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# Marketing and Promotional Plan for Local Rice Based on Drivers of Traders and Consumers Preferences

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**Summary**

The Programme of Accompanying Research for Agricultural Innovation (PARI) is supported by the German Government through GIZ and coordinated in Africa by the Forum for Agricultural Research in Africa (FARA). The project is aimed at facilitating functionality and efficiency of innovation platforms and innovation research uptake in Ghana and other African countries. This aspect of the project is aimed at identifying drivers of traders and consumers' rice preferences to help develop a marketing and promotional plan for locally produced rice in Ghana.

Rice has become an important staple in Ghana and its consumption is estimated to far exceed local production. Hence the deficit is supplied through importation with an average annual import bill of US$ 450 million, which is a major concern for the government. Despite the low level of local rice production in Ghana, it is estimated that just about 20% of local rice is consumed in urban areas in particular due to consumer preference for imported brands. As a result, farmers have difficulty selling locally produced rice.

As an intervention to increase local rice production and consumption, the government of Ghana is undertaking rice upscaling programme with the goal of attaining self-sufficiency by 2018. To contribute to the success of this intervention, there was the need for detailed insights into the drivers of traders and consumer's rice preferences to give policy advice on how to boost trading in local rice as well as its production, utilization and consumption to ensure increased income and food and nutrition security.

Recognising the crucial role traders play in marketing and distribution of rice in the country, this study was undertaken to assess their level of involvement, preferred rice types as well as factors that influence their preferences. Similarly, an assessment was done on consumers' preferred rice choices as well as factors that influence their preferences. The objectives of this study were to:

A. To identify traders and consumers' preferred rice types in rural rice-producing areas and non-rice producing urban centres
B. Assess the drivers of traders and consumers' rice preferences to get better insights into factors that influence the sale, purchase, utilization and consumption of rice (local and imported) in Ghana
C. To develop a marketing and promotional plan to stimulate the production, sale, purchase, utilization and consumption of locally-produced rice in Ghana.

The study responds to the request by farmers in the Hohoe and Jasikan Rice Innovation Platforms, established under PARI Year 2 project (see Ampadu-Ameyaw et al., 2017), to identify traders and consumers' rice preferences to enable them produce rice varieties that meet users' demands. The study provided strategic guidelines for the development of a marketing and promotional plan for locally produced rice in Ghana. The report is structured as follows: Chapter one introduces the study including the study objectives, design and methodology. Chapter two presents findings of the market study with a focus on rice traders in Accra and Hohoe while Chapter three provides the findings of the consumer studies carried out in Accra and Hohoe. Chapter four presents the proposed marketing and promotional plan for locally produced rice as well as recommendations for improving the local rice value chain.

Most traders in Accra (urban centre) sold imported rice while most traders in Hohoe (rice-producing area) sold locally produced rice. However, in both cases, perfumed rice (also known as fragrant or aromatic rice) was widely sold. Most traders' preferred rice choices were greatly influenced by product demand or marketability, profit margin, cost price, the popularity of the product, quality, competition and transport conditions. Generally, rice traders were of the view that they must increase the sale of local rice on the markets. For this to happen, many actors such as governments, farmers, traders, consumers and development partners have different roles to play to eliminate the constraints such as irregular availability, poor quality, poor packaging and weak promotional activities.

It was found out that rice was frequently consumed by most consumers in Accra and Hohoe. In Accra, most consumers preferred imported perfumed or fragrant rice while most consumers in Hohoe preferred locally produced perfumed rice. The main drivers of consumer rice preference were sensory characteristics such as taste, aroma, texture after cooking; nutritional quality; and absence of extraneous matters like stones, pieces of husk and pests. The greatest constraint to the purchase and consumption of local rice was its relatively higher price, irregular availability on the market, difficulty in cleaning it prior to cooking, and difficulty in cooking it because it easily gets soggy. Notwithstanding, majority of consumers were of the view that locally produced rice has health and economic benefits and therefore its production and consumption should increase. However, this could only happen when the identified constraints are eliminated, and consumers change their mindset and make efforts to buy and eat local rice and encourage family and friends to cook it both at home and for parties and other events. This is necessary because habit was found to be a stronger determinant of rice preferences hence when local rice is available and children, who are change agents, are encouraged to eat it they could develop the habit for eating locally produced rice. Negative attitude to local rice was also found to be a strong negative predictor of increased local rice consumption thus calling for the need for attitudinal change among consumers and other relevant actors in the rice value chain.

The market and consumer studies provided key inputs for the local rice marketing and promotional plan. The objectives of the local rice marketing and promotional plan are to:

A. Increase the production of local rice by 50% by 2020,
B. Increase the availability of local rice on the markets by 80%
C. Increase demand for local rice by 50% across all regions
D. Increase by 50% the number of catering establishments and public institutions such as hospitals and schools incorporating local rice in their menus
E. Convert at least 20% of local rice into shelf-stable marketable products for both household and commercial uses.

This plan was based on the marketing mix of the 5Ps – Product, Price, Place, Promotion, and People. The plan provides strategies to ensure increased production of preferred rice varieties, affordable price offering as well as sensitising consumers to willingly pay for high valued products, ensuring effective distribution and supply of products, involving all key actors in the rice value chain and implementing an effective promotional plan. The following strategies are critical for an impactful promotion:

- Support farmers to produce improved and acceptable rice varieties
- Train farmers and millers in good handling practices and quality management
- Link rice producers to markets across the country,
- Establish local rice collection centres,
- Launch awareness campaigns to highlight the benefits of producing, selling and consuming local rice,
- Target households and individuals through food demonstrations,
- Link local rice farmers, millers and traders to institutional feeding programs in school, hospitals, prisons etc.,
- Train processors, food vendors and individual consumers in local rice processing and utilization

To conclude, rice is largely consumed in Ghana but perfumed, aromatic or fragrant rice is mostly preferred in both rice producing area such as Hohoe and urban centre Accra. In promoting local rice to increase its production, marketing, consumption and utilization, there is the need to consider consumer and traders' preferences. As this study has revealed, there is the need to improve local rice availability, its sensory appeal as well as attributes such as quality and wholesomeness. The proposed local rice promotional plan should be implemented to increase production, marketing, consumption and utilization of locally produced rice in Ghana.

In terms of investment, there is the need for government and private sector to invest in rice production by providing improved and consumer preferred seeds; and supporting farmers with irrigation facilities, inputs and relevant machinery such as tractors and combined harvesters. Investments are also required in post-production activities to facilitate access to improved handling, milling and processing technologies and equipment; market opportunities; and improved packaging and promotional opportunities. In addition to the strategies indicated in the promotional plan, government should pay attention to the following to increase the growth of the local rice value chain:

- Support farmers especially women and youth to acquire land for rice farming
- Increase promotional activities and advertisements
- Make policies to reduce or discourage rice importation
- Build capacity for farmers in new, innovative and appropriate rice production technologies
- Provide farmers with improved and consumer preferred seeds, inputs, relevant rice production machinery and equipment
- Organise educational and awareness raising campaigns on benefits of local rice
- Establish a central local rice market and ensure increased availability of rice on the markets
- Educate farmers on appropriate post-production handling techniques to improve quality
- Give financial support and incentives to the farmers
- Support farmers, traders and processors improve on packaging
- Increase investment in the local rice industry
- Establish efficient rice processing factories

- Link farmers to interventions programs such as school feeding project, and state institutions such as police, military, prisons, boarding schools. Put in place compulsion measures to ensure that these institutions use local rice
- Improve roads to facilitate transportation of rice from production centres to other parts of the country
- Make policies that will reduce cost of rice production and price of rice on the market

**Key Words**

Rice, Consumer preference, Traders preferences, Marketing plan, Promotional plan, Rice consumption, Rice production, Ghana

## Introduction

In Ghana, rice is becoming one of the most important staple foods with per capita consumption of 35 kg in 2013 and urban consumption accounting for 76% of total rice consumed in the country (Osei-Asare, 2010). Ghana's rice production satisfies around 30-40% of demand hence the deficit is supplied through importation resulting in an average rice import bill of US$ 450 million annually (MOFA, 2010). Despite the low local production levels, just about 20% of locally produced rice is consumed in urban areas in particular due to consumer preferences for long grain aromatic rice, which is principally imported from Vietnam and Thailand (Angelucci et al., 2013). This has been a concern for Ghana government as it also deprives local producers the opportunities to increase productions and reduce the high rate of unemployment in the country.

Moreover, marketing of imported rice is done aggressively through television, radio and print media advertisements and are distributed all over the country while marketing strategy for local rice is weak if not non-existent (ODI, 2003). Omari et al. (2015) found that most restaurants do not use local rice due to marketing-related reasons including the inability of users to identify the rice by brand names. Some restaurateurs also believed that some traders deceptively package and sell locally produced rice as imported brands due to users and consumers' preference for imported rice. Even among consumers, factors that influence rice preferences vary. It has been reported that consumers generally prefer cooked grains to be firm and non-sticky (Priestly, 1994). In Brazil, researchers found that consumers preferred parboiled to milled rice (Luz and Treptow, 1994) while in Sri Lanka, the factors influencing rice preferences were percentage of head rice, shape of milled rice and aroma (Kotagama HB, Kapila, 1996).

As an intervention to increase local rice production and consumption, the government of Ghana is undertaking rice upscaling programme with the goal of achieving rice production growth rate of 20% per annum, to attain self-sufficiency by 2018 (and reach a surplus of 13% or 111,940 metric tonnes). However, these good interventions may not be successful if the perceptions, motives and preferences of traders, users and consumers of rice are not considered. Thus, detailed insights are required to give policy advice on how to address these issues to boost trading in local rice as well as its utilization and consumption to ensure food and nutrition security.

The objective of this study was to:

1. To identify traders and consumers' preferred rice types in rural rice-producing areas and non-rice producing urban centres
2. Assess the drivers of traders and consumers' rice preferences to get better insights into factors that influence the sale, purchase, utilization and consumption of rice (local and imported) in Ghana
3. To develop a promotional and marketing plan to stimulate the production, sale, purchase, utilization and consumption of locally-produced rice in Ghana.

This study responds to the request of farmers in the Hohoe and Jasikan Rice Innovation Platforms, established under PARI Year 3 project (see Ampadu-Ameyaw et al. (2017), to identify traders and consumers' rice preferences to enable them produce rice varieties that

meet users' demands. It therefore provides relevant insights into the rice varieties farmers must produce as well as the kind of quality improvement required to meet traders, processors and consumers' preferences. This study also provides strategic guidelines for the development of a marketing and promotional plan for locally produced rice in Ghana. The study aligns with PARI's objective of ensuring food and nutrition security. The findings will provide inputs that will be useful for developing a marketing strategy for rice, which will be subsequently implemented, monitored and evaluated to assess its impact on rice sales, utilization and consumption as well as farmers' income and nutritional status.

The design of the consumer study was guided by the conceptual framework presented in Figure 1. The framework presents drivers of food choice under broad factors such as socio-psychosocial factors, product characteristics, social and governmental environments and consumer behaviour factors. Additional factors (drivers) were explored through qualitative methods such as focus group discussions and in-depth interviews. Factors that influences traders rice preferences were explored by broadly examining factors such as policy environment, quality characteristics, storage properties, market infrastructure, marketability and social factors.

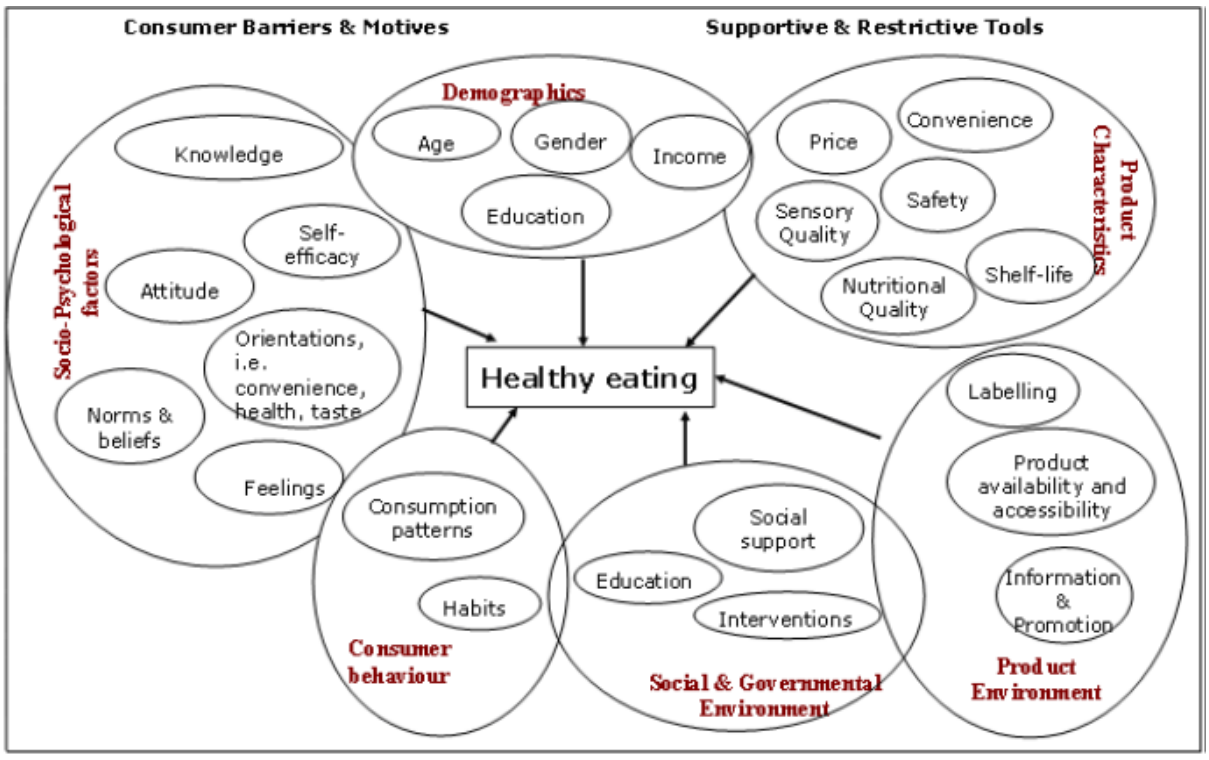


**Figure 1 Determinants of food choice**

Source: Snoek, Zimmermann and Reinders (2010).

**Method**

Both qualitative and quantitative methods were used to gather data. First, there was review of some documents including the National Rice Development Strategy (2009-2018). This was followed by focus group discussions among rice traders and consumers and then a marketing and consumer survey. The Survey data was obtained from primary sources in selected communities in Greater Accra and Volta regions using semi-structured questionnaire. The focus groups before the survey helped provide input for the development of the survey questionnaires. The focus groups after the survey provided information that helped explain some findings from the survey.

