IMPROVING THE COMPETITIVENESS AND MARKETABILITY OF LOCALLY-PRODUCED RICE IN GHANA

DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (DFID)

CROP POST HARVEST PROGRAMME

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3. An Assessment of Rice Post-Harvest Systems

3.4 – A Preliminary Study of Consumer Preferences and Price/Quality Relationships – Raphael K Bam, Vincent M Anchirinah, John T Manful, Florence Ansereh-Bio and Adelaide Agyemang

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ABBREVIATIONS AND ACRONYMS

FAO   Food and Agriculture Organisation

IRRI   International Rice Research Institute

IDRC   International Development Research Centre

PPMED   Policy Planning Monitoring and Evaluation Department

FRI   Food Research Institute

EXECUTIVE SUMMARY

Background

This preliminary study of consumer preferences and price/quality relationships for milled rice complements other studies of post-harvest practices, post-harvest losses and techno-economic assessment of rice processing enterprises being conducted concurrently. The study objectives were to:

(a) determine consumer preferences for milled rice with due regard to local and imported rice

(b) identify the major forms in which rice is consumed in the study areas and determine if any special varietal preference exists for these forms

(c) conduct a preliminary determination of relationships between perceived quality characteristics and prices

Methodology

The study covered Accra, Kumasi and Tamale Metropolitan areas. These are the three largest cities in Ghana with Tamale being a major producing and consuming centre of locally produced rice whilst Accra and Kumasi are major consuming centres for imported rice. Two sets of questionnaires were designed, one for consumers and the other for traders. These were pretested and administered to 152 and 64 consumers and traders respectively in the study areas. It is believed the results are fairly representative of consumers and traders in the three cities.

Results of the Survey

Relative importance of rice as a major food staple

Combined analysis of the results from the three cities showed that rice ranked next to maize as the most important staple. Analysis of the same data by city showed that rice was the most important staple in Accra. The results confirm the increasing popularity of rice relative to other staples.

Rice Consumption Patterns

Local rice

Local rice is either consumed raw or parboiled with the latter being more common in the north. As expected, 74% of consumers in Tamale usually consume local rice (parboiled) produced in the area. Forty percent of the respondents in Accra and 38.1% of the respondents in Kumasi consume local rice (raw). This suggests that there is specific demand for local rice which corresponds to specific uses such as in the preparation of waakye.

Imported rice

The popular brands of imported rice are the high quality long grain types such as US No. 5, the Thai Perfume rices such as Golden Cocoa Pods, Liberty rice etc., the medium quality Thai long grains like Green Label, Rising Sun, Thai White Rice, Lucky Rice etc., the lower quality Vietnamese, Pakistani and China rices and short or bold grain types such as Australia rice and Thai superfine. US No. 5 is the most popular brand among consumers in all the three cities with 84.0%, 94.2% and 74.0% of consumers in Accra, Kumasi and Tamale respectively ranking it as number one. Perfumed rice is however more popular in Accra (80%) and Kumasi (76%) than Tamale (34%). The low demand for Perfumed rice in Tamale may be due to the high cost of this brand and coupled with the fact that it is perceived there to have inferior cooking qualities.

Rice Consumption / Preference Trends

In a sample size of 152, apart from 8.6% of the consumers who said rice is still an occasional meal all others consume it at least 1-3 times in a week. Of those who frequently consume rice 46.7% said rice is now a staple, 17.8% consume it because of ready availability, 9.9% said rice was a special diet, 7.9% said it was easy to prepare and 13.9% gave relative price stability as the reason for their increased patronage. Plain rice with stew is the most popular form (61.8%). This is followed by rice ball with soup (13.8%), jollof rice (13.2%) and rice and beans (waakye) (9.9%) with rice porridge being the least popular (1.3%).

Imported rice is the most preferred for almost all food preparations. Parboiled local rice and glabberima (local red) though least preferred are particularly good for the preparation of rice and beans popularly called waakye. This therefore indicates that there is a specific demand for local rice corresponding to specific uses. There appears to be a gradual shift to imported rice even for this specific demand. For example, consumers indicated that the lower quality brands of imported rice like Vietnamese, Pakistani and China rices are best for waakye and rice balls.

White is the most preferred colour of consumers (86.8%), followed by brown (9.2%) and red (3.9%).

Seasonal Consumption Patterns and Price Trends for Imported and Locally Produced Rice.

Local rice, with its seasonal production is characterised by higher supply with lower prices at harvest and lower supply and higher prices during the lean period especially after planting. The supply of imported rice on the other hand is relatively stable and hence relative price stability. The demand and price of rice is related to the availability or scarcity of other staples like maize, yam and cassava. For example, the lowest demand for rice is made between July and September when these substitutes are abundant in the market. Other periods are high demand periods. Imported rice with its higher quality in terms of lower foreign matter content, better colour, higher milling degree and lower percentage of broken grains generally sells at higher prices than the local product.

Rice Quality and Quality/Price Relationships

Quality characteristics such as colour, foreign matter, percent broken grains and cooking and eating qualities such as hardness, stickiness and expansion ratio are the most important quality considerations for both consumers and traders. Considerable differences exist between the consuming cities and income groups.

The fact that two parallel markets exist for imported and locally produced rice has been emphasized. The Ghanaian market is also characterized by a greater demand for

quality. A range of samples found on the market was collected. In addition to traders being asked to rank a list of quality variables in order of importance as they affect the purchase/sale of rice, they were also asked to list those characteristics which influenced the pricing of those samples collected from them. These characteristics were compared with those determined at FRI analytical laboratory. Since the demand for rice by traders is derived from that of consumers the ranking for the two groups were fairly similar. Colour, percentage broken grains, foreign matter and cooking and eating qualities such as stickiness, expansion ratio, and hardness ranked very high. The study suggests that the price of imported rice is dependent mainly on colour (the higher the degree of whiteness or translucence the higher the price) and percent broken grains. It appears cooking and eating qualities such as stickiness, hardness and taste are also very important in pricing rice. For locally produced rice, colour, foreign matter and degree of milling (% of bran remaining after on rice grain after milling) appear to be the most important characteristics determining the price.

Seasonal Variations in the Supply and Price of rice

Lowest volumes of rice are traded between August and October due to availability of other staples such as maize, yams, cassava etc. This confirms the finding that consumers consume least amounts of rice between July and September. Christmas and New Year activities and availability of other staples are the most important causes of variation in the demand/supply and price of imported rice.

Seasonal variation in the nominal price of locally produced rice between harvesting when prices are minimum and after seeding or lean seasons (June - October) when prices are maximum was observed. This situation is more pronounced in Accra and Kumasi than Tamale.

1.1   BACKGROUND TO THE STUDY

The main parameters and statistics of local rice production, processing and marketing are set out in an earlier report from this collaborative UK -funded project. An overview of this sub-sector could be obtained from Marketing of Rice in Ghana, NRI Report No. R2358 (S) prepared in collaboration with CRI, SARI and GIDA.

A common perception is that one of the major constraints to increased acceptability of locally produced rice is not the quantity but rather its quality when compared to the imported product. Locally produced rice, in general, is not branded or graded and is mixed with a higher percentage of foreign matter. It also has a high starch content, high moisture content and a higher percentage of broken grains compared to the imported ones. This quality constraint has resulted in parallel markets for the local and imported types with different demand and supply responses. The demand for locally produced rice is low particularly in the urban consuming centres like Accra, Kumasi and Sekondi/Takoradi. Note however that some commercially processed raw milled rice produced in the irrigated rice schemes in the south of the country is both branded and graded and marketed competitively alongside imported products by the Ghana National Procurement Agency in Accra. This rice is reported to be sought after and preferred by a certain segment even at a price premium over imported brands (Conway, 1997).

This study therefore aims at identifying consumer preferences for rice in major urban centres and determining the apparent price/quality relationships underpinning those preferences as a means of reducing the current dependence on imported rice. Most studies done in the past have addressed pre-harvest issues. This study is part of the overall strategy of improving the competitiveness of locally produced rice. The study covered both consumers and traders in the Tamale, Kumasi and Accra metropolitan areas. Tamale being a major producing and consuming centre for local rice and Accra and Kumasi being major consuming centres for higher quality imported rice.

1.2 OBJECTIVES OF THE STUDY

The objectives of this study were to:

(a) determine consumer preferences for milled rice (both raw and parboiled) with due regard to local and imported rice

(b) identify the major forms rice in which rice is consumed in the study areas and determine if any special varietal preference exists for these major forms

(c) conduct a preliminary determination of relationships between perceived quality characteristics and prices.

2.0   METHODOLOGY

2.1   The Study Areas

The study was in two parts: one part covered rice consumers and the other, traders in the cities of Tamale, Kumasi and Accra in Ghana. Tamale was selected because (a) it has a history of rice cultivation and (b) it is a major consuming area for locally produced rice. Kumasi and Accra were selected because of their cosmopolitan nature. They are also major consuming areas for imported rice and the rice markets in these cities are also larger than the other cities.

2.2   Field Surveys

2.2.1   Preparation, Pretesting and Administration of Questionnaires

Two structured questionnaires were designed, one for consumers/end users (Annex 1) and the other for traders (Annex 2). These were administered to consumers and traders in Tamale, Kumasi and Accra between March and April, 1998.

2.2.2 Consumers/End users

The cities were divided according to administrative districts and/or sections/zones and income status. Tamale was divided into four sections namely North, South, East and West. Kumasi was divided into four administrative sub metropolitan assemblies/districts namely: Subin, Bantama, Asokwa and Suame/Old Tafo sub metropolitan assemblies. Accra was

divided into 5 districts. Towns surveyed within each district were selected according to their income status. This factor was also considered for Kumasi. Towns surveyed were therefore classified as high income, middle income or low income according to PPMED classification.

In the administration of the questionnaires in each area, a three stage sampling methodology was used. Towns within districts/zones were first sampled. Within each town, streets/routes were then sampled and on each street/route a person in every 5th house was interviewed. Fifty households were interviewed in Tamale (13 households/area), 52 in Kumasi (13 households/metropolitan area) and 50 in Accra (10 households/area). In all 152 households were interviewed in the three cities.

2.2.3 Traders

Traders interviewed were selected from wholesalers, retailers and those who perform both functions. Twenty-five traders each were interviewed in Tamale, Kumasi and Accra. Eleven of the questionnaires were not well completed (four in Tamale and seven in Kumasi) and were therefore discarded. In Tamale, traders were interviewed from Aboabo and Central markets and shops. In Kumasi, traders were interviewed from the Central and Asafo markets and shops at Adum while traders selected from Accra were from 31st Dec. Makola, Nima, Madina and Ashaiman markets.

Samples of rice representing the range of rice types/varieties/brands were bought from retailers. Samples were kept in high-density polyethylene bags. The bags were folded about three or four times and then stapled with pins at six points to prevent mixing of samples. For each sample collected, information on the rice type/brand, unit price, market from which it was bought from, name of trader/store from which sample was bought and the characteristics which influenced the pricing of the rice type were indicated on a piece of paper and put in the envelope before sealing it. The same information was provided on an adhesive label attached to the bag to prevent mixing of samples. The samples were then sent to the Food Research Institute (FRI) for quality assessment. Samples collected from Accra were sent to FRI on daily basis, while samples from Kumasi and Tamale were sent to FRI immediately after completion of the survey in these cities.

Data on retail prices of rice (local and imported) for Accra, Kumasi and Tamale were collected from 1991 to 1997 from PPMED. However, a lot of missing values for certain months within certain years were observed for each of these study areas. Those years in which there were no missing values were therefore used. Below is a table showing the city, type of rice and those years price data used in the calculation of the average price data.

City	Type of rice	Year
Accra	Local	1995, 1996, 1997
Accra	Imported	1994, 1995, 1996
Kumasi	Local	1993, 1995, 1996
Kumasi	Imported	1994, 1995, 1996
Tamale	Local	1992, 1993, 1996, 1997
Tamale	Imported	1992, 1993, 1994, 1996, 1997

Data collected was coded and analysed using StatPac Gold version 3.0 statistical software (1988).

