7	

Source: Study Survey.

With the lowest rank sum of 190, the absence of stones/foreign materials is the most important attribute that consumers considered in purchasing rice. Most consumers indicated that they could not stand the presence of stones/foreign materials in rice. The presence of stones/foreign materials in rice meant that the consumer had to hand pick them before cooking. This wasted a lot of time and is very important to consumers. The rank positions of the rest of the attributes are shown in the table above with the least important being the percentage of broken rice.

The Kendall's Co-efficient of Concordance (W) for the rankings as shown in table 4.17 is 0.785. That means the degree of agreement on a zero to one scale is 0.785. Thus, to a large extent, there is agreement among respondents with regards to the rankings provided. The asymptotic distribution gave a significance level value of 0.000, which is less than 0.05. Thus, the null hypothesis (the rankings disagree) is rejected and the alternative hypothesis (the rankings agree) is accepted.

The market seems to be segmented along the lines of imported and local rice. There are those who have preference for imported rice and others who have preference for local rice. There is a third group of consumers who patronise both imported and local rice. For the fifty respondents who had preference for imported rice, the first four attributes of local rice influencing their patronage were:

- Presence of stones/foreign materials (86% of respondents)
- Colour (74%)
- Percentage broken (70%)
- Stickiness (62%)

Eighty-six percent of the respondents indicated the presence of stones/foreign materials in local rice as the first attribute for non-patronage, followed by 74% who chose colour as the second, 70% who chose percentage broken as the third and 62% who chose stickiness as the fourth.

For the fifty respondents who had preference for local rice, the order of their acceptance of attributes of local rice why they patronise it were as follows:

- Taste (78% of respondents)
- Aroma (72%)
- Stickiness (64%)
- Expansion (62%)

Seventy-eight percent of the respondents indicated taste as the first attribute, 72% chose aroma as the second, 64% chose stickiness as the third and 62% chose expansion as the fourth.

For five selected local rice varieties, rankings were obtained for specific preferred attributes. The final results are shown in Table 4.18 below (next page).

TABLE 4.18 TOTALS OF ATTRIBUTE RANKINGS FOR SELECTED LOCAL RICE

Rice Variety	Taste	Aroma	Expansion	Stickiness	Stones/Foreign Materials	Colour
Asante Broni	157	142	234	155	58	50
Asante rice	64	67	99	80	95	100
Kwame Danso	168	162	185	180	168	162
Gwama	127	136	158	87	247	248
Hamale	234	239	75	248	177	188

Source: Study Survey.

For each variety, the attribute with the lowest sum is the most preferred and that with the largest sum is the least preferred. For instance, considering Asante broni, colour is the most preferred attribute whilst expansion of the grains when cooked is the least preferred. For Hamale, expansion of the grains when cooked is the most preferred attribute whilst stickiness is the least preferred. For each of the variety, the Kendall's Co-efficient of Concordance (W) was obtained from the rankings and the results are shown in Table 4.19 below.

TABLE 4.19 RESULTS OF W FOR LOCAL RICE ATTRIBUTE RANKINGS

Variable	Asante Broni	Asante rice	Kwame Danso	Gwama	Hamale
N	50	50	50	50	50
W	0.814	0.371	0.07	0.752	0.747
χ^2	203.45	92.78	17.53	187.88	186.81
Df	5	5	5	5	5
Asympt.Sig	0.000	0.000	0.004	0.000	0.000

Source: Study Survey.

The W for each variety shows the degree of agreement among the respondents who provided the rankings. The highest degree of agreement is that of Asante Broni (0.814) whilst the lowest is that of Kwame Danso (0.07). For each variety, the asymptotic significance value is less than 0.05, so the null hypothesis (the rankings disagree) is rejected and the alternative hypothesis (the rankings agree) is accepted.