**Sample Size, Sampling Technique and Data Collection Procedure**

The data was obtained from primary sources in selected communities in Greater Accra and Volta regions using semi-structured questionnaire. A sample size of five hundred (503) consumers was taken from Greater Accra (403) and Volta (100) regions for the consumption interview while a sample size of two hundred and ninety-four (294) was taken for the marketing survey, that is, 244 in the Greater Accra region and 50 from the Volta region. The differences in sample sizes is due to differences in the population size.

Purposive, stratified, simple random and systematic sampling techniques were used. Purposive sampling was used to select the two regions (Greater Accra and Volta regions) which was predetermined by the research. Stratified sampling was used to select the study sites in Greater Accra and Volta region. There were four strata in Greater Accra, these were Accra Metropolitan Area, Ga Central District, Ga South Municipal District and Adenta – La Nkwantanang Madina Municipals. Volta region had one stratum which was Hohoe municipal, a rice-producing area.

Simple random sampling was also used to select the communities/towns in the various strata within the two regions. From the simple random sampling, Accra Metropolitan area had 12 communities sampled, Ga Central District had 5 communities sampled, Ga South Municipal District had 10 communities sampled, Adenta – La Nkwantanang Madina District had 6 communities sampled, however Hohoe municipal had one community, i.e. Hohoe township. In addition, systematic sampling was used to select the respondent's households as well as the traders for the consumption and marketing survey respectively. Every forth household and trader was selected from a random starting point in each stratum during the two surveys. The major challenge was getting the traders to participate in the survey as most of them were very busy while others complain of survey fatigue. In some cases, the enumerators had to buy some rice before the traders agreed to complete the questionnaire.

**Data analysis**

Data has been analysed using SPSS Version 21 and different types of statistical analysis were performed and data presented in the form of tables, figures and narratives.

**Findings**

The findings are presented in three chapters as follows: Chapter two presents findings from the market study; Chapter three presents' findings from the consumer study; and Chapter four presents the marketing and promotional plan for local rice based on findings from both the market and consumer studies.

## Drivers of Traders Rice Preferences

### Introduction

Traders play a crucial role in marketing and distribution of rice in Ghana hence their role in the local rice supply chain needed to be examined to assess their level of involvement, their preferred rice types as well as factors that influence their preferences. The findings of the market study are presented in the following sections.

### Characteristics of Traders

In total 294 respondents participated in the survey with 80.6% being women and 19.45 men (Table 2.1). Majority of the respondents (52.7% had basic education and 32% had secondary level of education while 39% were youthful (18-35 years) and 32.7% and 54.1% middle aged (36-55 years). The respondents were made up of owners of the enterprises (71.4%) and others such as sales persons (16.7%). Majority of the he enterprises interviewed (44.6%) had been operating for 1-5 years followed 29.3% who had operated for 6-10 years. The rice supply chain enterprises played various role including retailing (90.1%), wholesaling (25.9%), distribution (10.9%) and importation (.7%).

**Table 2.1 Characteristics of traders**

| Characteristics | Greater Accra | Volta | Total | % of total respondents |
|---|---|---|---|---|
| ***SEX*** | | | | |
| Male | 50 | 7 | 57 | 19.4 |
| Female | 194 | 47 | 237 | 80.6 |
| ***AGE GROUP*** | | | | |
| 18-25 | 36 | 0 | 36 | 12.2 |
| 26-35 | 78 | 6 | 84 | 26.8 |
| 36-45 | 75 | 21 | 96 | 32.7 |
| 46-55 | 47 | 16 | 63 | 21.4 |
| 56-65 | 7 | 6 | 13 | 4.4 |
| 66-75 | 1 | 1 | 2 | .7 |
| ***EDUCATIONAL LEVEL*** | | | | |
| No education | 23 | 2 | 25 | 8.5 |
| Basic | 120 | 35 | 155 | 52.7 |
| Secondary | 85 | 9 | 94 | 32.0 |
| Tertiary | 16 | 4 | 20 | 6.8 |
| ***POSITION OF RESPONDENTS IN THE ENTERPRISE*** | | | | |
| Owner | 164 | 46 | 210 | 71.4 |
| Sales person | 48 | 1 | 49 | 16.7 |
| Manager/Supervisor | 22 | 2 | 24 | 8.2 |
| Accountant | 1 | 0 | 1 | .3 |
| Sales Assistant | 7 | 1 | 8 | 2.7 |
| Other (specify) | 2 | 0 | 2 | .7 |
| ***SUPPLY CHAIN CATEGORY*** | | | | |
| Retailer | 216 | 49 | 265 | 90.1 |
| Wholesaler | 56 | 20 | 76 | 25.9 |
| Distributor | 21 | 11 | 32 | 10.9 |
| Importer | 2 | 0 | 2 | .7 |
| ***AGE OF ENTERPRISE*** | | | | |
| < 1 year | 19 | 1 | 20 | 6.8 |

| | | | | |
|---|---|---|---|---|
| 1-5 years | 121 | 10 | 131 | 44.6 |
| 6-10 years | 70 | 16 | 86 | 29.3 |
| 11-15 years | 19 | 8 | 27 | 9.2 |
| 16-20 years | 10 | 7 | 17 | 5.8 |
| > 20 years | 5 | 8 | 13 | 4.4 |

**Rice trading activities**

Rice was the main food item sold by the respondents however about 25.9% of the traders also sell other grains such as millet, groundnut, maize wheat and soybeans and all these traders are retailers. In the greater Accra Region, 81.2% of the respondents sell imported rice only, 2% sell local rice only while 16.8% sell both local and imported rice. In the Volta Region (Hohoe district) however, 52% sell only local rice, 22% sell only imported rice while 26% sell both local and imported rice. In total 85 out of 294 (28.9%) of traders interviewed sell local rice either exclusively or in combination with imported rice while 263 (89.5%) sell imported rice either exclusively or in combination with local rice.

As shown in Table 2.2, the most popular type of local and imported rice is the perfumed or aromatic type, which constitutes 61.1% of local rice and 86.1% of imported rice. Another popular type of local rice is the brown rice, which in the past two decades used to be the main type of rice grown and sold in the Hohoe district. The popularity of local perfumed rice on the market is an indication that farmers are now producing new varieties probably to meet market and consumer preferences. Local parboiled rice is the least available on the markets partly because it is largely produced and available in the Northern parts of Ghana. Because of the extreme high temperatures in North Ghana the rice over-dries and becomes prone to breakage during milling hence parboiling technology is applied to reduce the proportion of broken grains. The local rice is mostlysold as milled grains (84.7%) however 15.3% of local traders sell paddy rice also. About 79.2% of local rice traders were satisfied with the overall quality of local milled rice although there could be challenges such as presence of pieces of husks, paddy grains, pests and stones.

**Table 2.2 Type of rice available on the markets**

| | Frequency | Percent |
|---|---|---|
| ***Local rice*** | | |
| Local perfumed long-grain | 52 | 61.1 |
| Local brown | 49 | 57.6 |
| Local non-perfumed long grain | 30 | 35.3 |
| Local perfumed broken grains | 14 | 16.5 |
| Local parboiled | 11 | 13.0 |
| ***Imported rice*** | | |
| Imported perfumed long grain | 253 | 86.1 |
| Imported perfumed broken grains | 72 | 24.5 |
| Imported non-perfumed long-grain | 63 | 11.4 |
| Imported parboiled | 22 | 7.5 |
| Imported brown rice | 9 | 3.0 |

The category of actors in the local rice supply chain who supply rice to traders were farmers serving 44.4% of traders, wholesalers (33%), distributors (20%), middlemen (28.3%) while 11.8% of the traders were also rice farmers who sell rice from their farms. For those who sell both imported and local rice, 27.8% said consumers bought more local than imported rice while 72.2% said the contrary. The former situation was observed mostly in Hohoe which is a rice producing area.

The traders have different types of customers, however majority indicated that caterers (including foodservices operators) were their major buyers followed by other wholesalers and retailers, schools, and the individuals. The revelation that foodservices were the major customers is not surprising because Omari et al. (2013) has reported that over 80% of restaurants in Accra serve various rice dishes with fried rice being the most popular. The traders expressed their desire to further explore other markets or customers to increase their dealings with customers such as hospitals, churches, football clubs, food services, schools, and export market.

Several bags of rice are sold by the traders every week as shown in Table 2.3. In total the estimated minimum quantity of rice per week is 6,667 bags. It should be noted that among the thirty traders who sell above 20 bags in a week, eighteen of them sell between 21 and 100 bags, eight traders sell between 100 and 500, and four traders sell up to1000 bags per week.

**Table 2.3 Number of 25kg bag of rice sold per week**

| No. of 25kg bag | Frequency | Min no. of bags |
|---|---|---|
| Less than 1 bag | 76 | <76 |
| 1-5 bags | 120 | 120 |
| 6-10 bags | 30 | 180 |
| 11-15 bags | 19 | 209 |
| 16-20 bags | 19 | 304 |
| More than 20 bags | 30 | >600 |
| 21-100 bags | 18 | 378 |
| 100-500 bags | 8 | 800 |
| Up to 1000 bags | 4 | 4000 |
| | | 6,667 |

**Factors influencing traders' preferred rice choices**

Choosing a product to sell may be the most difficult decision to make when starting a business. Not only should there be a demand for your products, but it must be profitable and something the trader enjoys selling. According to Tracy (2005) several factors need to be considered when choosing what type of product to sell. These factors include the product demand, cost price, profit, and quality. Based on the findings from the focus group discussion, several factors were identified, and these were included in the survey that yielded the findings presented in Fig 2.1. The extent to which these factors influenced the traders was assessed and it was realised that majority of the traders (50-86%) were greatly influenced by the product demand or marketability, profit margin, cost price, the popularity of the product, quality, competition and transport conditions (Fig. 2.1). Findings from the Repeated measure ANOVA followed by pairwise comparisons tests further showed that demand or marketability

of products is significantly most influential than all the other factors. The second most influential factors were cost price and profit margin, which had statistically the same level of influence on choice of product to sell. The least influential factor was product's country of origin followed by government's policies, which had statistically the same influence as labelling information as shown in Table 2.4.

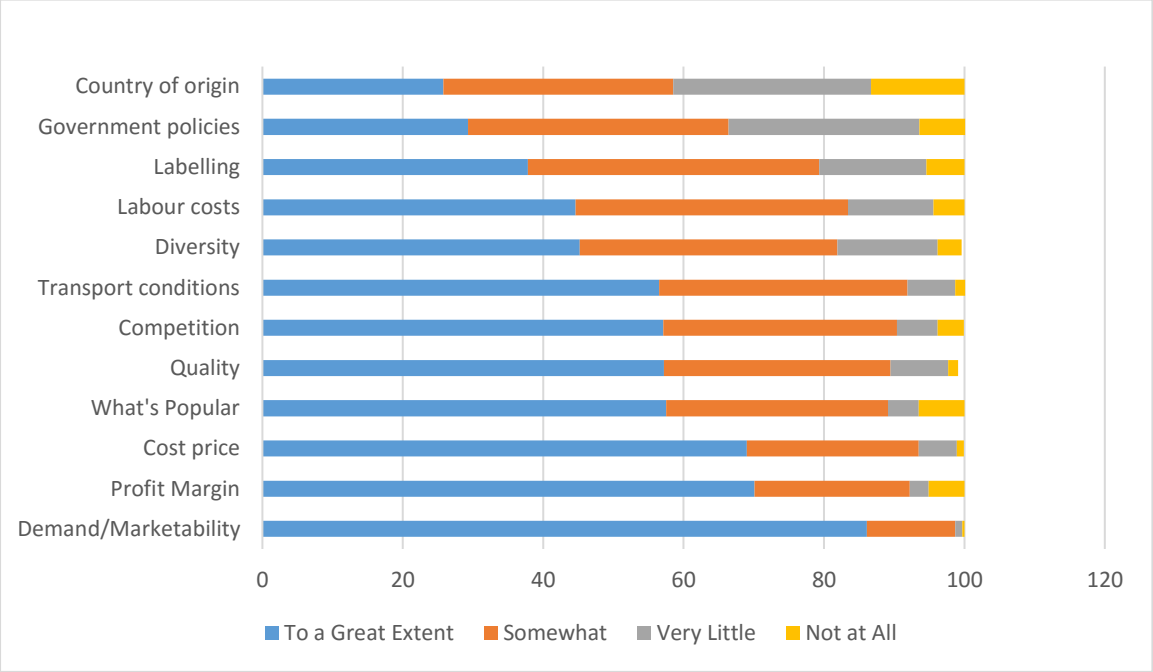


**Fig. 2.1: Extent to which traders are influenced by the factors**

**Table 2.4 Summary of Results for pairwise comparisons tests for factors influencing traders' choice of products**

| | Mean* | Std. Deviation |
|---|---|---|
| Demand/marketability | 1.15a | .402 |
| Profit margin | 1.43b | .782 |
| Popularity | 1.61c | .855 |
| Competition | 1.56bc | .770 |
| Labelling | 1.88e | .857 |
| Quality | 1.53bc | .709 |
| Diversity | 1.76ce | .826 |
| Cost price | 1.38b | .625 |
| Transport | 1.53bc | .684 |
| Labour | 1.76ce | .823 |
| Govt policies | 2.09e | .903 |
| Origin | 2.28f | .996 |

* Means that are significantly different are indicated with different letters.

The influence of these factors was well manifested among traders who sell only imported rice as shown in Table 2.5. According to these traders, imported rice has higher demand (81.7%), it is liked by most customers (80.8%), readily available (73.1%) and relatively cheaper (41.3%) as against local rice that is hard to find, has low consumer demand and relatively more expensive. Thus, demand or marketability, popularity and availability are critical considerations for traders' choices of the type of rice to sell.

**Table 5 Reasons for selling only imported rice and not local rice (n=208)**

| | Frequency | Percent |
|---|---|---|
| ***Reasons for selling only imported rice*** | | |
| Has high demand | 170 | 81.7 |
| Liked by most customers | 168 | 80.8 |
| Readily available | 152 | 73.1 |
| It is cheaper | 86 | 41.3 |
| It is more profitable | 52 | 25.0 |
| Just don't like selling locally produced goods | 29 | 13.9 |
| ***Reasons for not selling local rice*** | | |
| Not readily available | 138 | 66.3 |
| Has low demand | 114 | 54.8 |
| Too expensive | 80 | 38.5 |
| Not liked most customers | 78 | 37.5 |
| Has poor quality | 36 | 17.3 |
| Not profitable | 29 | 13.9 |
| Other reasons | 24 | 11.3 |
| Has lower shelf life | 19 | 9.1 |

**Real and perceived challenges in selling local rice**

The finding so far has shown that only 85 of 294 (i.e. 28.9%) traders interviewed sell local rice. According these traders, several challenges negatively affect the sale of local rice as shown in Fig. 2.2 where over 50% of local rice traders experience challenges such as presence of stones, lack of branding, seasonal availability, presence of paddy grains, pest infestation among others.