3.0 RESULTS

3.1 Consumption of Major Staples

Consumers were asked to mention the first, second and third major staples consumed within their households. Maize ranked highest followed by rice among the first category. Rice was however ranked highest among the second and third categories (Fig. 1). Analysis of the same data by city indicated rice as being the most important in Accra with maize being the most important in Kumasi and Tamale (Fig. 2). This goes to confirm the number one status of maize both in terms of area and level of consumption and rice as being the second most important. Millet and cassava which are used in preparing tuo zafi, an important northern staple, and fufu an important staple in Ashanti ranked higher than rice in Tamale and Kumasi respectively.

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3.2 Rice Consumption Patterns

3.2.1 Local Rice

Local rice is either consumed raw or parboiled. Forty percent of the consumers in Accra consume local rice (raw) while 38.1% and 20% of consumers in Kumasi and Tamale respectively consume local rice (raw). In Ghana, parboiling is mostly done only in the north because of the harsh environmental conditions during the harvesting period. As expected, a greater percentage (74%) of consumers in Tamale usually consume local rice (parboiled) produced in the area. The corresponding figures are 42.0 % for Accra and 25.0% for Kumasi. As already mentioned, it is popular for waakye (rice and beans) usually sold in the cities. Eighteen percent of respondents in Accra said they do not consume local rice. The figures for Kumasi and Tamale are 36.9 and 6.0% respectively (Fig. 3). Twenty eight percent of consumers in Tamale produced some proportion of the local rice they consume. Eight percent of the respondents in Accra said they consume only local rice whilst the percentages for Kumasi and Tamale are 1.9 and 12.0% respectively.

3.2.2 Imported Rice

The popular brands of imported rice are U.S. No.5, Thai Perfumed rice (PFR), other Thai brands (OTRB) such as Lucky rice, Thai Superfine, Thai White rice, Rising sun etc., Vietnamese (VR) etc. and other brands (OIMP e.g. Pakistani, China and Australia rice) in decreasing order of importance. U.S. No. 5 is very popular among consumers with 84.0%, 94.2% and 74% consumers in Accra, Kumasi, and Tamale respectively patronising it (Fig.4).

It was realised in Accra and Kumasi that consumers have studied into so much detail the characteristics of U.S. No.5 such that they are able to differentiate it from all other brands even without labels. For example, consumers use presence of yellow grains and leguminous seeds to identify it. They even believed that the presence of yellow grains and leguminous seeds are intended for easy identification. The relatively higher demand for U.S. No.5 than Perfumed rice (even though Perfumed rice is a high quality long grain and more translucent than U.S. No.5) was explained by the consumers to be due to the fact that U.S. No.5 has a higher expansion ratio than Perfumed rice, softer when cooked and that the taste is comparable to the Perfumed rice and sells cheaper. It was therefore not surprising to find

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most stores selling either U.S. No. 5 alone or relatively higher quantities of U.S. No. 5 during the trader survey. Perfumed rice is however more popular in Accra (80%) and Kumasi (76.9%) than in Tamale (34%). It was realised during the survey that only lower quality imported rice brands like the other Thai brands with comparable prices as the local ones were retailed in the daily markets in Tamale. Though other brands like the perfumed and U.S No.5 were sold in the shops they were not retailed in margarine cups, American tins etc., as in the case of other brands mentioned above.

3.3 Rice Consumption/Preference Trends

Only 8.6% of the consumers said rice is consumed occasionally. The rest consume it at least 1-3 times a week (Fig. 5). Asked why rice is being frequently consumed, 46.7% said rice was a staple, 17.8% said because of its availability, 9.9% said rice was a special diet, 7.9% said because it is easy to prepare, 3.9% said price of rice is stable compared to other staples, 4% gave no reasons while 9.9% said they do not consume rice frequently.

Plain rice with stew is the most popular form of food preparation by most households. This is followed by rice balls with soup, jollof rice and rice and beans with rice porridge as the least preferred food form (Table 1).

Table 1. Major common forms of consuming rice by respondent households

Form of preparation	Percentage of households consuming it
Plain rice with stew	61.8
Rice balls with soup	13.8
Jollof rice	13.2
Rice and beans	9.9
Rice porridge	1.3

N = 152   Source: Survey data

Imported rice was mentioned by 69.7% of the consumers as the most preferred rice for almost all the preparations (69.7%) followed by locally produced raw sativa (18.4%). Parboiled rice and glabberima followed with 6.6 and 5.3% respectively. These are particularly good for rice and beans, popularly called waakye. Also, 86.8% of the respondents indicated white as their most preferred colour, followed by brown (9.2%) and red (3.9).

In their preference orderings for various rice varieties/brands, foreign matter, expansion ratio, aroma and freedom from insect infestation are the most important quality considerations. The study also revealed that colour, milling degree, cooking time, stickiness, presence of paddy grains and proportion of broken grains are important quality considerations. Proportion of yellow grains and red rice are least important quality considerations (Table 2).

Table 2. Relative importance of different quality characteristics

Quality Characteristic	Relative importance/ Percentage of respondents		
	Very important	Somewhat important	not important
Foreign matter	97.4	0.7	2.0
Expansion ratio	94.1	3.3	2.6
Aroma	83.6	6.6	9.9
Insects	80.3	10.5	9.2
Colour	69.4	13.2	17.8
Cooking time	69.1	15.8	15.1
Milling degree	66.4	11.2	22.4
Odour	55.9	18.4	23.7
Stickiness	54.6	17.8	27.8
Hardness on cooling	53.9	21.7	24.4
Paddy grains	53.9	23.0	23.1
Long grains	52.0	21.1	27.0
Broken grains	51.2	18.0	33.8
Red rice	18.4	23.7	57.3
Yellow grains	13.8	32.8	53.3

N = 152   NB: Percentage total more than 100 because of multiple responses

Studies on the economics of grain quality in Indonesia, Bangladesh, Malaysia, the Philippines and Thailand indicated that rice grain quality and quality preferences vary across countries and regions but some quality preferences are widely shared (IRRI and IDRC, 1992). Our study revealed that quality and quality preferences do not only vary across countries and regions but also between cities within the same country (Table 3a) and ethnic groupings. While grain size/shape and percentage of broken grains are very important quality characteristics in Kumasi, milling degree, odour, hardness and stickiness are very important in Accra while in Tamale, milling degree is very important (Table 3a) because of the predominance of locally produced rice.

Table 3a. Relative importance of various quality characteristics in Accra, Kumasi and Tamale

Characteristic	Relative importance (Percentage of respondents/city)								
	Very important			Somewhat important			Not important		
	Accra	Kumasi	Tamale	Accra	Kumasi	Tamale	Accra	Kumasi	Tamale
Foreign matter	96.0	98.1	98.0	2.0	0.0	0.0	2.0	1.9	2.2
Insects	96.0	78.8	66.0	2.0	9.6	20.0	2.0	11.5	14.0
Expansion ratio	94.0	98.1	90.0	4.0	1.9	4.0	2.0	0.0	6.0
Aroma	88.0	82.7	80.0	10.0	5.8	4.0	2.0	11.5	16.0
Hardness	86.0	38.5	38.0	10.0	26.9	28.0	4.0	34.6	34.0
Milling degree	84.0	34.6	82.0	8.0	17.3	8.0	8.0	48.1	10.0
Cooking time	80.0	48.1	40.0	18.0	7.7	30.0	2.0	44.2	30.0
Stickiness	80.0	69.2	58.2	16.0	9.6	22.0	4.0	21.2	20.0
Odour	78.0	50.0	36.0	16.0	15.4	22.0	6.0	34.6	42.0
Colour	68.0	63.5	76.0	26.0	7.7	6.0	6.0	28.8	18.0
Broken grains	32.0	82.7	40.0	26.0	3.8	34.0	42.0	13.5	26.0
Red rice	32.0	15.4	8.0	44.0	9.6	18.0	24.0	75.0	74.0
Grain size/shape	30.0	88.5	34.0	24.0	5.8	16.0	46.0	5.8	50.0
Yellow grains	12.0	13.5	16.0	54.0	19.2	26.0	34.0	67.3	58.0

N= 152   NB: Percentage total more than 100 because of multiple responses

Source: Survey data

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Quality characteristics such as colour, foreign material, expansion ratio and aroma were commonly listed by respondents in all the survey areas. Differences were not observed in quality preferences between the various income communities (Table 3b). It was also observed in the study that quality preferences did not change much with income status but rather, high income consumers were able to pay higher prices for a larger number of quality characteristics than low income consumers. It was realised during the survey that some of the consumers in Accra and Kumasi who could not afford the price of U.S. No.5 buy, for example, greater quantities of the lower quality but higher expanding Vietnamese rice which according to them is not tasty. However, mixed with U.S. No.5, a cooked product with both desirable expansion ratio and better taste is achieved. This, therefore, suggests that lower income consumers prefer rice that is more filling. Most of the consumers preferred rice with high expansion ratio. This observation may be due to the fact that 86.2% of the respondents had up to 10 persons per household. Juliano (1985) reported that the amylose content of rice is a major eating quality factor and that it correlates directly with volume expansion and water absorption during cooking and with hardness, whiteness and dullness of cooked rice. The amylose content is controlled by both environment and variety (Juliano and Duff, 1989). The United States long grain rice are intermediate amylose types (Juliano et al., 1990) suggesting that the Ghanaian consumer prefers the intermediate amylose types.

Table 3b. Relative importance of various quality characteristics as influenced by different income communities

Quality Characteristics	Percentage of respondents from the different income communities									
	High Income			Middle Income					Low Income	
	Teshie/Nungwa Estates	Cantonments	Subin	Asokwa	Bantama	Adenta	Madina	Tamale	Suame	Nima
Foreign matter	90.0	100	100	92.3	100	100	100	98.0	100	100
Colour	100	100	75.0	45.2	69.3	100	90.0	82.0	88.9	80.0
Insects	100	100	87.5	100	100	90.0	100	86.0	72.2	100
Milling degree	100	100	50.0	53.9	53.9	60.0	100	90.0	50.0	100
Yellow grains	80.0	80.0	87.5	30.1	15.4	70.0	70.0	64.1	22.5	30.0
Broken grains	80.0	70.0	100	84.6	84.6	50.0	40.0	74.0	83.3	50.0
Long grain	70.0	80.0	100	84.6	100	30.0	30.0	50.0	94.5	60.0
Odour	100	100	62.5	61.6	69.2	100	100	70.0	38.9	90.0
Hardness	100	100	37.5	38.5	84.6	80.0	100	66.0	83.4	100
Stickiness	100	100	62.5	38.5	69.3	70.0	100	58.0	83.4	100
Expansion ratio	100	94.0	100	100	100	90.0	100	84.0	100	100
Aroma	100	100	87.5	76.9	100	100	90.0	84.0	88.9	100

3.4 Sources of Rice Supply to Consumers

Table 4 shows that most consumers obtain their rice from either a local (78.9%) and/or distant market (84.2%) with farms and rice mills being the least frequented sources of supply of the commodity. This is not surprising since most of the foodstuff markets in Ghana are dominated by women who retail at daily and weekly local markets within their areas of operation.

Table 4. Usual sources of rice purchased by consumers

Source	Percentage of respondents purchasing from source
Distant market	84.2
Local market	78.9
Retail store	38.2
Super market	28.3
Rice mill	3.9
Farm	0.7
Other sources	0.7

N = 152   NB: Percentage total more than 100 because of multiple responses

Source: Survey data

3.5 Seasonal Consumption Patterns and Price Trends for Imported and Locally Produced Rice

The fact that a parallel market exists in Ghana for imported and local rice has been emphasised. Local rice is produced at a point in time but consumed throughout the year. Its supply depends on natural factors such as rainfall, cost of inputs etc. The supply of local rice is therefore seasonal with higher quantities characterised by lower prices at harvest (October - January) and lower quantities characterised by higher prices during lean periods especially after planting (June - October). The supply of imported rice on the other hand is relatively stable and hence relatively stable prices.