4.4.6 Constraints Faced by Market Participants

4.4.6.1 Lack of Established Standards

There is lack of standardized qualities and grades in the system. This makes visual inspection of rice necessary and apart from increasing the direct cost of buying and selling, it provides opportunity for unfair trading practices and inhibits long distance trade. There is also the lack of standardized units of measurement. For instance, within a particular area, for the same price of a tin, the weight of produce may be variable depending on who fills the tin. Rice weighed at various mills and markets during the study indicated variation in the weights. Also, the weight of a sack of paddy may be variable due to the absence of standardized weights. The lack of established standards introduces some inefficiency in the system.

4.4.6.2 Access to Market Information

Farmers get some information from sources including neighbours, traders and millers. However, they do not get access to a variety of market information upon which they base their marketing decisions. The information that they get does not assist them in deciding the rice variety and how much to plant. As shown in Table 4.3, 87.9% of farmers reported that they did not get any professional advice on the variety to plant. There is no market extension service in the present system that guides farmers in taking production, storage and marketing decisions.

Rice traders need information regarding overall harvest prospect, demand and supply situation and prices in the terminal markets. Such information, if available, would guide traders in taking marketing decisions. Lack of adequate information has limited traders' sources of information to their own assessment and that of other traders and does not contribute to market efficiency. As a result of poor information, there may be market fragmentation because buyers and sellers are unaware of other prices being offered.

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4.4.6.3 Access to Transport Services

Farmers and traders normally use trucks and minibuses in conveying their paddy from the production areas to the milling centres. Generally, transportation is not a problem in the Ashanti region. However, there are some remote areas where getting access to transportation poses a problem. For such areas, the paddy traders reported that they encountered some difficulty in getting vehicles. They reported that after assembling one's paddy, sometimes they spend a few days before getting vehicles. Drivers who ply such areas always want the assurance that they would get truckloads before undertaking to convey the paddy. As such, the traders always have to group themselves to assure a convenient load before getting access to transportation. If one's paddy is not enough to fill up a truck, then he/she has to wait for the others in order to get a truckload. Also, due to the remoteness of such areas and limited facilities, haulers charge high tariffs.

4.4.6.4 Access to Bank Credit

Shortage of financial credit was found to be another limiting factor in the production and marketing of rice. None of the farmers acquired a loan from a bank. Most of them depended on their own meagre resources and some took loans from millers and traders. With regards to the millers, none took a loan from the bank. Four wholesalers took loans from informal sources at no interest. Three paddy traders also took loans from informal sources at no interest. Ten retailers took formal loans from NGOs and rural banks at various interest rates. Seven of them had the loans at the interest of between 1 – 25%, two had it at 26 – 50% and one had it at 51 – 75% per annum. Almost all the traders indicated the need for financial credit but cited the inaccessibility of bank loans. The main reasons given for not taking bank loans are the lack of collateral and the cumbersome nature of the application process. Others also indicated the high interest rate as the reason for not taking bank loans.

The main findings are summarized and presented in the next chapter. Based on the main findings, some policy measures are recommended to help improve the rice marketing system and make local rice more appealing to consumers.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The main findings of the study are summarized in this chapter and conclusions drawn. Based on the conclusions, some recommendations are presented.

5.1 Summary and Conclusions

The study was to analyze the organization and coordination of the marketing system and the perception of consumers towards local rice in the Ashanti Region. The following are the summaries and conclusions of the findings:

5.1.1 Socio-economic Characteristics of Respondents

The majority of farmers (93.1%) were aged between 20 – 49 years. On the whole, migrant farmers (77.6%) dominated rice farming in the Ashanti Region. A sizeable proportion of the farmers (43.1%) had no formal education with about 50% having up to basic school level education. Thus, farming is largely in the hands of the less formally educated.

Most of the farmers (69%) rented land for farming. With the land tenure being on annual basis, this has implications regarding yields from such lands as the farmers were cautious about undertaking land improvement methods. Majority of the farmers (87.9%) did not seek professional advice on the variety planted. Thus, they did not take into consideration consumer preferences on the market. This indicated the lack of or inadequacy of market extension service in the system that guides farmers in taking production, storage and marketing decisions. Majority of the farmers stored paddy for only up to 4 months and as such are not able to take advantage of price increase during the lean period.