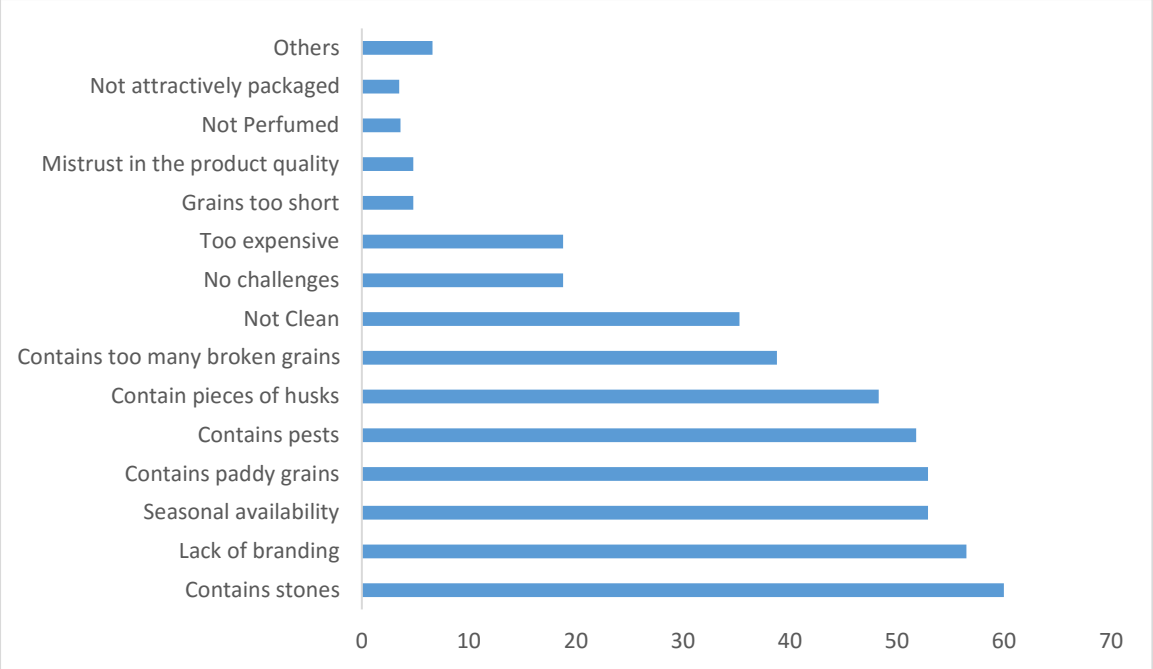


**Fig. 2.2 Challenges associated with selling local rice**

The other reasons for not selling local rice include the perception that it is not well packaged and labelled and often comes in bigger sacks, which makes traders feel uncomfortable that it might take so long to get customers buy them. Moreover, some traders do not sell local rice simply because they have not tasted it before and have heard that it is difficult to prepare and does not taste as well as the imported rice. The traders also mentioned that suppliers do not bring them local rice and even for the few who seldomly bring local rice to the markets, they prefer to sell it themselves often in a stationary van. The general perception among these traders was that there are no distributors for local rice and this was evidenced in realization. A few traders do not sell local rice simply because some neighbouring shops already sell it. A trader shared her experienced that she made losses when she previously stocked local rice, so she has stopped selling it.

**General challenges in rice trading**

Challenges are not only encountered by local rice sellers alone but also sellers of imported rice. Table 2.6 shows the results of ranking of challenges that confront all the rice traders where in order of severity, the challenges included access to finance, competition, transport costs, taxes, exchange, space rental fees, and labour costs. Some of the traders (about 31.3%) also have challenges with rice storage and for most of them, the main problem is rodent attack, limited storage space, poor packaging/storage materials, pest infestation and low shelf-life of product especially local brown rice.

**Table 2.6 Mean ranking of challenges that impact rice trading (1= most severe challenge; 12=least severe challenge)**

| Challenge | Mean | Std. Deviation |
|---|---|---|
| Finance | 2.78 | 3.214 |
| Competition | 3.77 | 3.523 |
| Transport cost | 3.83 | 2.878 |
| Taxes | 4.71 | 3.587 |
| Exchange rate | 5.04 | 3.341 |
| Rent | 5.10 | 4.281 |
| Labour cost | 5.66 | 4.034 |
| Enterprise location | 5.95 | 3.888 |
| Packaging | 5.98 | 3.646 |
| Branding | 6.04 | 3.406 |
| Pests infestation | 6.32 | 4.117 |
| Rodents attack | 6.37 | 3.998 |

**Factors positively impacting trading in rice**

Despite the challenges that traders go through, they still make profits from their trading activities. Figure 3 shows the level of profit traders make in selling the most popular types of imported and local rice in Ghana. In selling local perfumed rice, 60% of the traders indicated made high profits as against 42.3% of the traders who sell local brown rice and 37.5% of the traders who sell imported perfumed rice. This implies that comparatively, many more traders make high profits selling local rice than imported rice. This has several implications for the local rice sector as follows: contrary to the perception of some traders (those who sell only imported rice) that selling local rice is not profitable, findings have shown that some traders are making moderate to high profit in the trade. However, the fact that some local perfumed rice sellers (9.4%) and 10.6% of local brown rice sellers made no profit at all is a cause for concern. The reason for low or no profits could be due to the challenges that the traders face as discussed earlier. It is therefore critical to address those challenges to pave the way for the to sell and increase their profits and be willing to continue to trade in local rice.

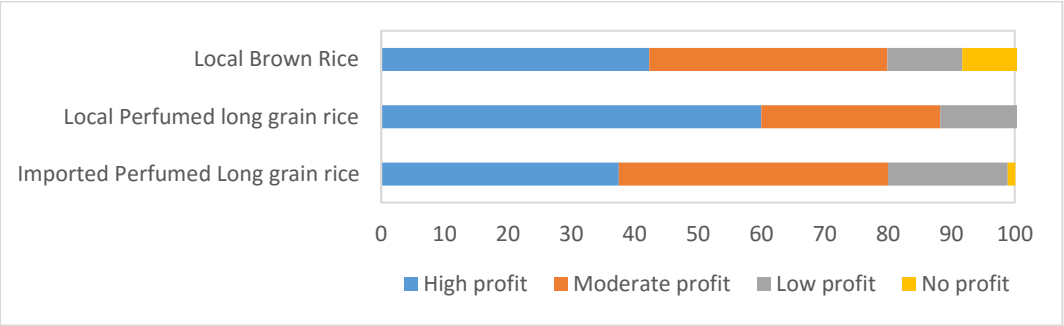


**Fig. 2.3 Level of profits in selling different types of rice**

The performance of rice trading enterprises particularly in terms of profits could be due to several factors. The findings revealed that factors such as offering good price (79.9%), good location of business (70.4%), high consumer demand (64.6%), and quality of products (51.4%)

were among the most popular factors that were positively impacting the performance of the enterprises. Other factors mentioned and the proportion of traders who mentioned them were taste of product (43.5%), adverts (28.2%), marketing strategies (27.9%), uniqueness of the brand (24.8%) and product origin (24.1%).

Another determinant of good performance of enterprises could be the skills and competences of the traders in issues related to trading and marketing. Accordingly, an assessment of the traders' access to training was done and findings revealed that about 90.5% of the traders had received no training in the past two years. Thus, only 28 out of 294 traders have benefitted from some trainings in topics including packaging, quality management, marketing, business management, record keeping, accounting, fire control and personal hygiene. Recognising the importance of training to their business the rice traders provided their training needs whereby majority wanted training in marketing (62.2%), business management (49.7%), record keeping (45.2%), quality management (42.2%) and packaging (32.3%). A few of the traders also provided other training needs including accounting, customer relations, advertising, and pests and rodent control. The traders were of the view that having access to these types of training will enhance the performance of their enterprises.

Advertising is the best way to communicate to the customers. It helps inform customers about the products available in the market and the variety of products useful to them. Advertising is done using various media types, with different techniques and methods. Advertising can be used done with the objective of convincing customers to buy new product introduced into the market. This type of advert is useful for newly introduced rice varieties. Another objective of advertising can be for companies or enterprises that want to attract the customers of their competitors. Basically, the adverts of the enterprises must convince the customers to switch from the existing brand they are using to their product. Advertising can also be done with the objective of bringing back customers who have switched to products of competitors. The advertisers use different ways discount sale, new advertise, and improved packaging to attract the customers back. Generally. Advertising plays an important role in buying and selling such that it helps create awareness of the existence of certain products on the market. Advertising helps increase sales, it helps producers or the companies to know their competitors and plan accordingly to meet up the level of competition, it helps in creating goodwill for the company and gains customer loyalty, it helps in educating people about the benefits or harmfulness of products.

Notwithstanding the benefits of advertising, findings have shown that only 30.6% of the rice traders advertise their products using various channels. Majority of the traders use word-of-mouth, followed by printed materials such as t-shirts, carrier bags, flyers, wrist bands and car stickers. Other minimally used channels were radio, print media, billboards, public address system and television, which is the least used advertising channel. In the absence of formal advertisement, the traders including those who have regular customers use various means to attract customers to the wares. These include:

- Making the products attractive and accessible
- Building and maintaining trust with customers
- Being nice to customers, showing good facial expression- good customer relation and customer service

- Calling out customers passing in front of the shops and convincing them to buy
- Siting shops in convenient and easily accessible locations
- Offering good prices and goodwill
- Openly displaying products
- Actively moving out of the shop to look for buyers
- Go around and introduced the shop
- Ensuring constant availability of products

It should also be noted that some of the shops especially distributors enjoy some monopoly for being the only shops offering such services in their areas of location. Hence, they believed that whether they advertise their products or not, their customers would always buy from them. This perception however could have negative implications for the traders in this competitive era where new products are being introduced into the markets and new shops are being opened. Some traders also benefit from advertising done by their suppliers such as importers and distributors. Such companies advertise their products using channels such as television, radio, billboards and printed materials. Others also sponsor reality shows and this provide good platform for creating awareness about the products. It is common to find adverts for *Lele Rice, Royal feast, Rice Master Brands, Royal Arome* among others which are all imported rice. Interestingly, none of the local rice traders advertise their products but they could also benefit from adverts done by Groupe Nduom, a Ghanaian Company that recently the locally produced *Edwumawura* Rice brands onto the Ghanaian market. This company has been advertising its brands on television, billboards and other channels and it is possible that other local rice sellers could benefit from the adverts.

**Access to Finance**

The lack of access to finance is the biggest obstacle affecting SMEs, microenterprises and new enterprises in developing countries including Ghana. Access to affordable finance is associated with innovation, job creation and economic growth. In line with this, this study examined the traders' sources of finance as well as their financial challenges. Findings in Fig. 2.4 showed that the most popular source of finance for rice trading activities is personal savings, which is done by 82% of the traders. Other sources of finance in order of popularity among the traders were Savings and Loan Companies, formal Banks, *Susu,* non-Bank Financial Institutions, loans from relatives and friends, loans from money lenders and donations from relatives and friends. Although these sources of finance are available 46.6% of the traders indicated they currently have financial challenges, which negatively impact the growth of their enterprises.

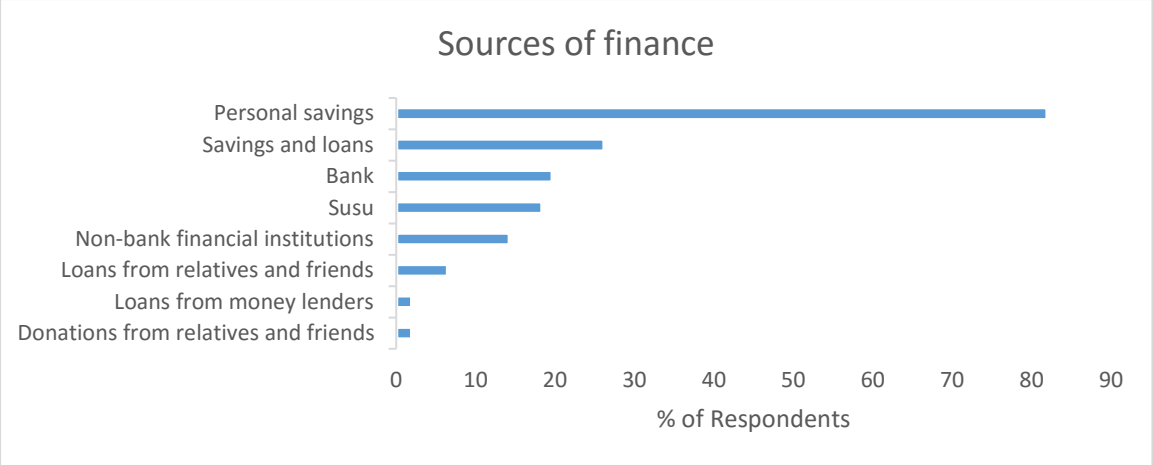


**Fig. 2.4 Traders' sources of finance**

Financial services play a pivotal role in the functioning of markets and the economy and contribute to economic and social development. The importance of financial services for the economy is manifold. Through a variety of banking, securities and insurance services, financial services facilitate domestic and international transactions, mobilize and channel domestic savings and broaden the availability of credit for small and medium-sized enterprises (SMEs) and households (UNCTAD, 2014). However, despite the availability of financial services, only 14.6% of the traders had applied for loan in the past 12 months. For the traders who never applied for loans, various reasons accounted for that and for most of the traders (50.7%), it was due to the high interest rate or cost of borrowing. Ghana's interest rate as at February 2018 was about 20% and it is among the highest rates in Africa. The rates are even higher in non-bank financial institutions that charge interests on monthly basis. Other reasons provided for not accessing loans, in order of popularity, were fear of inability to pay back the loan (32.3%), not meeting the requirement for the loan (15.0%) and fear of losing collateral in case of default in paying back the loan (11.2%). Interestingly about 21.4% of the traders indicated they had adequate funds for running their businesses and thus required no external funding. Difficulty in accessing loans is not only peculiar to Ghana but many other developing countries. World Bank surveys find that only 34 per cent of firms in developing economies take out bank loans, compared with 51 per cent in developed economies (UNCTAD, 2014). New firms, start-ups and services firms are particularly credit constrained, as lenders have little information on their performance or credit worthiness. Firms in the informal sector face major challenges in accessing finance, as many do not have bank accounts to run their business. Various factors affecting supply and demand of financial services inhibit the access of individuals and firms to financial services. While some of the unbanked people and firms exhibit no demand for accounts, most are excluded because of physical, economic, administrative and psychological barriers such as cost, travel distance, amount of documentation and lack of trust (UNCTAD, 2014). These barriers tend to have a disproportionate effect on the poor, women, youth, rural populations, and informal workers, who constitute most of the rice traders.