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The consumption of rice also depends on the absence and / or availability of other foodstuffs like maize, yam, cassava etc. These are also generally locally produced and so subject to the same supply variations as in the case of locally produced rice. The reason rice is increasingly becoming a staple in Ghana is due to these supply variations in stability of these locally produced traditional staples. Figures 6 and 7 indicate the seasonal variations in demand for rice and the reasons for these variations respectively. The results indicate that the lowest amounts of rice is demanded between July and September due to the availability of other staples like maize, yam and cassava since this is the harvest period for these crops. The other periods of the year are high demand periods for rice as these traditional staples become increasingly scarce.

It was generally accepted that imported rice with higher quality characteristics in terms of lower foreign matter content, better colour, higher milling degree, lower % broken grains (Table 5) etc. sells at higher prices than locally produced rice (92.8% of respondents). Some of the respondents (2.6%) could not tell which one sells at a higher price while 4.6% said locally produced rice sells at higher prices than imported rice. The reasons given by the respondents for the price difference are presented in Table 5.

Table 5. Most important reasons given for price differences between locally produced and imported rice

Reason	Percentage of respondents
Foreign matter	90.8
Colour	90.8
Broken grains	69.1
Milling degree	67.1
Odour	60.5
Paddy grains	52.0
Other factors	7.9

N= 152   Source: Survey data

3.6   The Rice Market in Ghana

The Ghanaian market is characterised by demand for quality rice as shown by the range of samples collected from the various markets in Accra, Kumasi and Tamale. There is also a preference for imported rice even though some is sold at a higher price. The quality types of rice on the market include high quality long grain rice (e.g. Perfumed rice such as Golden Cocoa pods, Liberty etc., and U.S. No. 5), medium quality long grain rice (e.g. Thai white rice, Lucky rice, Green label, Rising sun etc.), short or bold grain types (e.g. Thai Superfine, Australia) poor quality types (e.g. Vietnamese, Pakistani and China rice), parboiled (both imported and local). Each of them is demanded by different markets.

Paddy produced from the irrigated schemes (e.g.. Dawhenya, Afife, Kpong, Tono etc.) by rice farmers' co-operatives is sold to the industrial mills immediately after harvest. The industrial mills sell the processed rice to distributors. The major buyer of this industrially processed locally produced rice is GNPA. Locally produced rice which is industrially processed is clean, white and has low percentage of broken grains and addresses the same market as imported rice. Poor quality local rice (sativa non-parboiled) and locally produced parboiled rice are sold only in special markets in Accra and Kumasi.

3.7   Relationship between Price and Quality

Most (82.8%) of the trader respondents were females while 17.2% were males. Also, 92.2% of the trader respondents were wholesalers. Most of the wholesalers also performed retail functions.

In the trader survey, a list of quality variables were presented and traders were asked to rank these variables in order of importance as they affect the purchase/sale of rice. The results showed that physical attributes such as colour, % broken grains, grain length, and cooking and eating qualities such as hardness, stickiness and expansion ratio (Table 6) and foreign matter are very important grain quality indicators for traders.

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Table 6. Relative importance of quality characteristics traders look for when buying rice for sale

Quality Characteristic	Relative importance/ Percentage of respondents		
	Very important	Somewhat important	Not important
Colour	98.4	1.6	0.0
Expansion ratio	76.6	14.1	9.4
Broken grains	75.0	4.7	20.3
Foreign matter	73.4	9.4	17.2
Stickiness	67.2	9.4	23.4
Hardness	67.2	6.3	26.6
Grain size/shape	65.6	6.3	28.1
Odour	50.0	20.3	29.7
Aroma	43.8	37.5	18.7
Milling degree	35.9	42.2	21.9
Yellow grains	31.3	29.7	39.1
Paddy grains	20.3	42.2	37.5
Insects	12.5	12.5	75.0
Chalky grains	14.1	31.3	54.7
Cooking time	12.5	50.0	37.5

N = 64   NB: Percentage total more than 100 because of multiple responses

Source: Survey data

Differences were not observed between male and female trader responses. The range of rice samples found on the market were collected and traders were asked to list those characteristics which influenced their pricing. Among the characteristics listed were colour, % broken grains, foreign matter, and cooking and eating qualities such as stickiness, expansion ratio, hardness and taste (Table 7a). It was observed that the low quality brands rather have high expansion ratios compared to the high quality long and medium long grain brands. Several of the characteristics listed by the respondents were physically assessed by the Food Research Institute's analytical laboratory (Table 7b)

Table 7a shows that the value or price of imported rice is dependent on colour* (the whiter the rice, the higher the price), or grains that are translucent commanded higher price), percent broken grains, and cooking and eating qualities such as stickiness, hardness, and taste. For locally produced rice the important characteristics identified were colour*, foreign matter and degree of milling (% of bran remaining on rice grain after milling). Conway *et al.*(1992) observed in Indonesia that colour was an important factor in pricing rice. Both colour and foreign matter were also reported by Clarke *et al.* (1997) in Sri Lanka to affect the price of locally produced parboiled samba and long grain rice.

* as strongly indicated by traders

Table 7a. Traders assessment of quality characteristics which influenced the pricing of milled rice samples

Sample name	Price (*C/50kg+)	Grain classification: length & shape	Colour description	Cooking and eating qualities	Aroma	Other characteristics
1 Thai White rice (100%) Phoenix Jewel	80,000.00	Extra long grain and slender	Very attractive/ appealing (highly translucent)	-Non-sticky, fluffy and dry -Very tasty	Good	-No broken grains
2. Thai Superfine	64,000.00	Short and bold	Translucent	-Non-sticky, fluffy and dry -Good taste	Quite good	
3. Lucky rice (Thai)	57,500.00	Long and slender	Translucent	-Non-sticky, fluffy and dry -Good taste	Nil	- High percentage of broken grains
4. U.S No 5	82,000.00	Long and slender	Appealing but not as attractive as Perfumed rice	-Non-sticky, fluffy and dry -High expansion ratio (higher than the perfumed rice) - Fluffier than perfume rice - Very tasty (same as Perfumed rice)	Very good and comparable to the perfumed rice	Nil
5. Vietnamese rice (Tugyimi)	55,000.00	Long and slender	-Not attractive/appealing	-Very sticky and hard - Not tasty - Has highest expansion ratio - Good for waakye and rice balls - Patronised mostly by food sellers	Nil	-Grain mixed with high amount of foreign matter
6. Green label (Thai)	63,000.00	Long and slender	Translucent	-Non-sticky, fluffy and dry -quite tasty	Nil	Nil

7. U.S. No 5 Super extra long grain	84,000.00	Long and slender	Appealing but not as attractive as Perfumed rice	-Non-sticky, fluffy and dry -High expansion ratio (higher than the perfumed rice) - Fluffier than perfume rice - Very tasty (same as Perfumed rice)	Very good and comparable to the perfumed rice	Nil
8. Thai white rice (10% brokens)	57,500.00	Long and slender	Not very appealing	-Non-sticky, fluffy and dry -low expansion ratio -slight taste	Nil	Nil
9. Perfumed rice (gold rand) (Thai)	136,000.00	Long and slender	Very appealing/ highly translucent	-Non-sticky, hard and dry -low expansion ratio -Very tasty	Very good	Nil
10. Eagle rice (5% brokens) (Vietnamese rice)	58,000.00	Long and slender	Not attractive	-Sticky -Hard on cooling -High expansion ratio -Not tasty -Good for omo tuo	Nil	Nil
11. Australia rice	80,000.00	Short and bold	Good (Appealing)	-Sticky -high expansion ratio -Very tasty -Good for omo tuo	very good	Nil
12. China rice (35% brokens)	51,000.00	Short and bold	Not appealing	-Sticky -Hard on cooling -Not tasty -Good only for omo tuo	Nil	High % of brokens
13. Pakistan long grain (15 - 20% brokens)	52,000.00	Long and slender	Not appealing	-Sticky -Hard on cooling -High expansion ratio -Not tasty -Good for omo tuo -Patronised mostly by the food sellers	Nil	High foreign matter content

14. Ekombesa (Vietnamese rice)	51,500.00	Long and slender	Not appealing	-Sticky -Hard on cooling -Highest expansion ratio -Good for omo tuo and waakye	Nil	High foreign matter content
15. Local Parboiled rice. Ex-Kokomba	61,200	Medium and slender	Not appealing	-Sticky -Soggy when hot -Hard on cooling -Tasty	Good	-Low degree of milling -high % of brokens -High foreign matter content
16. Local Parboiled rice Ex-Yendi	61,200	Long and slender	Not appealing	-Sticky -Soggy when hot -Hard on cooling -Tasty	Good	-Low degree of milling -high % of brokens -High foreign matter content
17. Local Parboiled rice Ex-Dambai	61,200	Medium and slender	Not appealing	-Sticky -Soggy when hot -Hard on cooling -Tasty	Good	-Low degree of milling -high % of brokens -High foreign matter content
18. Diamond rice (Thai)-Perfumed	130,000	Extra long and slender	Highly Translucent	-Non-sticky, hard and dry -Low expansion ratio -Very tasty	Very good	Nil
19. U.S. No.5	84,000.00	Long and slender	Appealing but not as attractive as Perfumed rice	-Non-sticky, fluffy and dry -High expansion ratio (higher than the perfumed rice) - Fluffier than perfume rice - Very tasty (same as Perfumed rice)	Very good and comparable to the perfumed rice	Nil
20. Eagle rice (Vietnamese rice)	58,000.00	Long and slender	Not attractive	-Sticky -Hard on cooling -High expansion ratio -Not tasty -Good for omo tuo	Nil	Nil

21. Vietnamese rice	53,000.00	Long and slender	-Not attractive/appealing	-Very sticky and hard - Not tasty - Has highest expansion ratio - Good for waakye and rice balls - Patronised mostly by food sellers	Nil	-Grain mixed with high amount of foreign matter
22. Perfumed rice (Thai)	130,000.00	Extra-long and slender	Very appealing/ highly translucent	-Non-sticky, hard and dry -low expansion ratio -Very tasty	Very good	il
23. Tastic rice (South Africa)	200,000.00	Long and slender	Very appealing	-Tasty	Good	Nil
24. Old Mill stream (S Africa)	200,000.00	Long and slender	Very appealing	-Tasty	Good	Nil
25. Local Parboiled rice Ex-Wa	76,500.00	Long and slender	Very appealing	-Sticky -Could be soggy if too much water is added during cooking -Very good taste	Good	-Very High milling degree -Low foreign matter content -Low % brokens compared with other local types
26. Thai Long grain	85,000.00	Long and slender	Translucent	-Non-sticky, fluffy and dry -Good taste	Good	Nil
27. Local Sativa (raw) (Ashaiman)	61,200.00	Long and slender	Translucent	-Sticky -Soggy when hot -Hard on cooling -Tasty	Good	Moisture content
28. Parboiled rice (Togo)	112,200.00	Medium and slender	Appealing	-Non-sticky, fluffy and dry -Tasty -Good for fried rice	Good	Nil
29. Parboiled rice (Togo)	102,000.00	Long and slender	Appealing	-Non-sticky, fluffy and dry -Tasty -Good for fried rice	Good	Nil
30. Local Parboiled rice Ex-Bolgatanga	68,000.00	Long and slender	Very appealing	-Sticky -Could be soggy if too much water is added during cooking -Very good taste	Good	-Very high degree of milling - Low foreign matter content -Low % brokens

31. Local Parboiled rice Mandee Ex-Tamale	42,500.00	Medium and slender	Not appealing	-Sticky -Could be soggy if too much water is added during cooking -Very good taste	Good	-High foreign matter content -Low degree of milling
32. Local Parboiled rice Ex-Tamale	44,200.00	Long and slender	Not appealing	-Sticky -Hard -Good taste	Quite good	-High foreign matter content -Low degree of milling
33. Local Parboiled rice Ex-Navorongo	76,500.00	Long and slender	Very appealing	-Sticky -Could be soggy if too much water is added during cooking -Very good taste	Good	-Very high degree of milling -Low foreign matter
34. Local Parboiled rice Afife (Ex-Tamale)	42,500.00	Extra-long and slender	Not appealing	-Sticky and soggy -Hard on cooling -Tasty	Quite good	-High foreign matter content -Low milling degree -Moisture content
35. Asante broni Local sativa (raw)	61,200	Medium and slender	Not appealing	-Sticky and soggy -Hard on cooling -Tasty	Quite good	Nil
36. Kwame Danso, Local sativa (raw)	61,200	Medium and slender	Appealing	-Sticky and hard on cooling when freshly harvested -Very tasty	Good	Nil
37. Mr More Local sativa (raw)	61,200.00	Long and slender	Translucent	-Non-sticky, fluffy and dry when stored for some time -Good taste	Quite good	Nil
38. Mo koko (red rice) Glaberrima	71,400.00	Medium and	Quite appealing	-Sticky -Very good taste -Suitable for local dishes e.g., waakye	Very good	Nil
39. Asante mo Local sativa (raw)	56,100.00	Long and slender	Appealing	-Sticky and soggy -Hard on cooling -Tasty	Good	Nil