Millers play a pivotal role in the marketing of local rice. The mills serve as the main marketing centres. Apart from milling, the millers also rendered other services to the farmers and paddy traders. Other services rendered include selling of rice on behalf of

farmers and paddy traders, provision of storage facilities for farmers and paddy traders and provision of loans and credit for farmers.

Paddy traders buy paddy from the villages and transport them to the main towns for processing. Most of the traders buy paddy from the Brong Ahafo, Ashanti, Eastern and Volta Regions. About 63% of the traders provided loans for farmers during the 2007/8 season.

Wholesalers in the study purchased rice from the paddy traders and farmers and sell to retailers, cooked rice vendors and consumers. The main towns of activities were Kumasi, Obuasi, Bekwai, Prestea, Bogoso, Asankragua and Wassa Akropong. For the 2007/8 season, only one wholesaler provided loans to some farmers.

Retailers covered in the study traded in both imported and local rice. Imported rice was purchased from the wholesale stores and local rice was purchased from milling centres and itinerant traders. Most of the retailers started their enterprises with personal savings and informal loans from friends and relatives. Majority (82.6%) were also engaged in trading of other food products.

Consumers interviewed for the study were mainly from the Ashanti, Sefwi, Ewe, Frafra and Busanga ethnic groups. They were traders, civil servants and artisans. Majority were in the GH¢ 151 - GH¢ 250 income bracket.

5.1.2 Characteristics of the Structure and Conduct of the Rice Market.

Thousands of farmers, market agents and consumers are engaged in the production, consumption and in the provision of various marketing services. Both formal and informal markets exist simultaneously and traders are usually active in both markets. Relations between farmers and millers were generally flexible except instances where millers provided loans to farmers. Relations between millers and paddy traders were somehow fixed. Between paddy traders and wholesalers/retailers, relations were generally flexible. Relations between consumers and the other market participants were flexible.

At each level of the marketing chain, there were large numbers of sellers and buyers such that none controlled a significantly large share of the marketed volume. Within the same locality, agents were price takers.

Information regarding overall harvest prospect, supply situation in the major market centres, demand for rice and the price of rice in various markets and mills is totally lacking. Traders sometimes travelled to a few market centres before being able to make buying decisions. Farmers and traders do not get a variety of market information upon which they base their marketing decisions. The lack of information leads to a very low degree of market transparency and contributes to marketing inefficiency in the system.

Entry barriers facing retailers include the difficulty of establishing oneself in the market place especially in the well-established markets. Paddy traders needed large amount of start-up capital which is difficult to obtain and serves as a barrier for potential entrants.

Most farmers sold their rice soon after harvest (between August – December). The rice is sold in tins to wholesalers, retailers or consumers. The same tin can weigh different volumes from the same trader due to the lack of usage of weight measures.

Paddy traders buy paddy from the remote areas and transport them to Kumasi for processing. Some were able to store up to 5 months and so were able take advantage of price increases. Traders normally use old bags which can contain greater volume over new ones. Wholesalers and retailers usually buy with the "helping" hand and sell without it.

Prices are set mainly in Kumasi by the farmers and paddy traders in consultation with the millers. Factors that influence price include prevailing supply and demand conditions in the market, the price of imported rice, the quality of milling and percentage broken.

5.1.3 Performance Indicators

Consumer ratings of local rice attributes that influence their choice depended on colour, aroma, stickiness, tastes, absence/presence of foreign materials, expansion and percentage of broken rice.

Majority of consumers (89%) indicated preference for white rice and so generally rated imported rice to be of superior quality. All the respondents rated imported rice superior with regards to the absence of foreign materials. With regards to the percentage of broken grains, majority (78%) indicated preference for rice with low percentage of broken grains and so rated imported rice as being superior to local rice.

Labelling or branding is practically almost non-existent with regards to local rice. This introduces a source of operational inefficiency and therefore leads to poor performance. For this study, almost all the farmers marketed their produce themselves and does not lead to increased efficiency, hence lower performance. The range of products is limited with regards to local rice and hence has performed poorly.