**Product pricing**

As mentioned earlier, most of the traders, about 79.9% indicated that offering good prices to customers has positively impacted their business. Generally, pricing can influence whether a consumer purchases a product. It takes a combination of favourable market trends, product quality, consumer liking and product differentiation along with correct pricing to generate sales, which lead to the success of a product. When considering the pricing factor, setting prices too high or too low can affect sales hence traders need to consider many factors when trying to arrive at appropriate pricing. Consequently, an assessment was done to understand factors that traders considered in pricing their products and the extent to which pricing was influenced by the factors. The findings are shown in Fig. 2.5 where, in order of popularity, more than half of the traders were influenced greatly by factors such as cost price, level of competition, transportation cost, level of market demand, economic trend (e.g. inflation, depreciation of local currency) and availability.

Low pricing can affect the volume of sales upward or downward. Some traders deliberately price certain products low to get the attention of consumers to whom they hope to sell other more expensive products. But consumers sometimes are of the perception that the quality of a product is poor if the price too low. Many customers look for value and not just the lowest price and those who want quality products are usually willing to pay a price that the products are worth. While low prices may not give traders greater profits, it should also be noted that the more of a product a trader sells the more profit he or she makes. However, low pricing may not generate enough profit to cover costs, especially if sales volume is low.

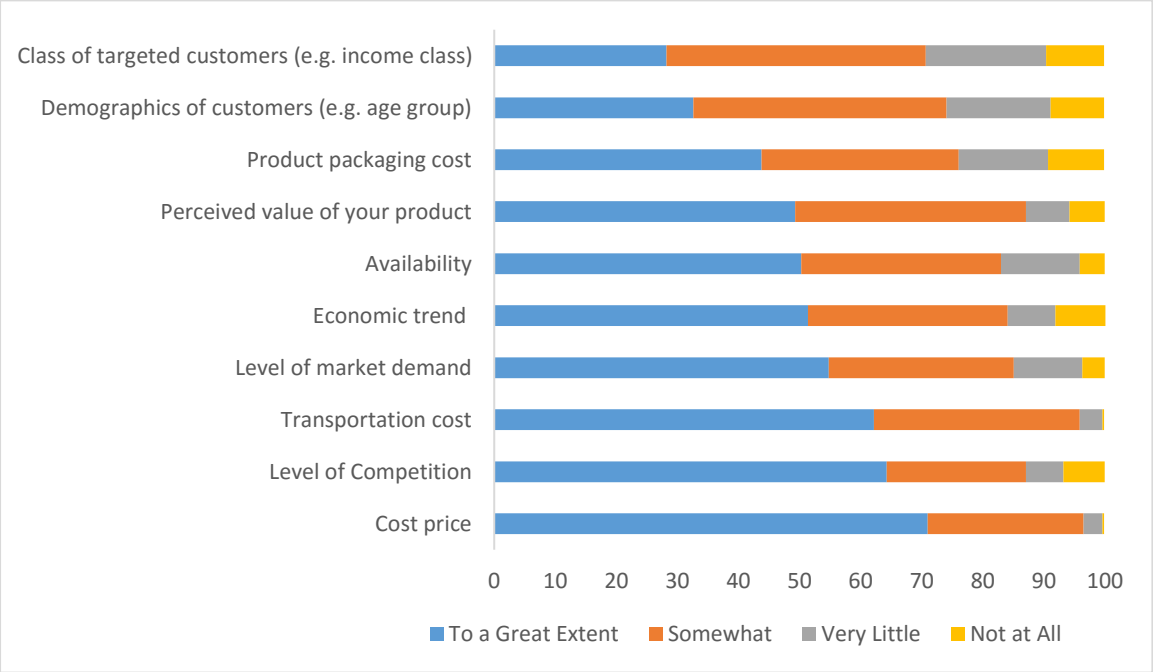


**Fig. 2.5 Factors that influence product pricing**

**Traders' perceptions and views about locally produced rice**

According to most of the traders, although they thought it was good to sell locally produced rice, they were of the view that most traders would still prefer to sell imported rice because it sells faster (91.5%), it is readily available (76.5%), cheaper (58.8%), more profitable (57.1%), it is of good quality (40.1%), and tastier (37.1%). Other reasons why traders might still prefer selling imported rice were the belief that Ghanaians do not believe in products produced locally as well as the poor packaging of local rice, aggressive advertising of imported rice mainly by importers and the view that local rice easily gets infested with pests. This calls for the need to address the challenges in the local rice value chain to increase the confidence and trust of traders in the products.

Although only 29% of the traders sell locally produced rice, almost all the traders interviewed (95.7%) were of the view that traders must increase the sale of local rice on the markets. For this to happen, many actors such as governments, farmers, traders, and consumers have different roles to play to eliminate the constraints in the sector. According to the traders, their role to increase the sale of local rice will be to advertise the local rice to customers, appeal to the government to reduce the level of rice imports, increase buying and selling of local rice, educate fellow traders on the benefits of selling local rice, educate the public on health benefits of local rice, encourage distributors and wholesalers to supply local rice, seek financial aid to help expand product line to include local rice and ensure the local rice is readily available on the market. They traders indicated they can also improve on the packaging of local rice to increase its attractiveness, brand the local rice to meet the demand of the consumers, provide convenient retail quantities in smaller packages, and reduce prices of local rice when possible. In addition to their contributions, the traders were of the view that the implementation certain specific interventions by the government could help salvage their challenges. These include financial assistance and low interest rates (64.3%), provision of relevant training (60.2%), tax reduction (56.1%), advertising (53.4%), and branding (32.7%).

As indicated earlier, irregular availability and lack of access to local rice has been cited among the main reasons why most traders do not sell local rice. Hence most traders expressed the view that farmers have an important role to play in terms of increasing the production of good quality and acceptable varieties of rice. For this to happen, several interventions are required from the government, private sector and development partners. These include: the provision of financial support to farmers, increasing farmers' knowledge and access to improved and appropriate rice production technologies, providing farmers with improved and acceptable rice varieties and relevant inputs such as agrochemicals including fertilizers and ensuring that farmers' have the needed skills to appropriately use the chemicals. Other interventions will be to assist farmers to access relevant equipment and machines such as tractors and combined harvesters, educate farmers on good agricultural practices to maximise their output and improve quality, and subsidize agricultural equipment and input to reduce production costs. There is need for government to increase its investment in the rice sector by (1) providing incentives for youth to participate, (2) attracting local and foreign investors to the sectors, (3) facilitating the provision of land for rice farming, (4) constructing good access roads to and from rice producing and market centres, and (5) providing irrigation facilities to facilitate all-year-round production of rice to avoid seasonality in supply.

At the post production stage, farmers need to be trained and supported to improve handling particularly during threshing and drying to reduce the introduction of extraneous matters such as stones. Investments are also required to provide advanced milling facilities that can provide good quality milled rice that will be free from extraneous matters such as stones, husk, and paddy grains. To ensure ready availability of local rice on the markets there is the need to improve rice distribution and transportation systems to ensure its availability and accessibility in many parts of the country. Because local rice faces stiff competition from imported rice, there is the need for active promotion of the commodity through advertisements, national campaigns and public education, organization of rice fairs and exhibition to showcase local rice recipes and ensuring that it is served at state functions and used in government institutions that provide institutional feeding. Whenever possible, there may be the need to deliberately put policies in place to reduce rice importation and increase local production and distribution.

**Conclusion**

Most traders in Accra (urban centre) sell imported rice while most traders in Hohoe (rice-producing area) sell locally produced rice. However, in both cases, perfumed, fragrant or aromatic rice is widely sold. Most traders' preferred rice choices were greatly influenced by product demand or marketability, profit margin, cost price, the popularity of the product, quality, competition and transport conditions. Generally, rice traders were of the view that traders must increase the sale of local rice on the markets. For this to happen, many actors such as governments, farmers, traders, consumers and development partners have different roles to play to eliminate the constraints such as irregular availability, poor quality, poor packaging and weak promotional activities.

## Drivers of Consumers Rice Preferences

**Introduction**

It is estimated that Ghana's rice consumption far exceeds its local rice production in the country. At the same time, local rice farmers have difficulty selling their produce hence this study was undertaken to assess consumers' preferred rice choices as well as factors that influence their preferences. The findings are presented in the next sections.

**Demographics and characteristics of consumers**

As shown in Table 3.1, a total of 503 consumers took part in the survey with 67.6% being females, 51.5% single, 32% married, 68% self-employed, 34.4% and 46.7% earning monthly income of less that GHS 500 (US$114) and between GHS 501-1,000GHS (US$114- US$227) respectively. About 46.5 of respondents were youthful (18-35 years), 47.1% with basic education and 11.3% had no education. Furthermore, 49.5% of respondents were heads of their households, 51.5% had between four and six persons in their households while 61.6% had between one and three dependents under 18 years in their households.

**Table 3.1 Characteristics of Consumers (Greater Accra: n=403; Volta: n=100)**

| Characteristics | Greater Accra | Volta | Total | % of total respondents |
|---|---|---|---|---|
| ***SEX*** | | | | |
| Male | 137 | 26 | 163 | 32.4 |
| Female | 266 | 74 | 340 | 67.6 |
| ***MARITAL STATUS*** | | | | |
| Single | 141 | 20 | 161 | 32.0 |
| Married | 201 | 58 | 259 | 51.5 |
| Divorced | 10 | 7 | 17 | 3.4 |
| Separated | 9 | 3 | 12 | 2.4 |
| Widowed | 20 | 7 | 27 | 5.4 |
| Cohabitating | 22 | 5 | 27 | 5.4 |
| ***EMPLOYMENT STATUS*** | | | | |
| Employed (public/civil service) | 6 | 13 | 19 | 3.8 |
| Employed in private sector | 42 | 3 | 45 | 8.9 |
| Self-employed | 272 | 70 | 342 | 68.0 |
| Unemployed | 33 | 5 | 38 | 7.6 |
| Student | 26 | 6 | 31 | 6.2 |
| Apprentice | 4 | 2 | 6 | 1.2 |
| National service | 2 | 1 | 3 | .6 |
| Retired | 16 | 1 | 17 | 3.4 |
| ***NO. OF PEOPLE IN HOUSEHOLD*** | | | | |
| 1-3 | 114 | 37 | 151 | 30.0 |
| 4-6 | 205 | 54 | 259 | 51.5 |
| 7-10 | 72 | 9 | 81 | 16.1 |
| 10-20 | 12 | 0 | 12 | 2.4 |
| ***AGE GROUP*** | | | | |
| 18-25 | 66 | 12 | 78 | 15.5 |
| 26-35 | 124 | 32 | 156 | 31.0 |
| 36-45 | 104 | 30 | 134 | 26.6 |
| 46-55 | 59 | 14 | 73 | 14.5 |
| 56-65 | 32 | 9 | 41 | 8.2 |
| 66-75 | 14 | 3 | 17 | 3.4 |
| 76-85 | 4 | 0 | 4 | .8 |
| ***RELIGION*** | | | | |
| Christianity | 348 | 93 | 441 | 87.7 |
| Islam | 52 | 7 | 59 | 11.7 |
| Traditional belief | 2 | 0 | 2 | .4 |
| Other specify | 1 | 0 | 1 | .2 |
| ***NO. OF DEPENDENT <18YEARS*** | | | | |
| 0 | 97 | 17 | 114 | 22.7 |
| 1-3 | 239 | 71 | 310 | 61.6 |
| 4-6 | 64 | 12 | 76 | 15.1 |
| 7-10 | 3 | 0 | 3 | .6 |
| ***MONTHLY INCOME*** | | | | |
| <500GHS | 123 | 50 | 173 | 34.4 |
| 501-1,000GHS | 190 | 45 | 235 | 46.7 |
| 1,001-2,000GHS | 55 | 5 | 60 | 11.9 |
| 2,001-5,000GHS | 12 | 0 | 12 | 2.4 |
| >5,000GHS | 2 | 0 | 2 | .4 |
| No response | 21 | 0 | 21 | 4.2 |
| ***ETHNICITY*** | | | | |
| Akan | 201 | 2 | 203 | 40.4 |

| | | | | |
|---|---|---|---|---|
| Ewe | 60 | 86 | 146 | 29.0 |
| Ga dangme | 85 | 1 | 86 | 17.1 |
| Grusi | 3 | 0 | 3 | .6 |
| Guan | 3 | 2 | 5 | 1.0 |
| Gurma (moshie) | 2 | 0 | 2 | .4 |
| Mole-dagbon | 9 | 0 | 9 | 1.6 |
| ***EDUCATIONAL LEVEL*** | | | | |
| No education | 53 | 4 | 57 | 11.3 |
| Basic | 188 | 49 | 237 | 47.1 |
| Secondary | 100 | 31 | 131 | 26.0 |
| Tertiary | 62 | 15 | 77 | 15.3 |
| Others | 0 | 1 | 1 | .2 |
| ***HEAD OF HOUSEHOLD*** | | | | |
| Respondents | 187 | 62 | 249 | 49.5 |
| Another male adult | 184 | 33 | 217 | 43.1 |
| Another female adult | 32 | 5 | 37 | 7.4 |

**Rice consumption pattern (Frequency, Preferences, Trends in consumption)**

As indicated in Table 3.2, a 7-day recall test showed that 57.7% of respondents eat rice about 3-6 times per week while 16.7% eat rice every day of the week. In the same Table 3.2, a 24-hour recall test showed that 61.6% of respondents ate rice the day before the survey. Majority of the respondents (93%) mostly cook rice at home and therefore purchase it from different sources such as markets and shops. Figure 3.1 shows consumers' preferred type of rice where in order of priority , the most preferred rice is imported perfumed long grain rice followed by local perfumed rice, local non-perfumed long grain rice and then local brown rice. This finding suggests that imported rice is preferred mostly if it is perfumed, fragranced or aromatic. In terms of regional location (Table 3.3), majority of consumers (75.4%) in Accra preferred imported perfumed long-grain rice while 74% of consumers in Hohoe mostly preferred local perfumed long grain rice.

In Ghana, rice is used to prepare various dishes and in this study about 54.5% consumers mostly eat plain boiled rice followed by jollof rice (28%) and others such as *waakye*, *omo tuo*, fried rice and rice water. Fig. 3.2 shows rice purchase trends where the proportion of consumers who will always buy imported perfumed rice in future decreased by 11.7% while those who will buy only local perfumed rice increased by 3.8%. Also, those who will buy more imported than local perfumed rice decreased by 1.6% while those who will buy more local than imported perfumed rice increased by 1.2%. This suggest that there is likely to be an increased consumer demand for local rice in the future.