Table 7b. Physical quality characteristics of milled rice samples collected from traders

Sample name	Price (*C/50kg+)	% Broken grains	% Foreign material	% red rice	% mouldy grains	% black grains	% discoloured grains	% chalky grains	Length/ Width ratio
1. Thai White rice (100%) Phoenix Jewel	80,000.00	4.1	0	0	0.8	0	0	0.9	4.30
2. Thai Superfine	64,000.00	4.6	0	0	0.8	0	1.0	0.4	1.95
3. Lucky rice (Thai)	57,500.00	34.9	0	0	1.4	0	0.6	0.4	4.13
4. US No.5	82,000.00	21.9	0	0	2.9	0	0.2	0	4.01
5. Vietnamese rice (Tugyimi)	55,000.00	15.1	0	0	2.3	0	0.7	0	3.94
6. Green label (Thai)	63,000.00	5.7	0	0	0.8	0	0.7	0.3	4.25
7. U.S. No.5 Super extra long grain	84,000.00	23.1	0	0	0.8	0	1.4	0	4.05
8. Thai white rice (10% brokens)	57,500.00	12.2	0	0.6	0	4.2	0.7	0	4.01
9. Perfumed rice (gold brand) (Thai)	136,000.00	2.9	0	0	0.3	0	0.3	0.2	4.29
10. Eagle rice (5% brokens) (Vietnamese rice)	58,000.00	2.3	0	0.7	1.0	0	0.9	0.1	3.86
11. Australia rice	80,000.00	23.5	0	0	0.3	0	0	.2	2.95
12. China rice (35% brokens)	51,000.00	37.2	0	0	1.0	0	0.1	0	2.69
13. Pakistan long grain (15 - 20% brokens)	52,000.00	23.5	0	2.3	1.8	0.	0.5	0.2	4.07
14. Ekombesa (Vietnamese rice)	51,500.00	39.7	0	0	2.1	0	1.0	0.6	3.80
15. Local Parboiled rice Ex-Kokomba	61,200	32.3	0	0.1	2.7	0.6	12.2	0	3.86
16. Local Parboiled rice Ex-Yendi	61,200	37.4	0.4	14.6	1.2	1.1	8.8	0	20
17. Local Parboiled rice Ex-Dumbai	61,200	29.3	0	0.4	1.3	0.9	1.3	0	3.80

18. Diamond rice (Thai)-Perfumed	130,000	0.8	0	0	0.4	0	0.5	0	4.19
19. U.S. No 5	84,000.00	19.5	0	0	0.3	0	1.2	0	4.12
20. Eagle rice (Vietnamese rice)	58,000.00	1.9	0	0.2	0.4	0	0.4	0	3.91
21. Vietnamese rice	53,000.00	40.6	0	0.2	0.8	0	0.2	0	3.82
22. Perfumed rice (Thai)	130,000.00	1.4	0	0	0.1	0	0	0.1	4.79
23. Tastic rice (South Africa)	200,000.00	1.3	0	0	0.6	0	0.5	0	4.09
24. Old Mill stream (S. Africa)	200,000.00	2.6	0	0	1.0	0.3	1.3	0	4.28
25. Local Parboiled rice Ex-Wa	76,500.00	22.1	0	0.9	0.5	0.1	0.5	0	3.83
26. Thai Long grain	85,000.00	28.1	0	0.1	0.1	0	0	0	4.03
27. Local Satrva (raw) (Ashaiman)	61,200.00	20.6	0	0	0.9	0	0.7	0.2	4.47
28. Parboiled rice (Togo)	112,200.00	11.8	0	0.3	0.8	0.2	0.6	0	3.81
29. Parboiled rice (Togo)	102,000.00	4.4	0	0	1.9	0.2	8.3	0	4.51
30. Local Parboiled rice Ex-Bolgatanga	68,000.00	27.7	0.5	4.3	2.0	1.2	2.5	0	3.81
31. Local Parboiled rice, Mandee Ex-Tamale	42,500.00	19.6	0.1	3.1	1.2	1.0	9.6	0	5.01
32. Local Parboiled rice Ex-Tamale	44,200.00	27.4	0	1.8	1.5	0.4	5.4	0	3.87
33. Local Parboiled rice Ex-Navorongo	76,500.00	22.0	0.4	2.3	2.6	2.6	1.5	0	3.82
34. Local Parboiled rice Afife, (Ex-Tamale)	42,500.00	28.3	0.8	13.8	0.7	0.8	80.6	0	4.28

35. Asante broni, Local sativa (raw)	61,200	25.0	0.2	18.5	2.5	0	1.2	11.2	2.55
36. Kwame Danso, Local sativa (raw)	61,200	27.0	0.5	0.3	2.2	0	1.8	0.8	2.95
37. 'Mr More' Local sativa (raw)	61,200.00	21.0	0	0	0.9	0	0.8	0.3	4.30
38. Mo koko (red rice) Glaberrima	71,400.00	22.0	0.1	-	0.3	0	2.3	0	2.78
39. Asante mo Local sativa (raw)	56,100.00	27.5	0	0.2	2.7	0	6.2	0.5	3.92

* National currency = cedis. The exchange rate was $1 = C2,400.00 as at April 1998 when the survey was conducted.
+ kg = kilogram

3.8   Seasonal Variations in the Supply and Price of Rice

Apart from 21.9% of traders who said there is seasonal variation in the supply of locally produced rice, 70.3% of the traders could not tell if there is any variation and 7.8% said there is no seasonal variation in the supply. Similarly, 23.5% of the traders indicated that a lot of the locally produced rice is found on the market between October and January. Twenty five percent of the traders indicated that there is scarcity of the locally produced rice on the markets between May and September while the remaining 75% could not tell when there is scarcity on the market. This trend of results may be due to the fact that locally produced rice is sold only by specific traders in specific markets in Accra and Kumasi.

Normally, farmers plant their paddy fields between April and June. Harvesting of rice usually begins from end-October and ends in January. Figure 8 shows seasonal variation in the nominal price of locally produced rice between harvesting time (November - January) when prices are minimum and lean seasons (June - October) when prices are maximum. The low and relatively stable price observed between January and May could be due to high supply on the market. During this same period farmers are getting ready to start cropping their fields again and therefore have to sell their rice so as to pay for their activities. This situation is more pronounced in Accra and Kumasi where locally produced rice rather is supplied from their surrounding villages. The causes of seasonal variation in both the supply and price of locally produced rice therefore appears to be determined by the cropping season (planting/seeding and harvesting) and availability of other foodstuffs in the market.

A majority (62.5%) of the respondents indicated that there is seasonal variation in the supply of imported rice whilst 21.9% stated that there is no variation and the remaining 15.6% could not tell. While some of the traders (46.8%) stated that there is a lot of imported rice between September and January, 53.2% indicated there is a lot of imported rice on the market throughout the year. Respondents were asked to indicate the months in which there are shortages of imported rice on the market. About one half (48.5%) of the respondents said there are no shortages on the market throughout the

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year and the remaining 51.5% said there is scarcity on the market between May and September.

A majority (55.7%) of the traders interviewed indicated that lowest volumes of rice are traded between August and October due to availability of other staples such as maize, yams, cassava etc. This confirms the finding that consumers consume least amounts of rice between July and September. Some of the traders (31.3%) could not tell however the months in which they made the least sales. Seventy-three percent of the traders also indicated that the highest volumes are traded between November and January due to Christmas / New Year festivities. The traders also indicated that during this period the demand for imported rice is very high.

Prices of rice are lowest between January and March (60.9%) and July - September (23.5%). Prices are however highest between October and December (65.8%) due to Christmas festivities and April - June (33.0%) due to absence of other staples from the market. These assertions rather appear to be related to imported rice.

Figure 9 confirms the traders' assertion that the price of rice is highest between October and December and April - June. Other staples such as yams, cassava, maize etc. become scarce on the market between April and June thereby causing consumers to shift their demands from these crops to rice. Also, nominal prices appear to be stable between July and October due to availability of other staples. Unlike the locally produced rice, the nominal price for rice generally rises sharply between October and December due to Christmas festivities. Christmas and New Year festivities and availability of other staples therefore appear to be the most important causes of variation in the demand or supply and price of imported rice.

3.9   Types of Rice Sold on the Market, Origin, Price and Proportions Sold
The range of the rice that are sold on the Ghanaian market and their origin have already been presented in Table 7a. It was observed during the survey that prices of the various brands of rice did not vary much in all the survey areas. For example, US No. 5 was selling between eighty and eighty-four thousand cedis in Accra, eighty-two and eighty-

four thousand cedis in Kumasi and eighty-two thousand cedis in Tamale. On average, the price for this particular brand was about eighty-two thousand cedis.

Among all the rice types/brands sold on the market, the traders (64%) indicated that US No.5 has the highest rate of turnover because of its good cooking qualities, taste and aroma. The traders also explained that even though Thai Perfumed rice has a better visual appearance (colour) than US No.5, the demand for US No.5 is higher because US No.5 is cheaper, has a higher expansion ratio, softer texture on cooling after cooking and has comparable taste and aroma. Vietnamese rice was mentioned (37.5%) as the type/brand with second highest rate of turnover because of its higher expansion ratio compared with other brands and is also cheap. Traders mentioned that it is highly patronised by food sellers and is good for local dishes such as 'omo tuo' and 'waakye'. It was observed during the survey that some of the Vietnamese rice were labelled as 'Ekombesa' meaning 'hunger will end' and Vietnamese rice generally have been named 'Tugyimi' meaning 'the rescuer' because of their high expansion ratio. Perfumed rice was mentioned (21.9%) as the brand with the third highest rate of turnover because of its good aroma and taste and excellent visual appearance (colour). This brand is patronised by the high-income class.

3.10   Major Customers and Sources of Supply of Rice to Traders

The major customers of traders are final consumers (95.3%), traders who sell in other small markets (86%), food sellers (79.7%) and commission agents (45.3%). It was observed that the commission agents usually sell for most of the wholesalers and are paid commission depending on the number of bags they are able to sell.

Table 8 shows that the major source of rice supply for the traders is local distributors. Traders (92.2%) indicated that they obtain their supply from local distributors/companies such as CCTC (Gh) Ltd., Imexco (Gh) Ltd, SIMAVI, KATA Trading Company, Fast Moon Trading Company, A & A commodities (all based in Accra). These distributors also serve as key importers of rice into the country. Some (20.3%) of the traders also mentioned GNPA as an important source of their supply. The GNPA markets both imported and industrially milled locally produced rice.

Table 8. Major sources of rice supply to traders

Source of rice sold	Relative importance of source/percentage of respondents buying from the source
Other (local distributors)	92.2
GNPA	20.3
Individual farmer	12.5
Rice mill	7.3
Farmer group /co-operatives	1.6
Own farm	1.6

N = 64   NB: Percentage total more than 100 because of multiple responses

Source: Survey data

3.11 Market Information, Membership of Trade Associations and Mode of Price Determination

Most (71.9%) of the traders obtain information concerning the current price at which rice sells from other traders, 17.2% from other markets and 12.5% from transport. Companies such as 'A Life' which has its own distribution network sends its staff to the major markets in order to find out about the current price at which rice is selling and the type/brand consumers are mostly patronising. None of the respondent traders belong to any association.

Traders were asked how they determine the price of the rice they sell and all of them indicated that they generally put a mark-up on the buying price.