5.1.4 Consumers' Rankings of Rice Attributes

Generally, in order of importance, consumers ranked the attributes of rice in which they based their preferences as follows:

1. Presence of stones/foreign materials
2. Taste
3. Expansion
4. Colour
5. Aroma
6. Stickiness
7. Percentage broken

5.1.5 Constraints Faced by Market Participants

There is lack of standardized qualities and units of measurement which introduces some inefficiency in the system. Market participants do not get enough information to guide them in taking marketing decisions. Farmers did not get information about the rice variety to plant, and production and storage decision. Rice traders do not get information regarding overall harvest prospect, demand and supply situations.

In the remote areas, getting access to transportation posed a problem and as such resulted in high tariff charges. Almost all the traders indicated the need for financial credit. However, bank loans were not accessible to the traders due to lack of collateral, high interest rates and the cumbersome nature of the application process.

5.1.6 Volume of Flow Along the Marketing Chain

A large proportion (about 90%) of the output was marketed by the farmers. Of the remaining output, some were retained for consumption, for planting, for payment of rent and for sale to other farmers as seed.

Majority of the farmers bypassed the paddy traders and marketed the rice themselves. They do this in order to take advantage of value addition as a result of processing the paddy themselves.

5.2 Recommendations

Based on the findings of the study, the following recommendations are worth considering: Standardized weights and measures should be introduced and enforced. Tins used at the various levels should be monitored to ensure that the right measurements are adhered to.

The feasibility of introducing de-stoners in the existing milling machine should be examined. If feasible, this could help reduce the presence of stones and other foreign materials in local rice. Along this line, efforts should also be made to improve whole grain and reduce the multicoloured nature of some of the local rice. This it is hoped will make local rice more appealing to more consumers.

Efforts should be made at institutionalizing market extension services. The Ministry of Food and Agriculture could provide regular and current information about varietal preferences, price levels, demand and supply situations in the markets so that market participants could make useful decisions.

Efforts should be made at improving the feeder roads network in the remote areas to enhance accessibility in such areas. This will facilitate the conveyance of produce from the remote areas.