**Table 3.2 Frequency of rice consumption**

| Frequency of rice consumption | % of respondents |
|---|---|
| Never | 0.6 |
| 1-2 times per week | 25 |
| 3-4 times per week | 39.6 |
| 5-6 times per week | 18.1 |
| Everyday | 16.7 |
| 24-hr Recall | 61.6 |

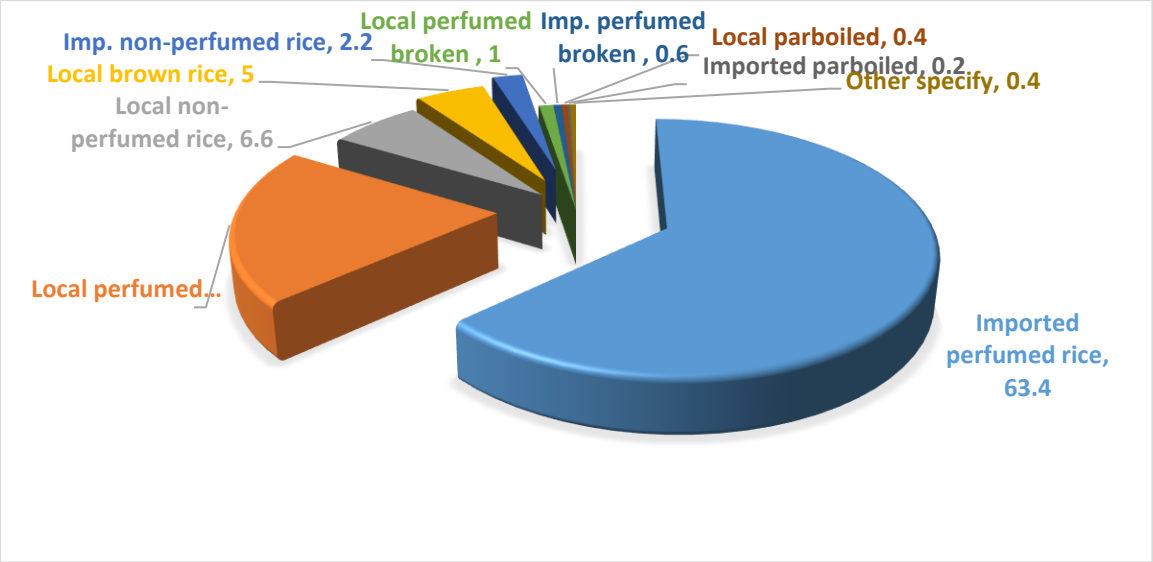


**Fig. 3.1 The most popular and preferred type of rice among consumers**

**Table 3.3 Consumers preferred rice types by location**

| Rice type | % Respondents | |
|---|---|---|
| | **Hohoe** | **Accra** |
| IMPORTED PERFUMED LONG-GRAIN | 15.0 | 75.4 |
| LOCAL PERFUMED LONG-GRAIN | 74.0 | 6.9 |
| IMPORTED PERFUMED BROKEN GRAINS | 1.0 | .5 |
| LOCAL PERFUMED BROKEN GRAINS | 2.0 | .7 |
| IMPORTED NON-PERFUMED LONG-GRAIN | | 2.7 |
| LOCAL NON-PERFUMED LONG GRAIN | 1.0 | 7.9 |
| LOCAL BROWN | 7.0 | 4.5 |
| IMPORTED PARBOILED | | .2 |
| LOCAL PARBOILED | | .5 |
| OTHER SPECIFY | | .5 |

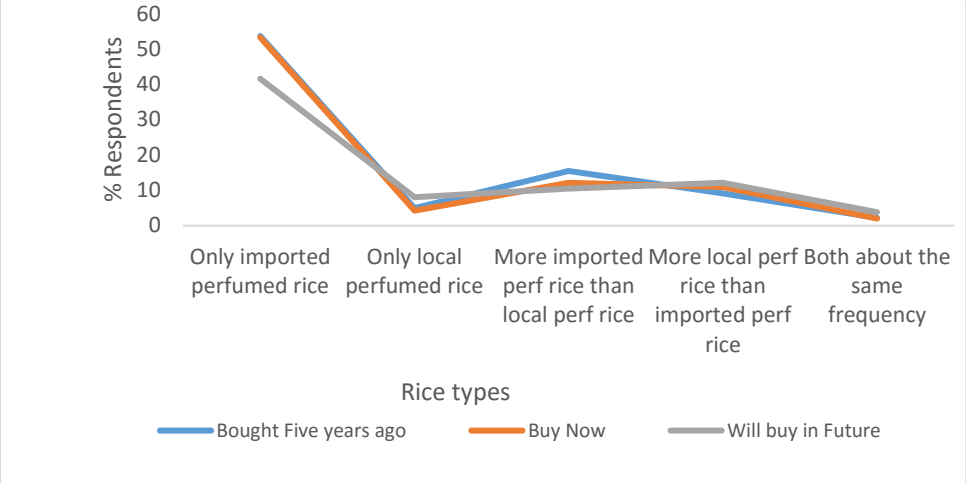


**Fig. 3.2 Trend in rice consumption (previously, now and future)**

**Factors that influence consumers' preferred rice choices and rice purchase decisions**

**Factors that influenced preferred rice choices**

Product characteristics are the features that identify the product to the producer, the market and the consumer. Each product is a complex of tangible and intangible characteristics which define the product, its use and value. Product characteristics can be viewed as technological, consumer and market:

- Technological: raw materials, composition, structure, size/shape, processing method, storage method, product type;
- Consumer: convenience, sensory properties, use, nutrition, safety, psychological, social;
- Market: type of market, marketplace, sales, price, promotion.

Variation of the characteristics and addition of new characteristics can make the product more appealing to the consumer and indeed give a unique product. A product has several characteristics, and they can be ranked in importance not only to the consumer, but also technically and for the market. The important characteristics are combined to give a product profile. Each product has a unique product profile with certain characteristics, some being more important than others. Some product characteristics can be needed or wanted by the consumer and are often called consumer product benefits. Other characteristics can be disliked by the consumer.

Based on discussions from focus groups, several factors were collated as drivers of rice preferences and these were subjected to consumer survey as shown in Fig. 3.3. Majority of consumers (82.9%) chose their preferred rice because of its acceptable taste followed by aroma (59.44%), nutritional quality (31.6%) and then better texture after cooking (29.0%). In relation to texture, consumers in the focus group discussion indicated that local rice hardens shortly after cooking while others become watery upon storage even in the fridge.

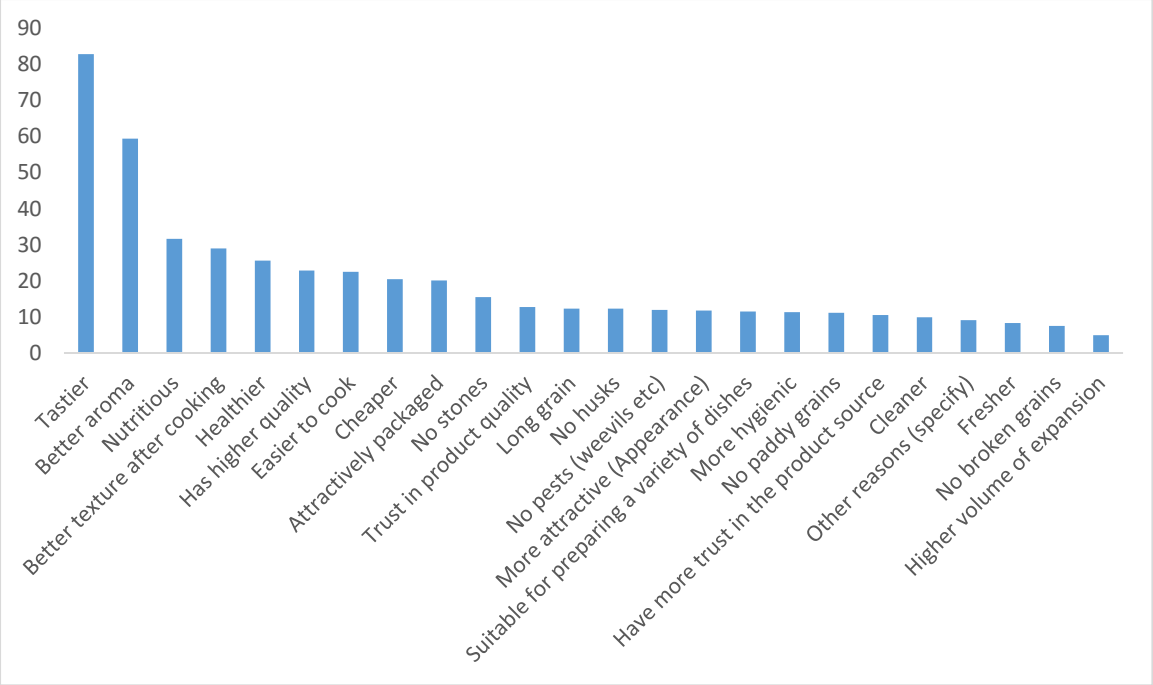


**Fig. 3.3 Attributes influencing preferred rice choices**

**Factors that influenced rice purchase decisions**

Fig. 3. 4 shows a number of factors that influence rice purchase decisions. These factors have been categorised into five factors namely technological product characteristics, sensory characteristics, convenience characteristics, social and informational factors with the mean scores shown in Table 3.4. As shown in Fig. 3.4, product-related characteristics was measured by items including price, quality/ freshness safety/wholesomeness, shelf-life, volume of expansion, nutritional quality and quality attributes such as absence of extraneous matters like stones, pieces of husk and pests. Here, more than half of the respondents are influenced a lot by quality/ freshness, safety/wholesomeness, shelf-life, nutritional quality and absence of extraneous matters. Sensory characteristics was measured by items such as taste, aroma, appearance and texture with 90% of respondents indicating that taste has a lot of influence on their purchase decisions followed by texture upon cooking (72.2%) and then appearance (66.6%) and aroma (65.2).

Convenience characteristics was measured by cooking duration, amount of effort required to prepare rice, availability, accessibility, and money available for food, which highly influenced rice purchase decisions in less than 50% of the respondents. Social factors were measured by children's preference, others' preference, and respondent's preference, what is healthy as well as dietary requirement of house hold member. Here, 62.6% of respondents were influenced a lot by their own rice preferences while 66.2% were influenced by what they consider as healthy. Informational factors were measured by items including label information, adverts, TV radio talks, promotional offers and articles on rice. In total, more than half of the respondents were not at all influenced by promotional offers and article on rice and 44-49% were also not at all influenced by label information, adverts, and TV radio talk shows.

As indicated in Table 3.4, sensory characteristics had the greatest influence on purchase decisions followed by social factors, convenience, product characteristics and information. A one-way repeated measure ANOVA followed by pairwise comparison tests (Appendix 1) showed that consumers were influenced significantly more by sensory characteristics (mean = 1.42; SD =.582) compared to social factors (mean = 1.94; SD =.700; p=.000); convenience factors (mean = 2.00; SD =.690; p=.000); product characteristics (mean = 2.01; SD = .625; p=.000) and informational factors (mean=3.00; SD=.862). However, product characteristics, social factors and convenience factors have statistically the same level of influence on rice purchase decisions of consumers.

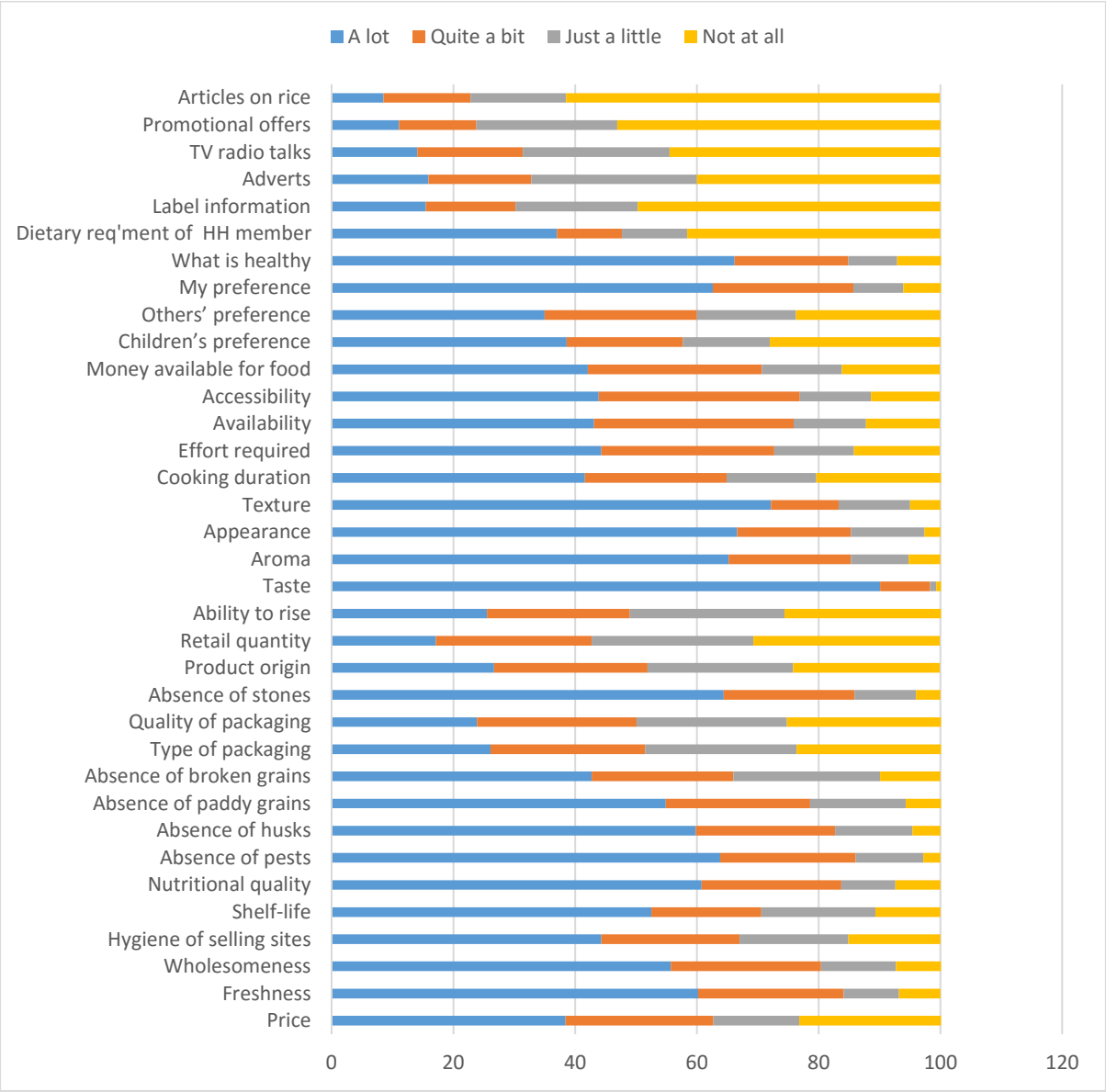


**Fig. 3.4 Factors that influence rice purchase decisions**

**Table 3.4 Mean score for the extent to which these factors influence rice purchase decisions (Range: 1-5 where 1= a lot of influence and 4= no influence)**

| Factors | Mean score* | Standard deviation |
|---|---|---|
| Product characteristics | 2.01 a | .625 |
| Sensory characteristics | 1.42 | .582 |
| Convenience characteristics | 2.00ab | .690 |
| Social factors | 1.94b | .700 |
| Informational factors | 3.00 | .862 |

*Means that are statistically the same are indicated by same letters

**Consumer attitudes and beliefs about rice**

Majority of consumers were of the view that locally produced rice has health (83.5%) and economic (76.5%) benefits. In terms of health benefits consumers were of the view that local rice especially the variety known as brown rice has most nutrients intact because it is not excessively polished; it is produced with little or no chemicals; helps control blood pressure, diabetes, cholesterol level and stroke as well as in the prevention or reduction of risks of certain diseases; it contains higher fibre content; boosts the immune system. In contrast, some consumers were also of the view that excessive consumption of perfumed/aromatic rice could be harmful to the body while chewing stones while eating rice could be detrimental and can damage the teeth. In terms of economic benefits, majority of consumers believed that producing and consuming local rice will create job opportunities, increase farmers' income, save foreign exchange, and help the economy grow faster.