3.12 Socio-economic Characteristics of Consumer Respondents.

Gender

A majority (87.9%) of the respondents were females while 12.1% were males

Age structure

The percentage of respondents whose ages fell between 20 and 30 years was 25.7, Similarly, 38.8% were between the ages 31 - 40 years, 25.0% , 41 - 50 years, 7.9 %, 51 - 60 years, 2.0%, 61 - 70 years and 0.7% could not tell their ages.

Household Composition

A majority (86.2%) of the respondents had between one and 10 persons per household. Also, 11.8% said they have between 11 and 20 persons per household while the remaining 2% reported having between 26 and 45 persons per household. With regard to number of children under 15 years of age in a household, 76.3% said they have between one and five, 13.7% said they did not have any and 10% reported having between 6 and 18.

Occupation

Forty percent of the respondents were traders, 37.7% civil servants, 11.8% housewives, 5.9% self-employed and the remaining 4.6% farmers.

Educational Background

Most (43.5%) of the respondents had either Primary, Middle or Junior Secondary School education, 21.7% had either Senior Secondary, School Certificate Ordinary or Advanced level education, 11.2% had University education, 12.5% had a vocational training and 11.2% had no formal training.

Religion and Ethnic Origin

About three fifth (60.5%) of the respondents were Christians while, 36.8% were Moslems and the remaining 2.7%, traditionalists. Whereas 42.1% of the respondents were people of the northern extraction, 38.8% were Akans, 11.2% were Ewes and 7.9% were Ga's.

4.0   CONCLUSIONS

The study shows that the main problem for local rice, as perceived by study respondents, is its poor quality as evidenced by poor visual appearance (colour), high foreign matter content and high levels of broken grains. Consumption of local rice by respondents is highest in Tamale (74%) followed by Accra (40%) and then Kumasi (38.1%). Consumers rated foreign matter, expansion ratio, aroma and colour as important criteria influencing their purchasing decisions whereas traders placed characteristics such as colour, foreign matter, milling degree and broken grains as most important in their perceptions of the ready salability of local rice as compared to imported brands.

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Annex 1 Consumer/end user survey

A. Consumption Patterns

1. What are the 3 most common staples consumed in your household?

    _____ 1st Major staple _____ 2nd Major staple _____ 3rd Major staple

    1= Maize   2= Cassava   3= Rice   4= Yam   5 = Plantain

    6 = Cocoyam   7 = Millet   8 = sorghum   9 = cowpea   10 = Other (specify)

2. How often do you or your family consume rice? _____

    1 = Daily   2 = 1 - 3 times/week   3 = 4 - 6 times/week

    4 = occasionally (state occasions)

3. If you eat rice frequently in your home why do you do so?

    _____

    1 = Because it is a staple   2 = Because of its availability

    3 = Ease of preparation   4 = Price/cost   5 = Special diet

    6 = Other specify)

4. If you do not consume rice frequently in your home why

    not?_____

    1 = Price/cost   2 = Poor quality   3 = Not a staple   4 = Too

    light

    5 = Non availability   6 = Other (state reason)

5. What type and quantity of rice do you usually consume at home ? (proportion out of 10)

Type of rice	Raw (locally produced)	Parboiled (locally produced)	Imported	Other (specify)
Proportion consumed				

B. Imported rice

6. Have you ever eaten imported rice?

   1 = Yes   2 = No   3 = Can't tell

7. Which of these types of imported rice have you ever eaten?

   1 = Yes   2 = No   3 = Can't tell

Name of imported rice	Response (Yes/No)	Rank (1 = Very important)
1 = Perfumed rice		
2 = US long grain		
3 = Thai rice		
4 = US No. 5		
5 = Vietnamese rice		
6 = Other(specify)		

C. Locally produced rice

8. Do you produce rice for home consumption ? _____

   1 = Yes   2 = No

9. If 8 is Yes, how many bags do you keep/store for home consumption? _____

   98 = N/A   99 = Can't tell

10. Have you/your family ever eaten locally produced rice? (See questions 8 & 9)

    1 = Yes   2 = No   3 = Can't tell

    If yes which type/variety?

    1 = Sativa (white rice - non parboiled)

    2 = Sativa (white rice - parboiled)

    3 = Glabberima (red rice - non parboiled)

    4 = Glabberima (red rice - parboiled)

11.   Please rank the following local varieties/types of rice in a descending order of preference. (Refer to 10)

Variety/ type	Rank (1 = most important)
1 = Sativa non-parboiled	
2 = Sativa parboiled	
3 = Glabberima non parboiled	
4 = Glabberima parboiled	

9 = NA

12.   In your choice of local varieties (refer to 10) for home consumption, what are the 3 most important characteristics you look out for?

1.

2.

3.

D. Seasonal variation in consumption

13.   At what period(s) of the year do you consume the highest amount of rice? _____

Period	Rank (1 = most important)
1 = Jan - March	
2 = April - June	
3 = July - Sept.	
4 = Oct. - Dec.	

Give reasons for your answer _____

1 = when rice is being harvested   2 = During peak rice milling periods

3 = Non availability of other staples (name staples)   4 = Festivals (name)

5 = Other (state)

14.   At what period(s) of the year do you consume the lowest amount of

rice? _____

Period	Rank (1 = most important)
1 = Jan - March	
2 = April - June	
3 = July - Sept.	
4 = Oct. - Dec.	

Give reasons for your answer

1 = Lean season   2 = No festival

3 = Other staples available (name staples)   4 = Other (state)

E. Source of Rice Purchased and Quality characteristics of Purchased Rice

15.   Do you purchase rice for home consumption? _____
       1 = Yes   2 = No

16.   If 15 is yes then proportion of rice consumed purchased (proportion out of 10)

_____

9 = N/A

17.   Where do you usually buy your rice from? _____

Source	Response (Yes= 1, No = 2)	Rank (1= most important source)
1 = Local market (name)		
2 = Distant market (name)		
3 =Retail store		
4 = Super market		
5 = farm		
6 = Rice mill		
7 = Other (name)		

18. How important are the following quality attributes to you when you purchase rice for home consumption? (Please tick x)

1 = Very important   2 = somewhat important   3 = not important

Characteristics	1	2	3
Colour			
Milling degree			
Foreign matter			
Insects			
Yellow grains			
Broken grains			
Red rice			
Paddy grains			
Size/shape Long grain Bold grains			
Odour			
Cooking time			
Hardness			
Stickiness			
Expansion ratio			
Aroma			

F. Prices

19.   Which one(s) sell for higher price?_____

        1 = Locally produced rice   2 = imported rice   3 = Can't tell

20.   What do you think accounts for the price difference in (19)?

Quality attribute	Response (Yes = 1, No = 2)	Rank (1 = most important factor)
1 = Milling degree		
2 = Broken grains		
3 = Paddy grains		
4 = Foreign matter		
5 = Colour		
6 = Odour		
7 = Other (specify)		

21.   From your experience, is the price of locally produced rice generally;

        1 = Lower

        2 = Same

        3 = Higher

        than that of imported rice?_____

G. Types of rice in relation to special local dishes and ceremonies

22.   What are the most common forms of consuming rice in your

        household?_____

        1st major form   2nd major form   3rd major form

        1 = Plain rice with stew   2 = Rice and beans   3 = Jollof rice

        4 = Rice balls with soup   5 = Rice TZ   6 = Rice porridge

        7 = Other (specify)

23. For the 3 most important forms mentioned in 22 above, which types/varieties and colour of raw rice are most appropriate/preferred for their preparation?

	Forms	*Type of rice	**Colour of rice most preferred
1			
2			
3			

*   1 = Sativa (white rice - non parboiled)   **   1 = White
    2 = Sativa (white rice - parboiled)   2 = Red

    3 = Glabberima (red rice - non parboiled)   3 = Brown
    4 = Glabberima (red rice - parboiled)   4 = Other (Specify)
    5 = Imported (white – non-parboiled)
    6 = Imported (parboiled)
    7 = Other (specify)

24. Is rice associated with any traditional ceremonies or functions?_____
    1 = Yes   2 = No   3 = Can't tell

25. If 24 is Yes, then fill in the table below

*Type of ceremony or function	**Type of rice used

* 1 = Puberty rites

2 = Funeral rites

3 = Marriage rites

4 = Birth rites/Naming ceremonies

5 = Festival (Name of festival)

6 = Other (specify)

** 1 = Sativa (white rice - parboiled)

2 = Sativa (white rice non parboiled)

3 = Glabberima (red rice - parboiled)

4 = Glabberima (red rice –non-parboiled)

5 = imported (white – non-parboiled)

6 = Imported (parboiled)

7 = Other (Specify)

H. Distinguishing between locally produced rice and imported rice

26.   How do you distinguish locally produced rice from imported rice?

Factor	Response (Yes = 1, No = 2)	Rank (1=most important factor)
1 = Milling degree		
2 = Broken grains		
3 = Paddy grains		
4 = Foreign matter (Stones)		
5 = Colour		
6 = Price/Cost		
7 = Brand/ Label		
8 = Size		
9 = Other (Specify)		

SOCIAL - DEMOGRAPHIC CHARACTERISTICS

1. Age-----------

2. Gender   1 = Male   2 = Female

3. Occupation main:

   Others:

4. Religion   1 = Christian 2 = Moslem   3 = Traditionalist   4 = Other (Specify)

5. Ethnic origin   1 = Ewe   2 = Northern 3 = Akan   4 = Ga
                      5 = Other tribes (Name)

6. Number of persons in household _____

7. Number of children under 15 years _____

8. Highest educational level 1 = Primary education   2 = Middle/JSS
                       3 = SSS/ O-level   4 = Other (Specify)

9. Marital status   1 = Married   2 = Single   3 = Divorced

Annex 2. Trader survey

1. Type of trader _____

   1 = wholesaler 2 = retailer   3 = wholesaler/retailer

   4 = commission agent   5 = Other (Specify)

A. Major sources of supply

2. What type of producer or trader sells rice to you? (Rank in order of importance)

Source of rice sold	Response (Yes = 1, No = 2)	Rank (1 = most important source)
1 = Your own production		
2 = Individual farmer		
3 = Farmer groups/co-operative		
4 = Other traders		
5 = GNPA		
6 = Rice mill		
7 = Other (specify)		

1.   Type of trader _____

      1 = wholesaler 2 = retailer   3 = wholesaler/retailer

      4 = commission agent   5 = Other (Specify)

A. Major sources of supply

2   What type of producer or trader sells rice to you? (Rank in order of importance)

Source of rice sold	Response (Yes = 1, No = 2)	Rank (1 = most important source)
1 = Your own production		
2 = Individual farmer		
3 = Farmer groups/co-operative		
4 = Other traders		
5 = GNPA		
6 = Rice mill		
7 = Other (specify)		

B. Quality attributes affecting the purchase of rice

3.   Which of the following quality attributes do you look for when buying rice?(Tick x)

     1 = Very important   2 = somewhat important   3 = not important

Quality attributes	1	2	3
Colour			
Milling degree			
Foreign matter (stones)			
Insects			
Yellow grains			
Broken grains			
Red rice			
Paddy grains			
Size/ shape			
a. Long grains			
b. Bold grains			
Odour			
Cooking time			
Hardness			
Chalky grains			
Stickiness			
Expansion ratio			
Aroma			

C. Market information and membership of trade associations

4.   Do you know the price of the rice you sell in other market outside this
        city/Town?_____

        1 = Yes   2 = No

        If yes which town/cities.