Bank credit to the farmers should be revisited. Millers could be roped in by the financial institutions to serve as a link between them and the farmers through which credit could be made available to the farmers. Credible millers could be screened and given some form of orientation to enable them play this role more effectively. This would make more funds available to the farmers who need them.
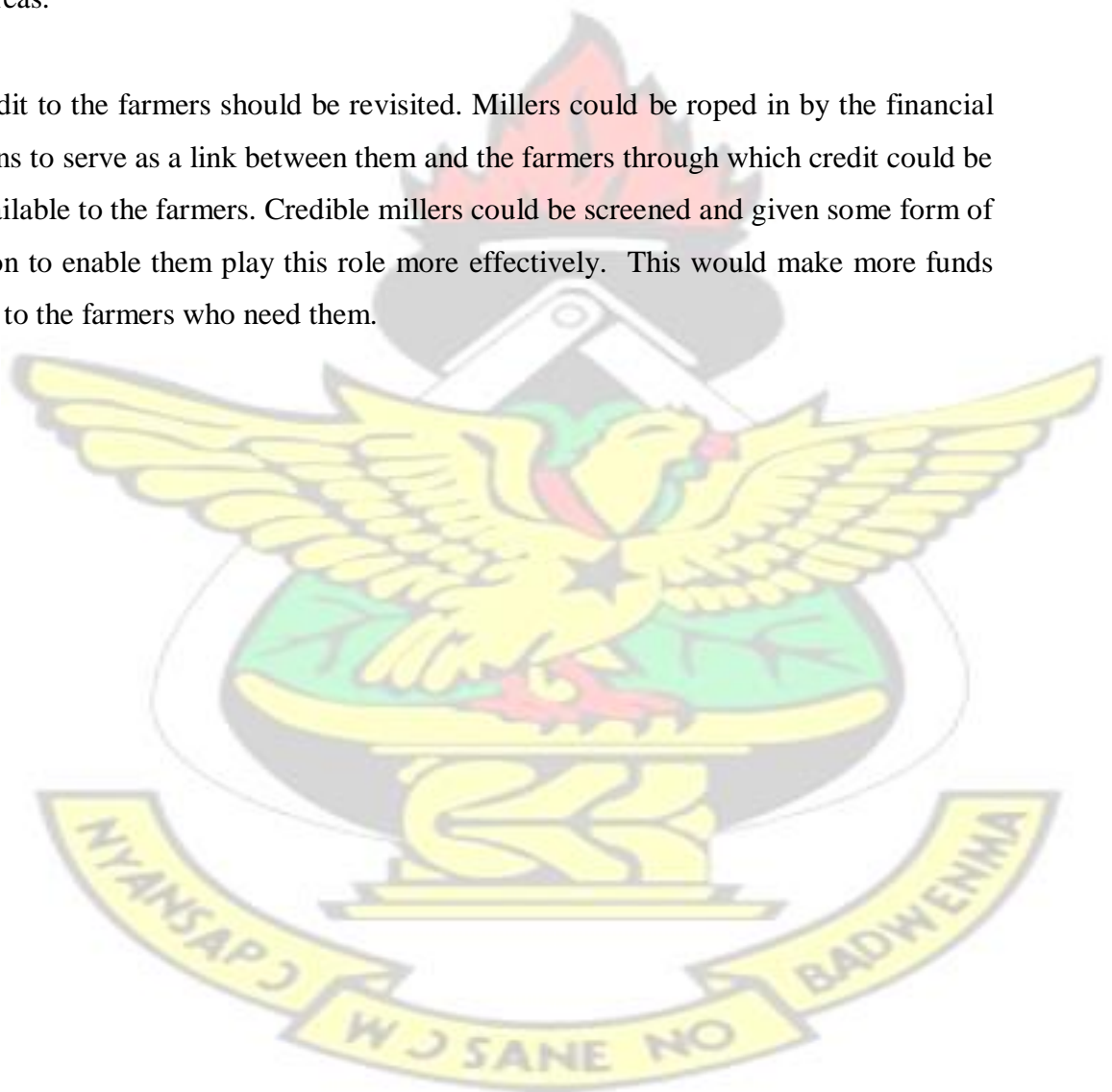
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APPENDIX A: LOCATIONS AND OTHER DETAILS OF RICE MILLS USED IN STUDY.