These perceived benefits notwithstanding, 92.4% of respondents believed that most Ghanaians generally prefer imported rice to local rice. The common reasons respondents cited for the preference for imported rice were that imported rice is more readily available (62.0%), tastier (55.9%), rarely contains extraneous matters (40.6%), easier to cook (37.8%) and relatively cheaper (36.4%). Other reasons gathered from open-ended questions were:

- Ghanaians acquired taste for imported rice due to long period of consumption,
- Extensive advertisement of imported rice
- The Ghanaian mentality or mindset that foreign goods are better than local goods
- Attractive packaging
- Better texture and served at many occasions and parties hence they perception that they are the best
- The lack of awareness of the nutritional and health importance of local rice

Fig. 3.5 shows the level of satisfaction consumers have with locally produced rice where more consumers were dissatisfied with the price and availability of local rice than those who were satisfied with these. The dissatisfaction stems from the perceived barriers such as locally produced rice is relatively more expensive than imported rice and at the same time it is hard to find on the market. They indicated that one must travel to only specific locations to get local rice to buy which adds on to the overall cost of the product. In addition to these, consumers said they had difficulty cooking local rice because it needs to be cleaned thoroughly to remove extraneous matters such as stones, paddy grains, pieces of husk, which require more time and effort unlike imported rice which may not even be washed before cooking. Besides, it is difficult

to cook local rice because it easily gets soggy hence special skills are required which most people lack.

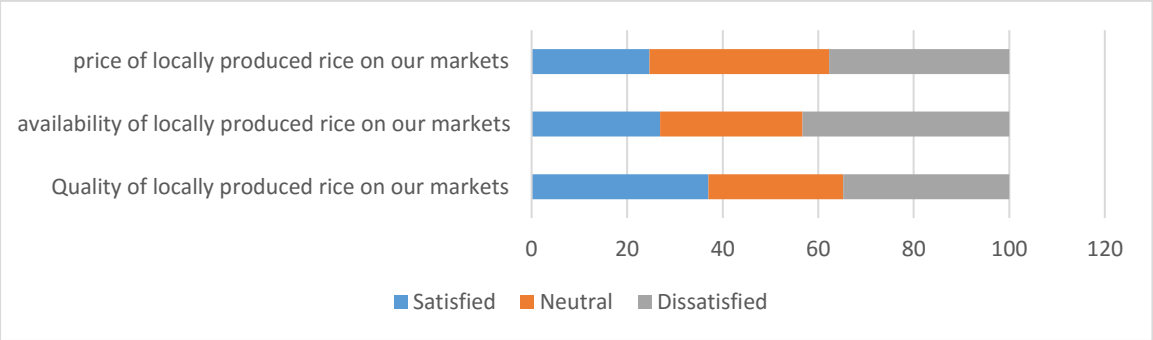


**Fig. 3.5 level of consumer satisfaction about local rice**

Despite these, more consumers were satisfied with the overall quality of locally produced rice than those who were dissatisfied because they perceived the local rice as fresh, free of chemicals and its origin well known and trusted. Perhaps in line with this, almost all the respondents (95.4%) were of the view that Ghana should increase local rice production and consumption because of its health, food security and economic benefits. For this to happen, respondents made some suggestions on what government must do as follows:

- Support farmers especially women and youth to acquire land for rice farming
- Increase promotional activities and advertisements
- Make policies to reduce or discourage rice importation
- Build capacity for farmers in new, innovative and appropriate rice production technologies
- Provide farmers with improved and consumer preferred seeds and inputs
- Assist farmers with relevant machinery and equipment
- Organise educational and awareness raising campaigns on benefits of local rice
- Establish a central local rice market and ensure its increased availability on the markets
- Encourage the youth into rice farming
- Educate farmers on appropriate post-production handling techniques to improve quality
- Give financial support and incentives to the farmers
- Improve on packaging
- Government should increase investment in the local rice industry
- Establish State rice farms
- Establish rice processing factories
- Link farmers to interventions programs such as school feeding project, and state institutions such as police, military, prisons, boarding schools. Put in place compulsion measures to ensure that these institutions use local rice
- Improve roads to facilitate transportation of rice from production centres to other parts of the country
- Make policies that will reduce cost of rice production and price of rice on the market

Clearly, increasing local rice production will also come with some responsibilities for consumers and these include changing the mindset and making efforts to buy and eat local rice and encouraging family and friends to cook it both at home and for parties and other events.

**Factors that influence consumer perceptions and beliefs about rice**

Food-related decisions made by individuals are influenced by a complex array of factors and processes. These include demographic factors, familial and household influences, habit and price, health considerations, ethical concerns and wider societal trends.

Habit development is important for obtaining maximum benefits from any health-related behaviour. It is well known that the typical pattern of change for such behaviours consists of a progression from occasional, irregular performance to more frequent and regular involvement, and that repetition over an extended period is needed to improve the chances of maintaining the new regime (Prochaska & Velicer, 1997; Prochaska et al., 1994). In part, this is because the initiation of new behaviours requires deliberation and conscious effort, but, after the behaviour has been repeated many times, it requires less conscious effort. Therefore, it can be performed in a semi-automatic or habitual fashion and becomes more resistant to change (Aarts & Dijksterhuis, 2000; Ajzen & Fishbein, 2000; Bargh & Chartrand, 1999). Habit is an acquired behaviour pattern regularly followed until it has become almost involuntary. Habit has been found to influence people's eating behaviours and this study (reliability analysis) habit was measured by items such as "*Eating local rice is something I do without thinking", "Eating local rice is something I do NOT do frequently* (reversed)", "*I serve local rice everyday", "Eating local rice is typical of me", and "*I *have been eating local rice for a long time" . As shown in* Appendix 2, people who had the habit of eating local rice were less likely to have preference for imported perfumed rice and would less likely eat it in the past, currently or in future. This is an indication that what an individual has been exposed to over a long period can become a habit that could be difficult to break. This could imply that it may be difficult to influence people who have developed the taste and habit for imported rice to change their rice preferences. As the way forward, it therefore means that when local rice is available and children who are change agents are encouraged to eat it they could develop the habit and preference for locally produced rice.

Attitude is described as a disposition to respond favourably or unfavourably to an object, person, institution or event Ajzen (1988). Within consumer and food studies, attitude objects are often attributes such as fat, odor, texture or defined brands, or general product categories such as seafood or meat (Olsen, 1999). Eagly and Chaiken (1993) in turn defined attitude as a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour. Attitude influence people's food choices and preferences. In this study attitude was assessed (after reliability analysis) by two items, that is, "*Local rice usually tastes bad" and "Eating local rice is usually an unpleasant experience".* The findings in Appendix 2 showed that negative attitude toward local rice was found to be a strong determinant of consumers' belief that local rice consumption could have adverse health effects while its consumption comes with challenges. Also, negative attitude to local rice was found to be a strong negative predictor of increased local rice consumption. This call for the need for attitudinal change among consumers and other relevant actors in the rice value chain.

Health-related attitudes are important factors affecting food choice (Hayes & Ross,1987; Steptoe et al., 1995; Lindeman & Stark, 1999). Health perceptions (or perceived health attributes) are subjective ratings by an individual of the health importance of an object, activity or a consumption pattern (Wilson and Cleary, 1995). Some people perceive some foods as healthier and that has been found to influence eating behaviours. In this study (after reliability analysis) health perception was measures by two items namely "*Eating local rice is healthy" and "Eating local rice is nutritionally beneficial".* As shown in Appendix 2, people who perceives local rice as healthy and nutritious are more likely to consumer non-perfumed rice in the past, currently and in future probably because of the perception that perfumed rice could contain chemicals and be harmful when excessively consumed over a longer period. Positive health perception also significantly predicted consumer's beliefs that local rice has health benefits, economics benefits and therefore its production and consumption must be increased.

**Conclusion**

Rice is frequently consumed by most consumers in Accra and Hohoe. In Accra, most consumers preferred imported perfumed or fragrant rice while most consumers in Hohoe preferred locally produced perfumed rice. The main drivers of consumer rice preference was sensory characteristics such as taste, aroma, texture after cooking, nutritional quality, and absence of extraneous matters like stones, pieces of husk and pests. The greatest constraint to the purchase and consumption of local rice is that it is relatively more expensive, hard to find on the market, difficult to clean prior to cooking, and difficult to cook because it easily gets soggy. Notwithstanding, majority of consumers were of the view that locally produced rice has health and economic benefits and therefore its production and consumption must increase. However, this can only happen when the identified constraints are eliminated, and consumers change their mindset and make efforts to buy and eat local rice and encourage family and friends to cook it both at home and for parties and other events. This is necessary because habit was found to be a stronger determinant of rice preferences hence when local rice is available and children, who are change agents, are encouraged to eat it they could develop the habit and preference for locally produced rice. Negative attitude to local rice was also found to be a strong negative predictor of increased local rice consumption thus calling for the need for attitudinal change among consumers and other relevant actors in the rice value chain.

## Marketing and Promotional Plan for Locally Produced Rice

**Introduction**

The low production and consumption of local rice and the huge importation of rice has been a cause for concern for the government of Ghana. To contribute to government's efforts to salvage the situation, a marketing and consumer study was conducted, which brought to the fore key drivers for traders and consumers rice preferences as well as barriers and motivational factors to the sale and consumption of locally produced rice. Thus, the findings have provided key issues for the development of a promotional and marketing plan to stimulate the sale, purchasing, utilization and consumption of locally-produced rice in Ghana.

Marketing involves various issues including determining what the customer wants and developing that product as well as delivering it to a place where the customer will reach to purchase it. Furthermore, it involves determining for the product a price that is profitable and

attractive, informing the customer about the product and identifying people who will be involved in the transactions during sale of the product. Marketing also entails sensitizing traders and consumers about the unique features of a product, and this requires product positioning. This chapter presents suggestions on ways to position locally produced rice using the marketing mix concept – Product, Price, Place, Promotion, and People.

**Objectives of the rice promotional and marketing plan**

The objectives of the local rice plan are to:

A. Increase the production of local rice by 50% by 2020,
B. Increase the availability of local rice on the markets by 80%
C. Increase demand for local rice by 50% across all regions
D. Increase by 50% the number of catering establishments and public institutions such as hospitals and schools incorporating local rice in their menus
E. Convert at least 20% of local rice into shelf-stable marketable products for both household and commercial uses.

**Promotional and Marketing Strategies for locally produced rice in Ghana**

Locally produced rice, which is available in different varieties will be introduced to various segments of the markets using strategies such as penetration pricing (offering a low price for rice during its initial offering), various promotional strategies including extensive advertising, expanded distribution, farmer-trader-processor-consumer linkages, training on utilization, and education on health and economic benefits. This is expected to increase rice availability on most markets, increase consumption and utilization, increase revenues for farmers, traders and processors and improve health of consumers. Creating market opportunities will provide farmers with a strong incentive to grow the rice. The marketing strategy will involve:

I. Creating demand for existing, newly improved, introduced and acceptable rice varieties; and
II. Creating a supportive environment to accelerate behaviour change at the trader, household level and community levels.

The development of market for local rice aims to link farmers to traders and to inform consumers about where they can purchase local rice, and how they can utilise it in food preparations. It is expected that this marketing strategy will generate demand, stimulate production, enhance producer and traders' income and spread the health benefits of local rice to the wider population.

**Action Plan based on the marketing mix of the 5Ps**

This action plan is based on the marketing mix of the 5Ps; that is; Product, Price, Place, Promotion, and People. These are the 5 pillars which anyone involved in marketing local rice and its products should have in mind when planning. The 5 pillars are given as follows:

1. Product (locally produced rice)
2. Place (where to sell or buy)
3. Price (how much to sell)
4. Promotion (how to draw attention or create interest in the product)
5. People (Market chain actors, that is farmers, traders, processors and consumers)

**Product**

In Ghana, rice is mainly produced in the Volta, Northern, Upper East, and Upper West Regions. In the Volta region, rice is produced mainly in the following municipals and districts: South Tongu, North Tongu, Cental Tongu, Ketu North, Akatsi South, Akatsi North, Ho Municipal, Afadzato South, Hohoe Municipal, Jasikan, Biakoye, Kadjebi and Nkwanta South. In the Volta Region, about 26,038ha of land is under cultivation with an average yield of 3.22mt/ha. In addition to, commercial farms in rice production individual small-scale and peasant farmers are largely involved in rice cultivation in the region. The total number of male farmers is 31,245 as against 12,151 females (Rice e-Hub, 2018). A recent study conducted by the Statistics Research and Information Directorate of the Ministry of Food and Agriculture revealed that the Volta region has increased its annual rice production from 43,944 metric tonnes in 2008 to 190,450 metric tonnes in 2014 making it the highest producer of rice in the country. This figure represents only yields from 28% of a total land area of 155,545 hectors suitable for rice production in the region. This suggests that the region has potentials of producing about 380,000 metric tonnes of paddy rice capable of augmenting the increasing demand in the country.

In the Hohoe district of the Volta region, two main type of rice are produce, i.e. the white and the 'brown'. Ampadu-Ameyaw et al. (2017) reported that 28.6% of the farmers cultivate only the brown rice while 34.7% of the farmers cultivate both brown and white rice or while rice only. Among those who cultivated brown rice, it was observed that majority cultivated local varieties such as *Viwonor*, *Damansa*, and *Tema brown*. In the case of the white rice, most farmers cultivate long grain varieties such as Togo Marshal, Jasmine 85, and AGRA. The major challenge for the farmers is their continual experimenting with varieties mostly with little extension services and advice.

**Value addition, utilization and consumption**

Rice is a staple food for nearly one half of the world's population (Zhou et al., 2002). In Ghana it has become the second most important staple, next to maize (Ministry of Food and Agriculture, 2009) and serves as an important convenience food for urban consumers (Tomlins et al., 2005). Per capita consumption of rice in 2013 was about 35 kg with urban areas accounting for about 76 percent of total rice consumption (Osei-Asare, 2010). In urban areas, rice is preferred over other staples as it is easy and convenient to prepare as it allows for a wide variety of dishes. Omari et al. (2015) conducted a survey of 90 restaurants in Accra and found that 92.2% serve fried rice, 44.4% serve jollof rice and 24.4% serve plain boiled rice. Other types of common Ghanaian rice dishes are waakye, omo tuo, and rice porridge. The consumption study revealed that rice is used to prepare various dishes and about 54.5% consumers mostly prepare plain boiled rice followed by jollof rice (28%) and others such as waakye, omo tuo, fried rice and rice water.