        _____

        _____

        _____

5.   What is your source of information about the prices in these markets?
        (Rank in order of importance)

Source of information	Response (1 = Yes, 2 = No)	Rank (1 = most important source)
1 = You or your employees travel to the market		
2 = Other traders		
3 = Transporters		
4 = Radio or newspaper		
5 = Farmers		
6 = Other specify		

6. Do you belong to associations of rice traders?_____

    1 = Yes   2 = No

7. If yes, what services do these associations provide to their members?

Services	Response (1 = Yes, 2 = No)
1 = Loans or Credit	
2 = Information on prices	
3 = Cooperative buying of rice	
4 = Transport	
5 = Rules on weight and measures	
6 = Agreement on selling prices	
7 = Other (specify)	

D. Seasonal variations in the Supply and Price of rice

8. For rice traded in this market in which month(s) are the prices highest or lowest?_____

  J   F   M   A   M   J   J   A   S   O   N   D

L = Lowest   H = Highest

9. In which months are volumes traded highest and lowest? Same as above?_____

  J   F   M   A   M   J   J   A   S   O   N   D

10. Are there seasonal variations in the supply of

    a= locally produced rice?_____

    b= imported rice?_____

    1 = Yes   2 = No   3 = Can't tell

11. If either a or b in 10 is Yes, at what time(s) of the year

(i) do you have a lot on the market?

a._____

b._____

(ii) do you have shortages on the market (indicate months)

a._____

b._____

(Indicate months)

12. If 10 is yes, then what causes these variations?

a._____

b._____

E. Factors affecting volume of rice traded

13. What are some of the factors that affect the volume of rice that you trade?
(Rank in order of importance.)

Factors affecting volume of rice traded	Response (1 = Yes, 2 = No)	Rank (1 = most important)
1 = Transport difficulties		
2 = Limited supply of rice		
3 = Too many other traders		
4 = Lack of finance or credit		
5 = Not enough customers		
6 = Risk of quality deterioration		
7 = Risk of price changes		
8 = Not enough capital		
9 = Other (Specify)		

F. Destination of Rice sold / Major customers of the Trader

14. Who buys your rice in this market? _____

    (Rank = 1 = most important)

Name of buyer	Response (1 = Yes, 2 = No)	Rank (1 = most important)
1 = Final consumer		
2 = Retailer		
3 = Food seller		
4 = Trader who sells in another market		
5 = Commission agents		
6 = Other (specify)		

15. If more than one type of buyer, how many parts out of 10 of your total sales are sold to the most usual buyer? _____

G. Mode of Price Determination

16. How do you determine the price of the rice you sell? (Rank in order of importance)

Mode price is determined	Response (1 = Yes, 2 = No)	Rank (1 = most important)
1 = A price negotiated by a broker/commission agent		
2 = A price you negotiated with a buyer		
3 = A certain mark-up on your buying price		
4 = The current price at which rice is traded in the market		
5 = A price set by a trader association/union /syndicate		
6 = A price set by government marketing authority		
7 = A price fixed by the owner		
8. = Other (specify)		

H. Type of rice sold, origin, proportions and price sold.

17.   Please fill in the table below:

*Type of rice sold	**Proportion sold	***Source (Origin of rice)	Price sold
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

*1 = Perfumed rice

 2 = US long grain (uncle Bens)

 3 = Thai rice

 4 = Vietnamese rice

 5 = Pakistani rice

 6 = Mexican rice

 7 = U.S No. 5

 8 =   Lucky rice

 9 =   Other imported (specify)

10 = Sativa (white rice - parboiled)

11 = Sativa (white rice - non-parboiled)

12 = Glabberima red rice parboiled

13 = Glabberima red rice non-boiled

** Proportion out of 10

   98 = Can't tell

***   1 = Local distributor (Specify)   2 = Imported directly (Name country of origin

      3 = Supermarket 4 = Rice mill   5 = Other (Specify)

18.   Of the types of rice listed in 17 above which of them have the highest rate of turnover.

_____1st highest   _____2nd highest   _____3rd highest

Use same codes as 17.

19.   For the 3 most important types listed above, why are they most preferred?

1=

2=

3=

List of Figures

(see following pages)

Fig. 1 Common staples consumed in main urban centres in Ghana

Major staples

Percentage of respondents consuming the major staples

☐ Maize ☐ Rice ☐ Cassava ☐ Yam ☐ Plantain ☐ Millet ☐ Cowpea ☐ Cocoyam ☐ Sorghum ☐ Other

Bar 1 (top): 11.2   13.8   30.9   0.9   0.6   0.7
Bar 2 (middle): 17.8   18.4   18.4   6.9   1.3
Bar 3 (bottom): 16.1   9.2   2.6   10.5   0
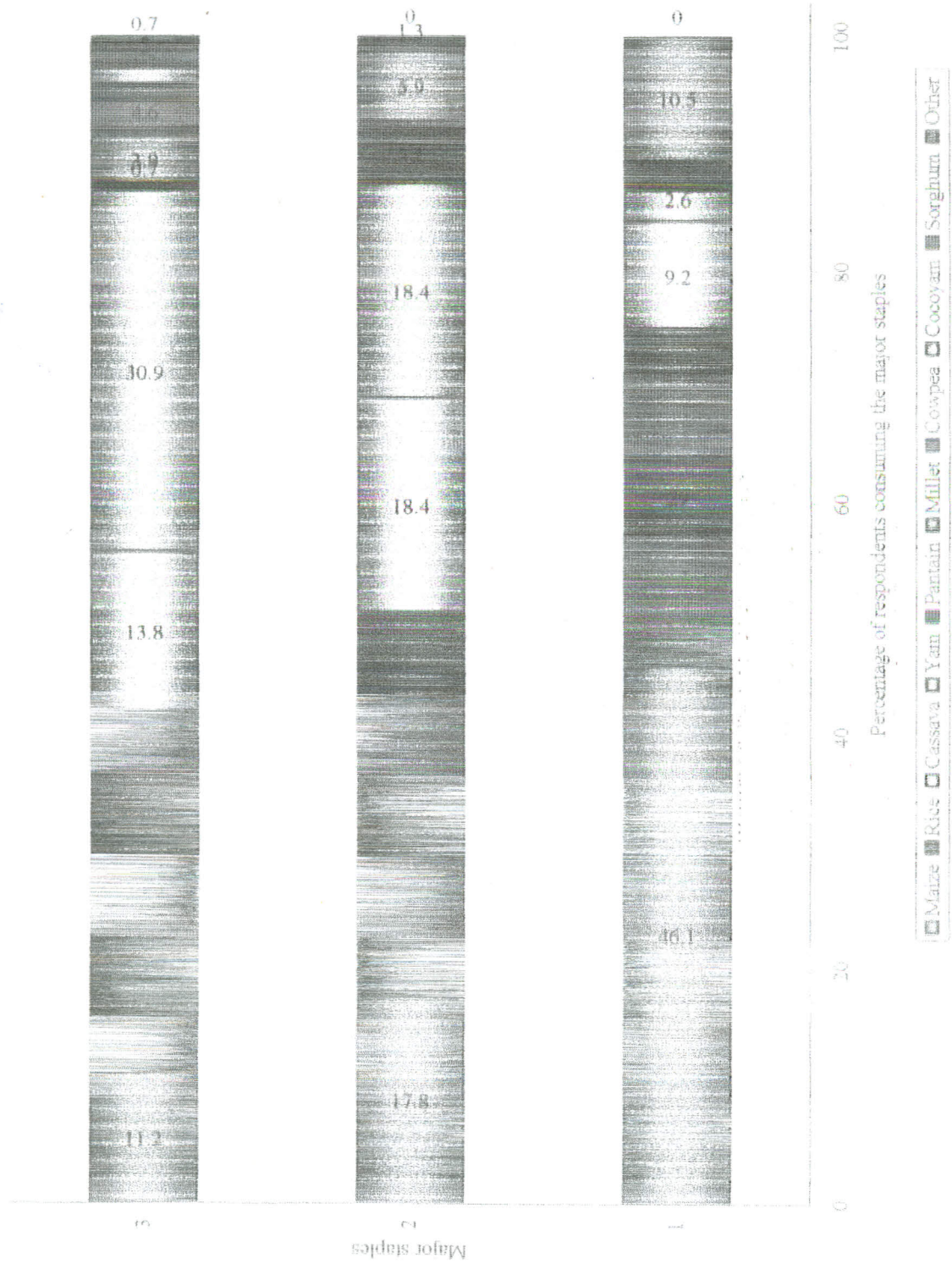
Fig. 2. Percentage Consumption of major staples by respondents in three Ghanaian cities

(Accra, Kumasi, Tamale)
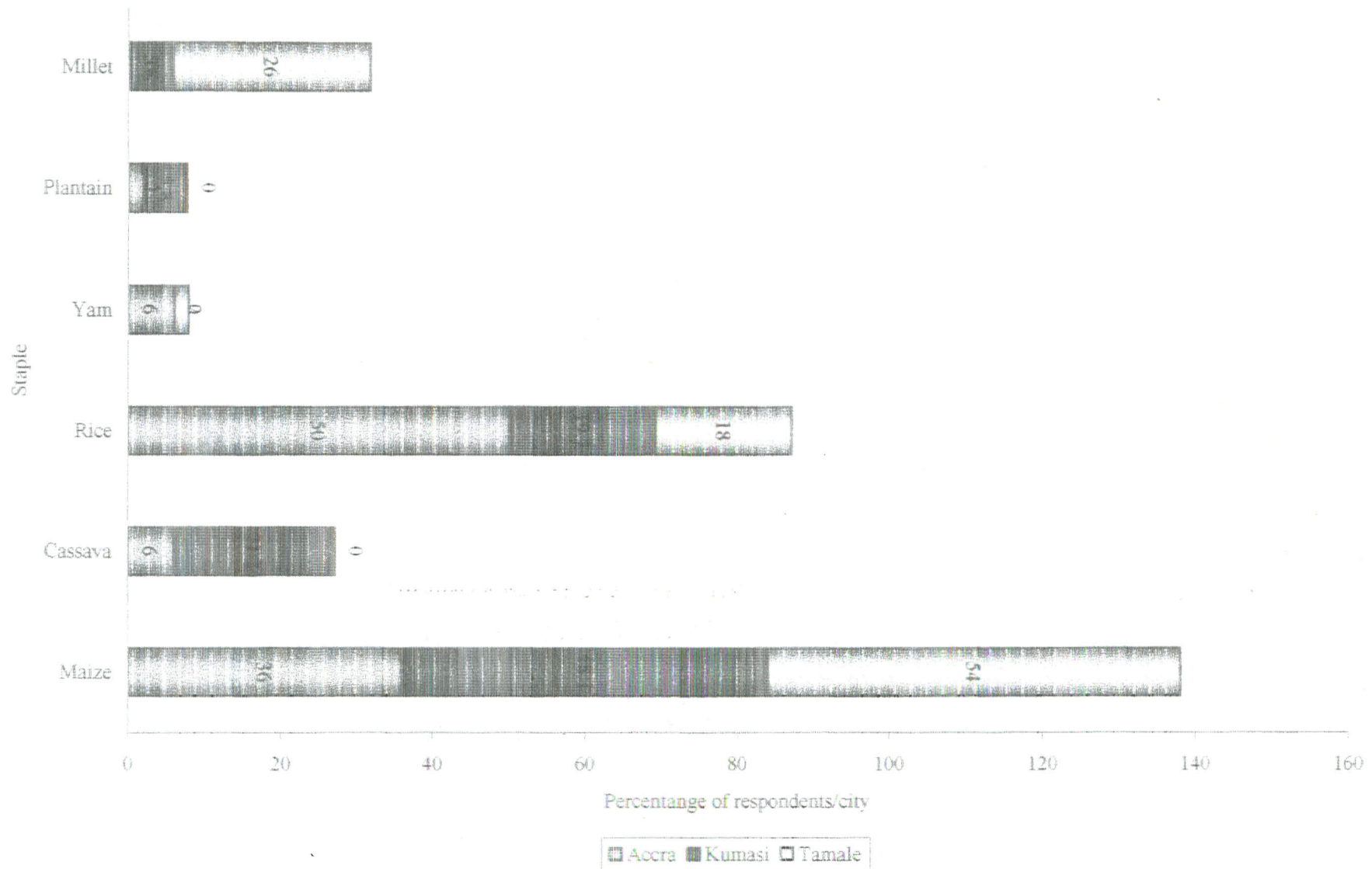
Fig. 3   Percentage consumption of local rice in three Ghanaian cities (Accra, Kumasi, Tamale)