No. Village/Town Village /Town	Name of	Name of	Year of

Location (Main Road)		Owner	Operator	Establishment
1	Obuasi Mile-nine	Kwaku Bronya	Kofi Danso	1959
2	Obuasi Watreso	Aliu Salifu	Abu Bosabdi	1994
3	Obuasi Watreso	Kwadwo Yate	Salifu	1997
4	Obuasi Watreso	Kwabena Kakraba	Kwadwo Mensah	1999
5	Obuasi Kumpese	Akua Afriyie	Kofi Moses	1999
6	Obuasi Antoakrom	Kwame Atuahene	Iddi Gariba	1982
7	Obuasi Antoakrom	Issac Mensah	Joseph Tawiah	1997
8	Bibiani Nkyemkyemso	Daniel K. Sarpong	Kuasi Mensah	1987
9	Bibiani Nkyemkyemso	Awudu Issaka	(Owner/Operator)	2000
10	Sunyani Pokukrom	Opanin Sibiri	Kofi Yeboah	1983
11	Sunyani Pokukrom	Yaw Amoako	Kofi Atta	1997
12	Sunyani Adugyama	Adu Tawiah	(Owner/Operator)	1975
13	Sunyani Adugyama	Mohammed Iddrisu	(Owner/Operator)	2001
14	Sunyani Asuadei	Kwaku Baah	Safur Zibila	1992
15	Sunyani Biemtetrete	Abudu Mahama	(Owner/Operator)	1995
16	Sunyani Gyaenkontabuo	Ibrahim Mohamadu	(Owner/Operator)	1993
17	Sunyani Gyaenkontabuo	Mallam Shaibu	Abdul Karim	1999
18	Sunyani Mfensi	Yaw Mbugri	(Owner/Operator)	1990
19	Sunyani Mfensi	Seidu Apame	Muhamadu Seidu	1997
20	Sunyani Mfensi	Abangaba Alhassan	Inusah Akeliba	1996
21	Mampong Abrakaso	Adwoa Boahemaa	Samuel Kodua	1999
22	Mampong Agona	Anti Diana	Baba Soca	1982
23	Mampong Agona	Kossi Nomeshe	Komla Tenasu	1997
25	Offinso Koforidua	Zakari	Kwasi Boateng	1984
26	Offinso Abofour	Alhaji Salifu	Abass	1980
27	Offinso Abofour	Zakari Issaka	Inusah Issaka	1979
28	Offinso Abofour	Peter Boakye	Kofi C. K.	1999
29	Offinso Adukuro	Mohammed Issaka	AbubakrMohammed	2001
30	Offinso Adukuro	Amadu Sakibu	(Owner/Operator)	1999
31	Offinso Worapon	Iddrisu Moro	Karim Alhassan	2000
32	Offinso Barekese	Methodist Church(James)	Fuseini Tariga	1995
33	Offinso Barekese	Kwasi Sereboe	Osei Kwame	1993
34	Accra Duampompo	Alhaji Yahaya	Kwame Yeboah	1983
35	Accra Nobewam	Comfort Serwaa	Kwame Ofori	1998
36	Accra Konongo	Ahmed Yussif	Abdul Malik Ahmed	1990
37	Accra Boawadumasi	Joseph Kofi Dwumah	Atta Frimpong	1999

38 Accra Simdadeso Issah Mossi Paul Afukey 1996 39 Accra Kwaso S. K. Addai Atta Kwabena 1998

40 Kumasi Race Course Amadu Amidu (Owner/Operator) 1986 41 Kumasi Race Course Yaw Manu (Owner/Operator) 1982 42 Kumasi Race Course Ama Agyapomaa RichardAcheampong 1983

43 Kumasi Race Course Abena Sakaa Aminu 1987 44 Kumasi Race Course Hawa Shaibu Ibrahim 1987 45 Kumasi Race Course Cecilia Agyeiwaa Mohammed 1999

46 Kumasi Race Course W. O. II Lumor Danid Moses Ahiable 1982 48 Kumasi Race Course Mariama Yahaya Yahaya 1982 49 Kumasi Race Course Abena Kyerewaa Yaw Opoku 1982

52 Kumasi Akwatia line Alhaji Baba Issaka Ibrahim Zakari 1983 53 Kumasi Akwatia line Iddrisu Abdul Mumuni "Boozing" 1997 54 Kumasi Akwatia line Kwabena Kanor Offoe Kanor 1992

55   Kumasi Akwatia line   Joseph Oppong Ofori   Alex Baffour Awuah   1992

56   Kumasi Akwatia line   Salifu Mumuni   1997

57   Kumasi Akwatia line   Mary Tetteh   Joseph Akanko   1990

58   Kumasi Akwatia line Kennedy Obeng Kankam Mohammed 1996 59 Kumasi Akwatia line Emmanuel Frimpong Osman Haruna 1998 60 Kumasi Akwatia line Osei Kwadwo Joseph Abebrese 2000

61 Kumasi Akwatia line Awudu Mumuni "Alhaji   Abogwese" 1998 62 Kumasi Akwatia line Hajia Mariama William Sowah 1999

63   Kumasi   Akwatia line   Haruna Akogri   Baba Haruna   1998

APPENDIX B : MARKETS IN WHICH STUDY WAS DONE

 AGONA MARKET
ANWIANKWANTA MARKET
ASAFO MARKET
ASAMANG MARKET
AYIGYA MARKET
BEKWAI MARKET
CENTRAL MARKET
EJISU MARKET

ESERESO MARKET
JUABEN MARKET
KONONGO MARKET
KWADASO MARKET
MAMPONG MARKET
OFFINSO MARKET
RACE COURSE MARKET