Recently, efforts are being made to add value to rice by processing it into shelf-stable products. One of such efforts was the training workshop organised in 2017 under the PARI project for the rice value chain actors to enhance their skill in processing rice into various appealing and marketable products (Fig. 4.1 and 4.2). The overall objectives of the training were to increase utilisation of rice in the production of various nutritious and quality products, add value to

broken rice grains, and diversify income sources of rice value chain actors. The specific objectives were to enhance skills in weanimix production (cereal-legume mix) using the recommended Ministry of Health and UNICEF weanimix formula; soybean processing before milling into flour; pastries and baked goods production using rice-wheat composite flour; hygienic food handling, processing and packaging; as well as costing of raw materials and inputs.

**Figure 4.1: Processed and packaged rice product**

**Figure 4.2: Training in rice value addition**

**Consumer preferences**

As indicated in Chapter Two, most of rice on the Ghanaian market is imported with the perfumed long grain type being the most popular among traders. In the rice consumption study, rice was found to be frequently consumed such that a 7-day recall test showed that 57.7% of respondents eat rice about 3-6 times per week while 16.7% eat rice every day of the week. A 24- hour recall test also showed that 61.6% of respondents ate rice the day before the survey. Findings further showed that the most preferred rice, in order of popularity, is imported perfumed long grain rice followed by local perfumed rice long grain rice, local non-perfumed long grain rice and then local brown rice. This finding suggest that imported rice is preferred mostly if it is perfumed, fragranced or aromatic. In terms of regional location, majority of consumers (75.4%) in Accra preferred imported perfumed long-grain rice while 74% of consumers in Hohoe mostly preferred local perfumed long grain rice. Other rice types such as non-perfumed long-grain and parboiled rice are least preferred.

Rice consumption has increased rapidly and is currently estimated at about 45 kg/year/per person. This creates a wide gap between demand and supply and has contributed to the scarcity of the grain and its high price. Because consumption exceeds production, it creates a

huge deficit that is offset by large volumes of rice imports into the country. A combination of increasing urbanisation, consumers' income and preference of Ghanaians for imported rice are driving rice imports to unprecedented high levels (Amikuzuno et al., 2013).

This trend notwithstanding, the survey showed that the proportion of consumers who will always buy imported perfumed rice in future will decrease by 11.7% while those who will buy only local perfumed rice will increase by 3.8%. Also, those who will buy more imported than local perfumed rice will decrease by 1.6% while those who will buy more local than imported perfumed rice will increased by 1.2%. This suggest that there is a great potential for the local rice industry as consumer demand is likely to increase in future.

**A. Factors/Attributes that influence consumers' preferred rice choices and rice purchase decisions**

In the rice consumption study, focus group discussions provided insights into several factors that could influence rice preferences and choices. Thus, in the survey, the influence of these factors was assessed and finding revealed that majority of consumers (82.9%) choose their preferred rice because of its acceptable taste followed by aroma (59.44%), nutritional quality (31.6%) and then better texture after cooking (29.0%). In relation to texture, consumers in the focus group discussion indicated that local rice hardens shortly after cooking and can also become watery upon storage even in the fridge. Several factors also influenced rice purchase decisions. These factors have been categorised into five factors namely technological product characteristics, sensory characteristics, convenience characteristics, social and informational factors. The product-related characteristics was measured by items including price, quality/ freshness safety/wholesomeness, shelf-life, volume of expansion, nutritional quality and quality attributes such as absence of extraneous matters like stones, pieces of husk and pests. Here, more than half of the respondents are influenced a lot by quality/ freshness, safety/wholesomeness, shelf-life, nutritional quality and absence of extraneous matters. Sensory characteristics was measured by items such as taste, aroma, appearance and texture with 90% of respondents indicating that taste has a lot of influence on their purchase decisions followed by texture upon cooking (72.2%) and then appearance (66.6%) and aroma (65.2). Convenience characteristics was measured by cooking duration, amount of effort required to prepare rice, availability, accessibility, and money available for food, which highly influenced rice purchase decisions in less than 50% of the respondents. Social factors was measured by children's preference, others' preference, respondent's preference, what is healthy as well as dietary requirement of house hold member. Here, 62.6% of respondents were influenced a lot by their own rice preferences while 66.2% were influenced by what they consider as healthy. Informational factors was measured by items including label information, adverts, TV radio talks, promotional offers and articles on rice. In total, more than half of the respondents were not at all influenced by promotional offers and article on rice and 44-49% were also not at all influenced by label information, adverts, and TV radio talk shows.

In summary, (1) sensory characteristics had the greatest influence on purchase decisions followed by (2) social factors, (3) convenience, (4) product characteristics and (5) information. Whereas consumers were influenced significantly more by sensory characteristics compared to the other four categories of factors, product characteristics, social factors and convenience factors had statistically the same level of influence on rice purchase decisions of consumers.

## B. Consumer perceptions and beliefs about imported and local rice

Despite the large preference for imported rice, most consumers were of the view that locally produced rice has health (83.5%) and economic (76.5%) benefits. In terms of health benefits consumers were of the view that local rice especially the variety known as brown rice has most nutrients intact because it is not excessively polished; it is produced with little or no chemicals; helps control blood pressure, diabetes, cholesterol level and stroke as well as in the prevention or reduction of risks of certain diseases; it contains higher fibre content; boosts the immune system.

In contrast, some consumers were also of the view that excessive consumption of perfumed/aromatic rice could be harmful to the body while chewing stones while eating rice could be detrimental and can damage the teeth. In terms of economic benefits, majority of consumers believed that producing and consuming local rice will create job opportunities, increase farmers' income, save foreign exchange, and help the economy grow faster.

## C. Factors that influence consumer perceptions and beliefs about rice

Food-related decisions made by individuals are influenced by a complex array of factors and processes. These include demographic factors, familial and household influences, habit and price, attitude, health considerations, ethical concerns and wider societal trends. In the consumer survey, findings showed that people who had the **habit** of eating local rice were less likely to have preference for imported perfumed rice and would less likely eat it in the past, currently or in future. This is an indication that what an individual has been exposed to over a long period can become a habit that could be difficult to break. This could imply that it may be difficult to influence people who had developed the taste and habit for imported rice to change their rice preferences. As the way forward, in addition to behaviour change communication, children who are change agents need to be encouraged to eat local to develop the habit and preference for it.

**Attitude** is described as a disposition to respond favourably or unfavourably to an object, person, institution or event Ajzen (1988). Findings from the consumer study showed that negative attitude toward local rice was found to be a strong determinant of consumers' belief that local rice consumption could have adverse health effects while its consumption comes with challenges. Also, negative attitude to local rice was found to be a strong negative predictor of increased local rice consumption. This calls for the need for change of attitudes and mind-set of consumers and other relevant actors to have a positive view about and perceptions about local rice and other Ghanaian-made products. **Health perceptions** (or perceived health attributes) are subjective ratings by an individual of the health importance of an object, activity or a consumption pattern (Wilson and Cleary, 1995). Some people perceive some foods as healthier and that has been found to influence eating behaviours. In this study, people who perceived local rice as healthy and nutritious were more likely to consume non-perfumed rice in the past, currently and in future probably because of the perception that perfumed rice could contain chemicals and be harmful when excessively consumed over a long period. Positive health perception also significantly predicted consumer's beliefs that local rice has health benefits, economics benefits and therefore its production and consumption must be increased.

**Constraints to consumption of local rice**

Notwithstanding the perceived benefits of local rice presented above, 92.4% of respondents believed that most Ghanaian generally prefer imported rice to local rice. Most consumers have challenges with the local rice because of certain perceived barriers as follows:

1. Local rice is relatively more expensive than imported rice
2. Local rice is hard to find on the market. Basically, one must travel to only specific locations to get local rice to buy, which adds on to the overall cost of the product.
3. Cooking local rice is laborious because it needs to be cleaned thoroughly to remove extraneous matters such as stones, paddy grains, pieces of husk, which require more time and effort unlike imported rice which may not even be washed before cooking. Besides, it is difficult to cook local rice because it easily gets soggy and therefore unsuitable for preparing some popular rice dishes such as fried rice. In fact, cooking local rice requires special skills and patience, which most people lack.

In contrast, most consumers were of the view that imported rice is more readily available (62.0%), tastier (55.9%), rarely contains extraneous matters (40.6%), easier to cook (37.8%) and relatively cheaper (36.4%).

Despite the constraints mentioned earlier, there are also opportunities as more consumers were satisfied with the overall quality of locally produced rice than those who were dissatisfied with it because they perceived the local rice as fresh, free of chemicals and its origin well known and trusted. Perhaps in line with this, almost all the respondents (95.4%) were of the view that Ghana should increase local rice production and consumption because of its health, food security and economic benefits. Increasing local rice production will come along with some responsibilities for consumers and these include changing the mindset and making efforts to buy and eat local rice and encouraging family and friends to cook it both at home and for parties and other events.

**What are the competitive crops?**

The major competitive crop for local rice is imported rice. As both the market and consumer studies showed, imported rice is generally more popular in Ghana than locally produced rice. However, findings showed that in Hohoe, which is a rice producing area, local rice is largely available on the market and is also largely consumed. In order of popularity, the types of imported rice available on the markets were as follows: imported perfumed long grain, imported perfumed broken grains, imported non-perfumed long-grain, imported parboiled, and imported brown rice. Imported perfumed rice is not only widely available on the market but it is also largely consumed and is in fact the most preferred by most traders and consumers. Most consumers were of the view that compared to local rice, imported rice is more readily available (62.0%), tastier (55.9%), rarely contains extraneous matters (40.6%), easier to cook (37.8%) and relatively cheaper (36.4%). Other reasons for the high preference for imported rice as gathered from open-ended responses were due to the perception that

- Ghanaians have acquired taste for imported rice due to long period of consumption,
- Imported rice extensively advertised,
- Some Ghanaians have mentality or mindset that foreign goods are better than local goods
- Imported rice is more attractively packaged and branded

- Imported rice has better texture and is served at many occasions and parties hence they perception that they are the best
- Consumers lack of awareness of the nutritional and health importance of local rice

To be able to develop local rice value chain to favourably compete with the imported brands, there is need to understand attributes of imported rice that make them more appealing to both traders and consumers. In the market survey, several factors were identified as drivers of traders' rice preferences. For example, majority of the traders (50-86%) were greatly influenced by factors such as product demand or marketability, profit margin, cost price, product popularity, quality, competition and transport conditions. Findings further showed that demand or marketability of products was significantly most influential than all the other factors. The second most influential factors were cost price and profit margin, which had statistically the same level of influence on choice of product to sell. The least influential factor was product's country of origin followed by government's policies, which had statistically the same influence as labelling information. The influence of these factors was well manifested among traders who sell only imported rice. According to these traders, they preferred to sell only imported rice because it has higher consumer demand (81.7%), and it is liked by most customers (80.8%). It is also readily available (73.1%) and relatively cheaper (41.3%) as compared to local rice that is hard to find. The latter also has low consumer demand and it is relatively more expensive. Thus, demand or marketability, popularity and availability are critical considerations for traders' choices of the type of rice to sell.

Furthermore, traders who sell only imported rice were of the perception that local rice is not well packaged, labelled and branded, and often comes in bigger sacks, which makes traders feel uncomfortable that it might take so long to get customers buy them. Moreover, some traders do not sell local rise simply because they have not tasted it before and have heard that it is difficult to prepare and does not taste as well as the imported rice. The traders also mentioned that suppliers do not bring them local rice and even for the few who seldomly bring local rice to the markets, they prefer to sell it themselves often in a stationary van. The general perception among these traders was that there are no distributors for local rice. A trader shared her experienced that she made losses when she previously stocked local rice, so she has stopped selling it. Whereas imported rice has attributes that motivates traders to sell it, selling local rice is unfortunately perceived to be bedevilled with several challenges, which mostly has to do with the distribution system, packaging, and people's attitudes, perceptions and mindsets.

Despite the perceived challenges associated with selling local rice, findings from the market survey have shown that traders still make profits from their trading activities. In relation to local perfumed rice, 60% of the local rice traders made high profits as compared to 42.3% of the traders who sell local brown rice and 37.5% of the traders who sell imported perfumed rice. This implies that comparatively, many more traders make high profits from selling local rice than imported rice. This has several implications for the local rice sector as follows: contrary to the perception of some traders (those who sell only imported rice) that selling local rice is not profitable, findings have shown otherwise, which is an indication that people may be having wrong perceptions about the local rice value chain due to ignorance and lack of information that some traders are making moderate to high profit in the trade. However, the fact that some

local perfumed rice sellers (9.4%) and 10.6% of local brown rice sellers made no profit at all is a cause for concern. The reason for low or no profits could be due to the challenges that the traders face as discussed earlier. It is therefore critical to address those challenges to pave the way for the traders to sell and increase their profits and be willing to continue to trade in local rice.

**Place to sell local rice**

The most common places to sell local rice are the open markets, shops and supermarkets. As found in the consumer studies, these were the common places where individual consumers purchase their rice. However, as findings from the market study has revealed, the traders are different categories namely, importers, distributors, wholesalers and retailers, who are in the majority. Each of these supply chain actors have their target customers and appropriate mechanisms must be devised to reach them. Majority of traders in the survey indicated that caterers (including foodservices operators) were their major buyers followed by other wholesalers and retailers, schools, and the individuals. The revelation that foodservices were the major customers is not surprising because Omari et al. (2013) has reported that over 80% of restaurants in Accra serve various rice dishes with fired rice being the most popular. The traders expressed their desire to further explore other markets or customers to increase their dealings with customers such as hospitals, churches, football clubs, food services, schools, and export market. Essentially, the rice market is big and wide, and efforts must be made to penetrate the market to maximise its potential benefits for the local rice value chain.

As mentioned in the previous section, traders have real and perceived challenges that make it difficult for them to sell local rice. Hence there is need to address issues related to quality, packaging, branding, supply and distribution system, attitudes, perceptions and mindsets.

**Price**

Among many factors that positively impacted the performance of the businesses of rice traders, offering good price was found to be the most influential followed by other factors such as good location of business, high consumer demand, and quality of products. Generally, pricing can influence whether a consumer purchases a product or not. It takes a combination of favourable market trends, product quality, consumer liking and product differentiation along with correct pricing to generate sales, which lead to the success of a product. When considering the pricing factor, setting prices too high or too low can affect sales hence traders need to consider many factors when trying to arrive at appropriate pricing.