Legend:
☐ Raw   ▦ Parboiled   ☐ Do not consume

Accra: 40, 42, 18
Kumasi City: 38.1, 25, 36.9
Tamale: 74, 20, 6

Y-axis: Percentage of respondents (0–80)
X-axis: City
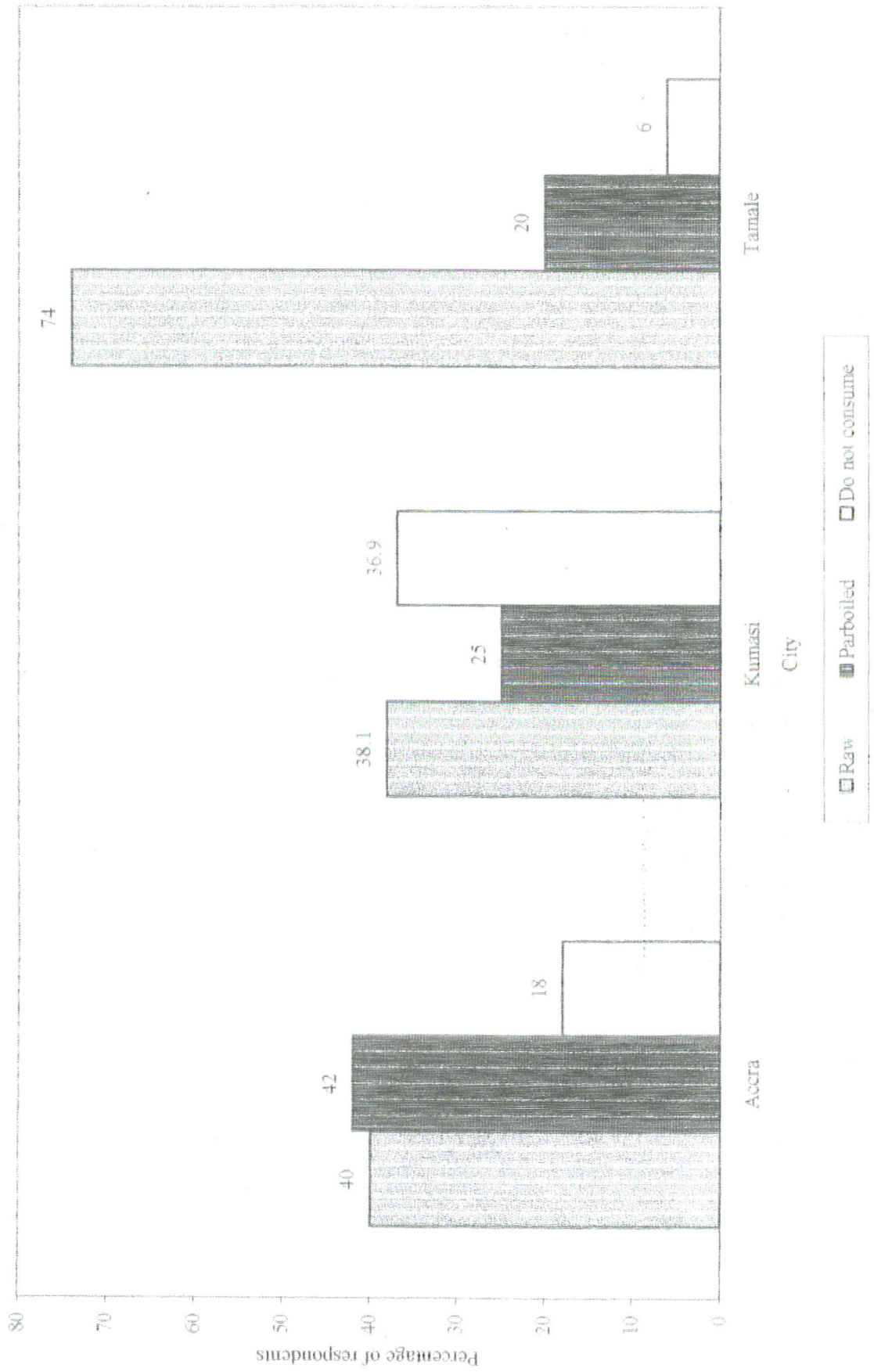
Fig. 4 Types of imported rice consumed in three Ghanaian cities
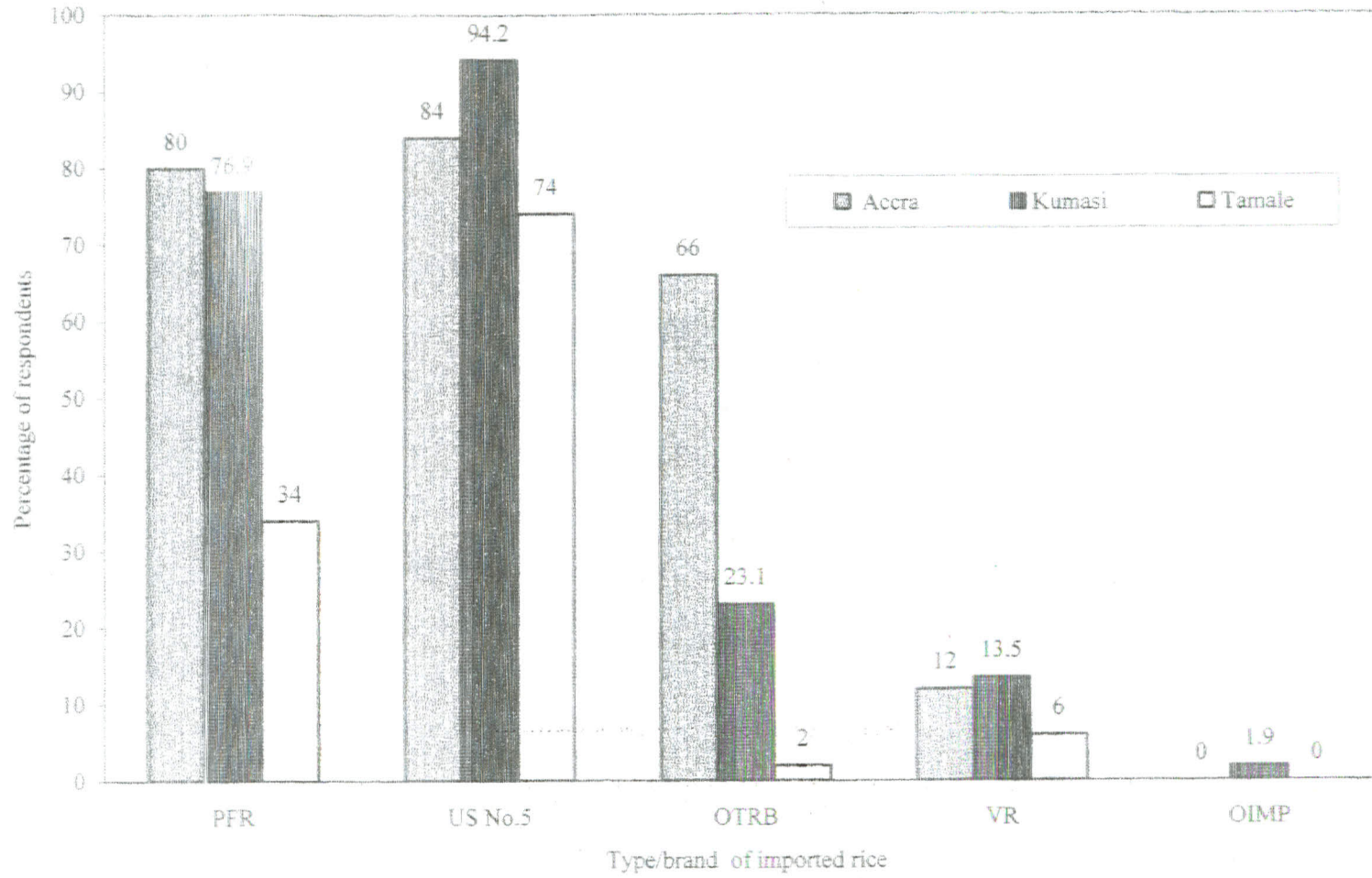
Fig. 5 Frequency of rice consumption in three Ghanaian cities (Accra, Kumasi, Tamale)

Occasionally
9%

Daily
12%

4-6 times/week
32%

1-3 times/week
47%
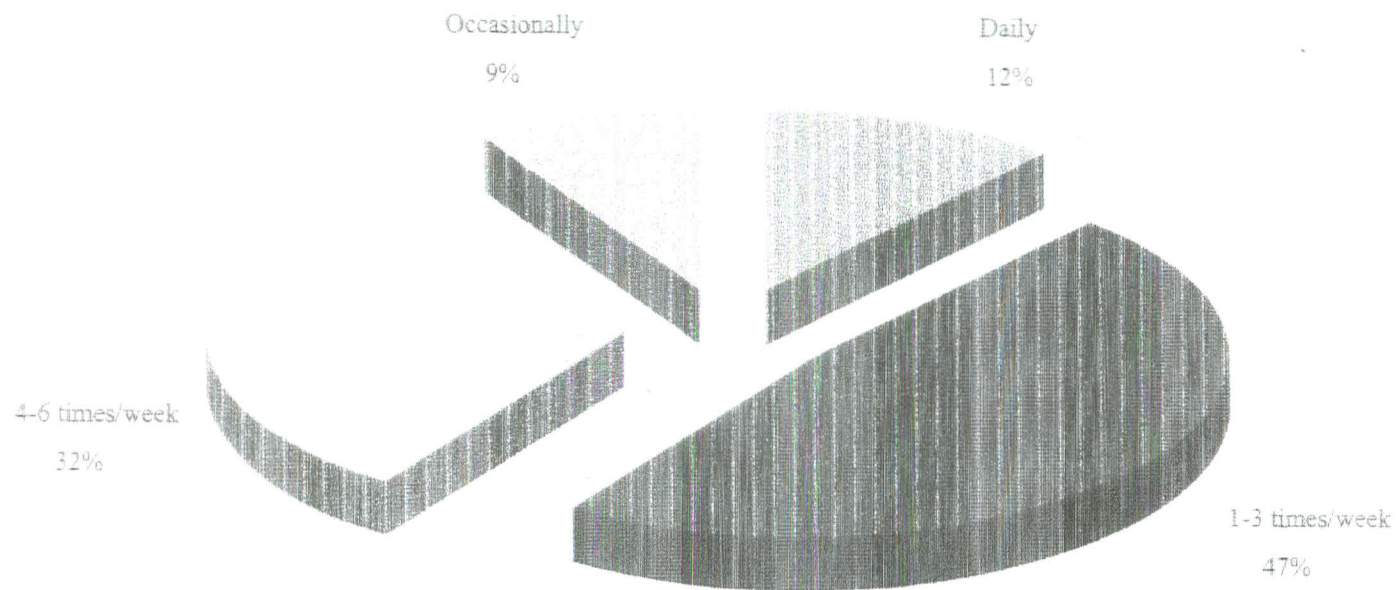
Fig. 6 Percentage of respondents consuming least amounts of rice during certain periods of the year
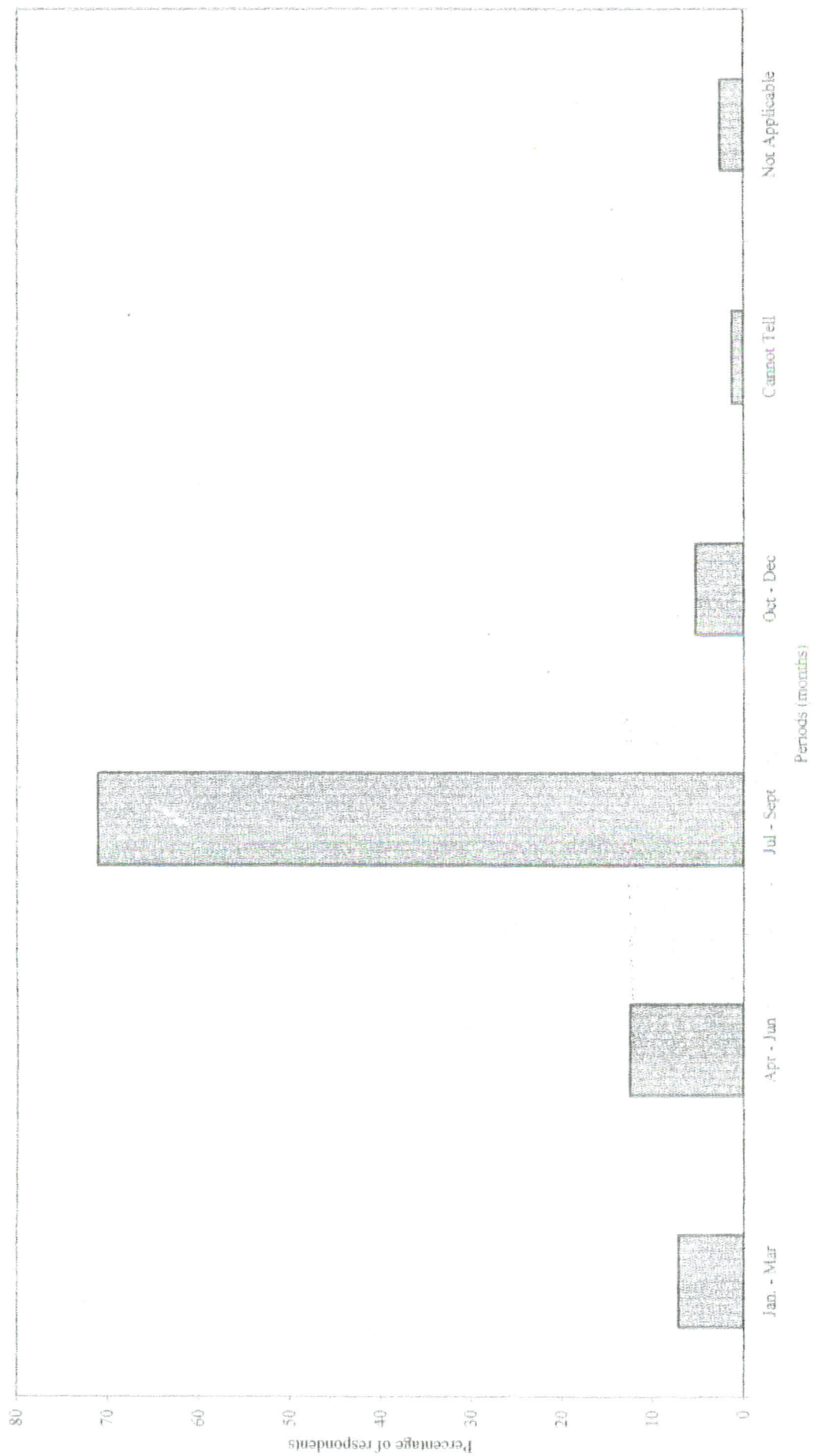
Fig. 7 Reasons for low demand for rice at certain periods of the year in the study areas.
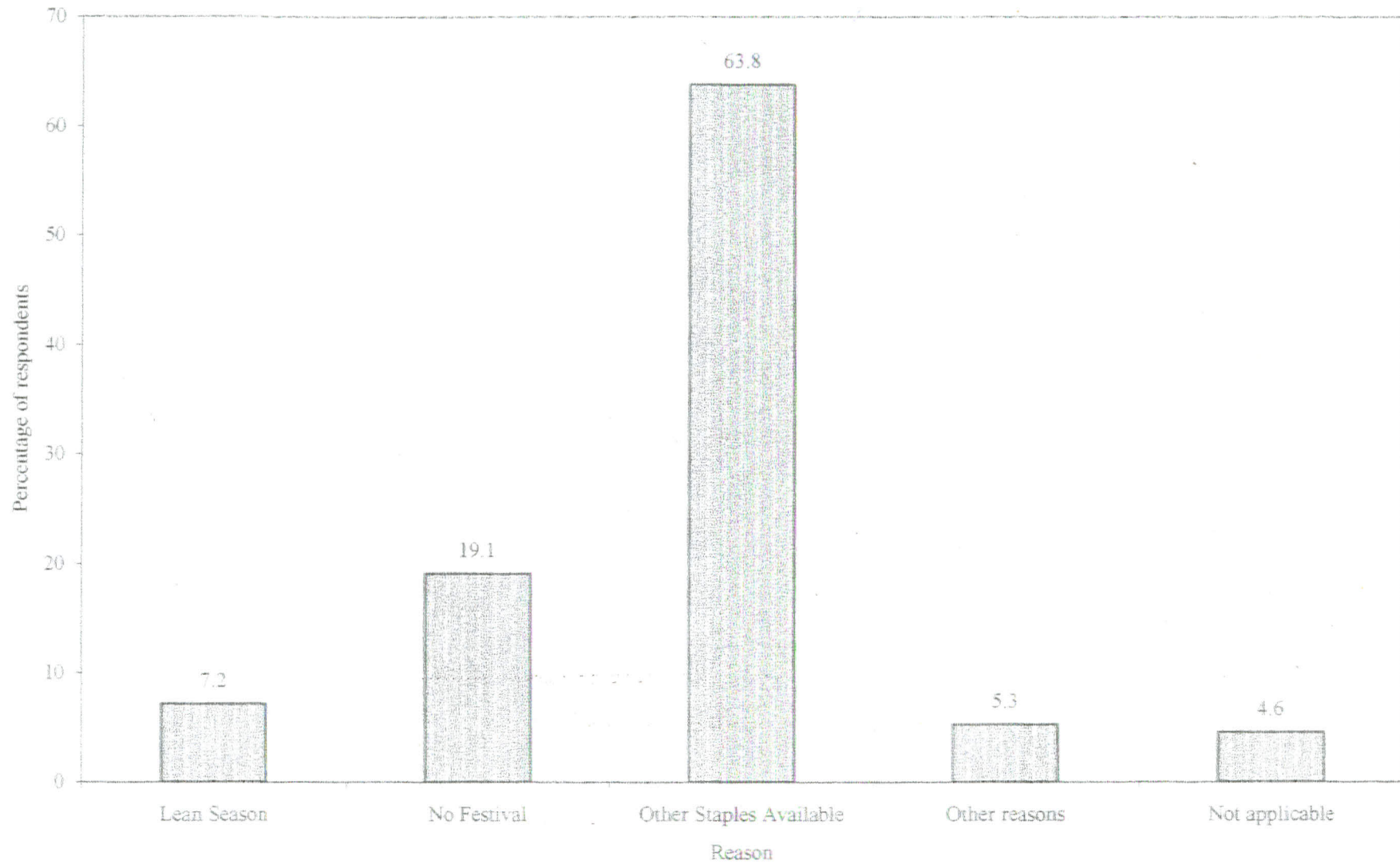
Fig. 8 Average price changes with time (months) of locally produced
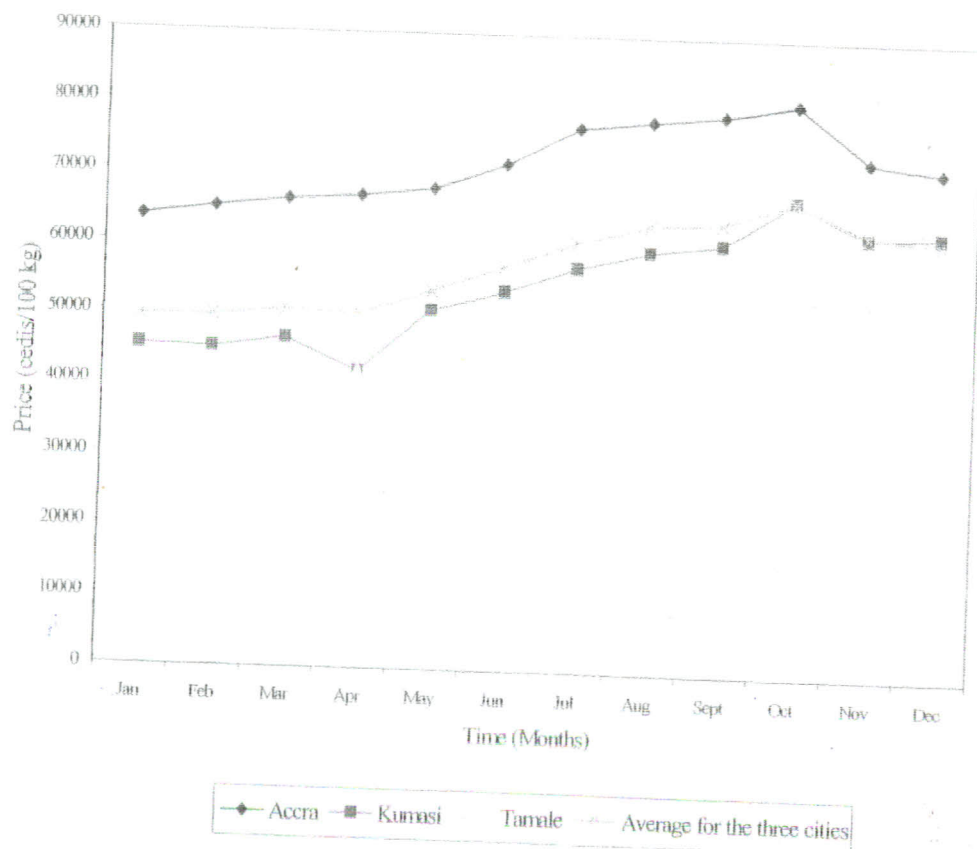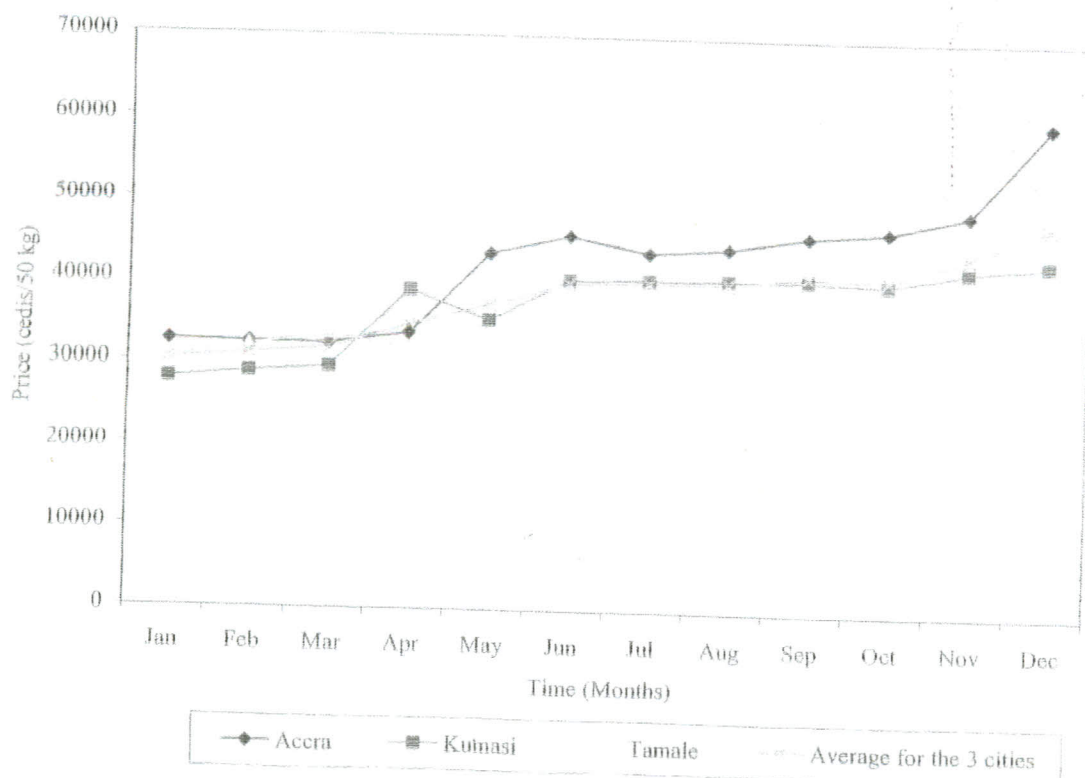rice in Accra, Kumasi and Tamale, and for the 3 cities combined

Fig. 9 Average price changes with time (months) of imported rice in Accra,
Kumasi and Tamale, and for the 3 cities combined

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