Consequently, an assessment was done to understand factors that traders considered in pricing their products and the extent to which pricing was influenced by the factors. The findings showed that, in order of popularity, more than half of the traders were influenced greatly by factors such as cost price, level of competition, transportation cost, level of market demand, economic trend (e.g. inflation, depreciation of local currency) and availability. As found in the both consumer and market studies, local rice was generally perceived to be more expensive than imported rice and this was one of the main reasons why some traders and consumers would not sell or buy it. It is therefore critical to address most of the factors that influence product pricing to ensure fair pricing that will yield profits for traders and at the same time ensure consumer affordability.

It is worth noting that some traders deliberately price certain products low to get the attention of consumers to whom they hope to sell other more expensive products. But consumers sometimes are of the perception that the quality of a product is poor if the price too low. Many customers look for value and not just the lowest price and those who want quality products are usually willing to pay a price that the products are worth. While low prices may not give traders greater profits, it should also be noted that the more of a product a trader sells the more profit he or she makes. However, low pricing may not generate enough profit to cover costs, especially if sales volume is low.

**Promotion**

Promotional strategies are important for raising awareness on nutritional, health, economic and social benefits of local rice and encourage replacement of imported varieties with local varieties. It is also important to create awareness of the various types of local rice on the markets as well as their uses in food preparations since most consumers have difficulty preparing local rice. The strategies will include sustained radio and TV programmes including radio spots reminding listeners of the benefits of patronising locally produced rice. This together with a catchy song (jingles) will be broadcast regularly along with radio programs covering farming, processing, marketing and nutritional aspects in more detail. Other strategies will be promotional events including cooking competitions in catering schools, among chefs and traditional caterers etc. Furthermore, it will be useful to give prizes in the form of free local rice well packaged and branded, printed materials (e.g. 'T' shirt, cap and pens) including a CD with the rice recipes and the benefits recorded on it. The following strategies are critical:

- Link rice producers with markets across the country,
- Establish local collection centres,
- Launch awareness campaigns to highlight the benefits of producing, selling and consuming local rice,
- Target households through food demonstrations,
- Link local rice farmers, millers and traders to intuitional feeding programs in school, hospitals, prisons etc.,
- Train farmers and millers in good handling practices and quality management
- Train processors, food vendors and individual consumers in local rice processing and utilization.

**People relevant to the local rice value chain**

It is important to identify those who will produce the product, those who will mill and process the product, those who will sell the product (group member, retailer in market), who the target consumers are and those who will be responsible to supply produce to the selling points. Fig. 4.3 shows the rice value chain map with the major value chain actors as well as their various activities. Table 4.1 shows some of the key rice value chain actors and what their roles will be.

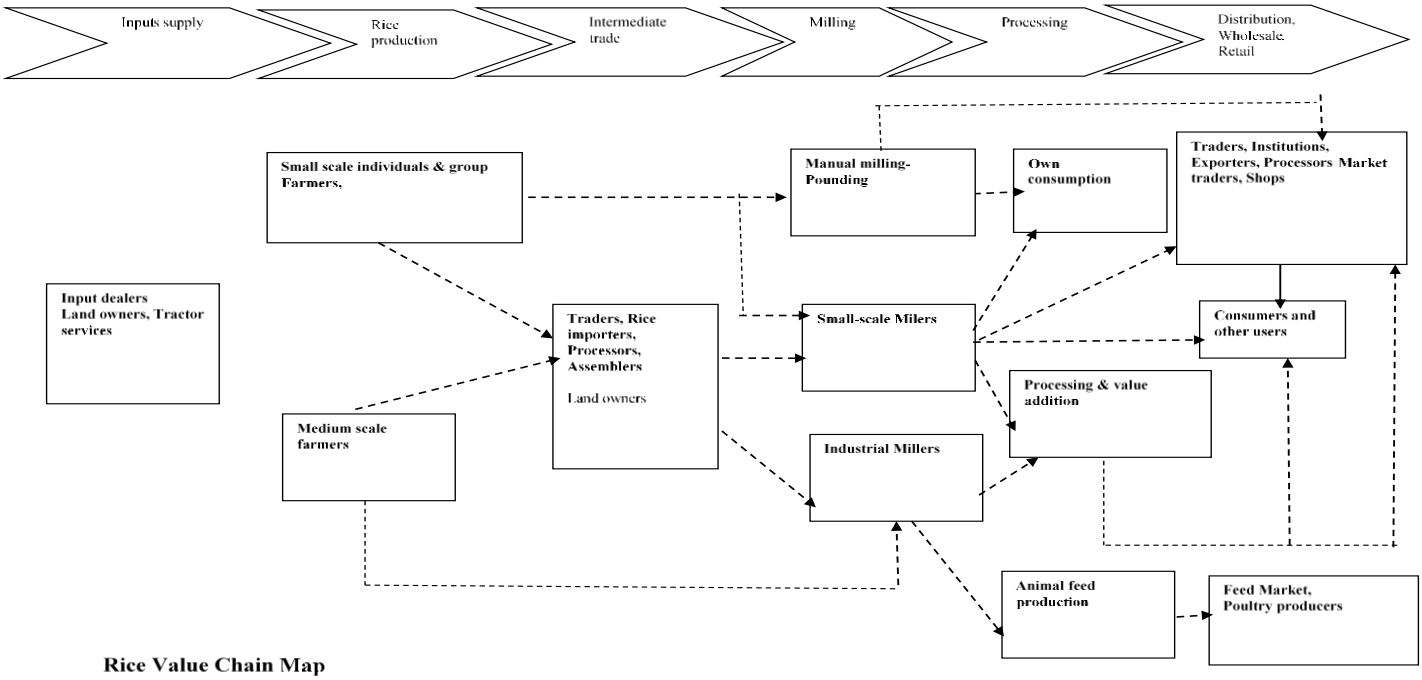


**Fig. 4.3 Rice value chain map**

**Table 4.1: Key Actors and their Roles**

| Actor | Role |
|---|---|
| Farmer | • Produce improved and acceptable (consumer preferred) rice varieties<br>• Sell to different rice value chain actors |
| Broker/Assembler | • Contacts the farmers to buy rice from them<br>• Packs paddy rice and transports from farms to storage, milling or trading centres |
| Miller | • Buys paddy rice and mills to sell to traders<br>• Mills paddy rice for different rice value chain actors for a fee |
| Distributor | • Buy rice from farmers, brokers etc<br>• Mills paddy rice<br>• Hires trucks and organizes transportation of paddy or milled rice to milling, storage and trading centres.<br>• Distributes rice to wholesalers, retailers in different markets and rice users e.g. caterers, processors |
| Transporter | • Brings/owns the trucks or tricycle and usually works with the farmers, distributor or broker. |
| Urban broker/Wholesaler | • Supplies rice to retailers in different markets and rice users e.g. caterers, processors |
| Retailer | • Takes retail packs of rice close to consumers in different locations e.g. market centres, shops, supermarkets, small kiosks. |
| Processor | • Buys rice from farmers, distributors, wholesalers etc. and processes into various value-added shelf-stable products<br>• Supplies various processed products to supermarkets, restaurant, schools, health centres, export market etc. |
| Market Queen | • Allows the inflow and outflow of products and information<br>• Organizes other actors of the rice supply and value chains |
| Foodservices actors (e.g. street vendor, restaurant operators, hotels, catering establishments) | • Buys rice from farmers, wholesalers, retailers etc for preparation of various rice dishes |
| Institutional feeding managers | • Buys rice from farmers, distributors, wholesalers, retailers etc. for food preparation at schools, health centres, prisons, etc. |
| Consumer | • Buys rice and its value-added products for home consumption and other uses such as for parties and other events |

**Proposed marketing and promotional plan for locally produced rice in Ghana**

This session presents the proposed promotional plan for local rice in Ghana. Based on the marketing mix, promotional activities relevant to each of the 5 pillars are presented in addition to responsible organisation as shown in Table 4.2.

**Table 1.2: Marketing and plan for locally produced rice**

| | **Activities** | **Responsibility** |
|---|---|---|
| Product | ***Production***<br>• Organize farmers into groups (women included)<br>• Supply improved, high yielding and consumer preferred local rice seeds to farmers free of charge initially and government should later subsidize the cost<br>• Support some farmers to become seed producers through the provision of subsidies.<br>• Train farmers in good agricultural practices and improved rice production technologies, crop management<br>• Support farmers with irrigation facilities, machinery such as tractors, combined harvesters and relevant inputs such as agrochemicals.<br>• Encourage and support the youth to be actively involved in rice production<br>• Link up with youth in agriculture programmes and build their capacity of youth to produce, add value and market local rice.<br>• Train farmers in improved post-harvest handling and storage practices<br>• | • Researchers (rice breeders, crop production and rice processing),<br>• Farmers' Association, Processors Associations,<br>• Ministry of Food and Agriculture<br>• District Departments of Agriculture<br>• Private sector<br>• Post-harvest experts |
| | **Milling**<br>• Support millers with state-of-the art and efficient rice milling equipment<br>• Train millers in the repair and maintenance of milling equipment<br><br>***Value addition***<br>• Organize value addition actors into groups i.e. processors, Caterers & Bakers etc., Consumers<br>• Train selected processors to develop and produce various shelf-stable local rice products (based on products already developed through research and new products)<br>• Empower processors e.g. by assisting them to secure loans, processing equipment, product certifications and licences.<br>• Print and widely disseminate local rice recipe book to food services, institutions, households and individuals | • Government-<br>• Ministry of Food and Agriculture<br>• Ministry of Trade and Industry<br>• Private sector<br>• GRATIS Foundation<br>• CSIR- Food Research Institute |

| | | |
|---|---|---|
| | • Support value addition trainers such as WIAD to train various women groups in rice value addition.<br><br>***Packaging***<br>Support millers, processors and traders with appropriate packaging materials and provide training in good storage practices<br>• | |
| | ***Utilization***<br>• Train users of both raw and processed rice (Caterers, Bakers, households) to use the products in preparing various dishes.<br>• Develop Trainer of Trainers (TOT) training module for local rice for future training programmes.<br>• Organize nutrition education for urban and rural households and individual consumers (emphasizing nutritional and health importance) to create demand for local rice and its products.<br>• Create awareness among urban and rural households and individual consumers on various ways of using local rice and its products (e.g. through exhibitions, demonstrations, recipe books & leaflets). | • All state institutions<br>• Ministry of food and Agriculture<br>• Women in Agricultural Development Directorate (WIAD)<br>• CSIR- Food Research Institute<br>• Caterers and Chefs Association |
| Place | • Identify potential markets in rural and urban centres, shops, supermarkets, kiosks, and international markets where rice and its products can be sold<br>• Identify institutions e.g. schools, health centres, prisons, Ministries and other government Agencies and private institutions that will buy and use local rice and its products<br>• To increase accessibility of local rice to traders, processors, food vendors and consumers, there is a need to identify and map out farm gates and other centres where farmers can directly sell to these groups of actors. | • Government-<br>• Ministry of Food and Agriculture<br>• Ministry of Trade and Industry<br>• Private sector |
| Price | • As much as introduce measures that will reduce cost of local rice production, milling and transportations costs etc. so that retail prices can be reduced and made affordable.<br>• Conduct a promotional campaign and emphasize the nutritional, health and economic benefits of local rice | • Government-<br>• Ministry of Food and Agriculture<br>• Ministry of Trade and Industry<br>• Private sector |

| | | |
|---|---|---|
| | and encourage consumers to buy even when prices are slightly higher than the competitors' prices<br>• Conduct a willing-to-pay study. | • CSIR-Science and Technology Policy Research institute |
| Promotion | ***Farmers***<br>• Establish accessible seed production/ multiplication sites<br>• Supply improved seeds to farmers either free-of-charge or at subsidized rates.<br>• Link farmers (including women and youth) to rice seed producers to increase local rice seed accessibility<br>• Women, men and youth must be engaged as volunteer promoters of local rice production<br>• Promote local rice value chain activities as a business enterprise for the youth.<br>• Participate in various youth programmes and create awareness about these business opportunities and provide necessary support, e.g. training, supply seeds, release of land, provision of inputs and machinery.<br><br>***Traders***<br>• Link farmers to traders and other market opportunities.<br>• Facilitate trading among all categories of supply chain actors (distributors, wholesalers, retailers)<br>• Provide branded and printed items to processors and traders for use in selling the products.<br>• Facilitate and encourage development of contractual commitments between farmers and traders<br>• Engage specialized marketing organizations to facilitate linking traders to credit opportunities.<br>• Train traders as change agents capable of spreading useful information about local rice<br><br>C***onsumers***<br>• Organize community-level nutrition education programmes and highlight the important role of local rice in nutrition<br>• Organized food demonstrations and food fairs on local rice recipes and process products<br>• Produce and disseminate audio messages and video documentary on the uses and nutritional benefits of local rice<br>• Promote consumption of the local rice using IT applications and social media<br><br>***Processors, Caterers etc*** | • Government-<br>• Ministry of Food and Agriculture<br>• Ministry of Trade and Industry<br>• Private sector<br>• CSIR-Science and Technology Policy Research institute<br>• Farmers' Association<br>• Trade Associations<br>• All media houses<br>• IT companies<br>• Women in Agricultural Development Directorate<br>• Caterers and Chefs Association<br>• Metropolitan, Municipal and District Assemblies |

| | | |
|---|---|---|
| | • Train Processors, restaurant operators, and bakers and other food service actors on preparation of various rice dishes and products<br>• Train caterers, matrons of School Feeding Program, restaurant operators, agricultural and health extensionists on the nutritional and health benefits of local rice and their uses in food preparation<br>• Organize cook shows, exhibitions, forums, farmers' day events, participatory radio campaigns, radio promotions through broadcast, jingles, and radio drama etc.<br><br>***Promotional channels to consider***<br>• Schools<br>• radio<br>• health centres<br>• Media (TV, radio, newspapers)<br>• Social media (Facebook, WhatsApp, Twitter, etc)<br>• Dedicated Websites<br>• Emails (Listserv)<br>• Printed materials (publications, fact sheets, t-shirts and caps, car stickers, key holders, posters, billboards etc.)<br>• Digital publications<br>• Meetings, workshops, focus groups<br>• Public consultations<br>• Partners/stakeholder network<br>• Information days/meetings<br>• Drama and live role-play by traditional groups in the communities<br>• Documentaries<br>• Community workshops/town meetings<br>• Community meetings<br>• Demonstrations<br>• Focus group discussions with opinion leaders<br>• Use other social media platforms such as blogging, podcasts and webinars can also be used<br>• Use information service (e.g. using information vans)<br>• Organise talks at religious or festival gatherings<br>• Organize national quiz competitions on local rice to create awareness and promote change of mindset | WIAD<br>Researchers (e.g. Food Research Institute)<br>Chefs' Association,<br>Caterers' Association,<br>Print and electronic media<br>Ghana Education Service,<br><br>Metropolitan, Municipal and District Assemblies |

| | | |
|---|---|---|
| People | • Organize all the people (actors) must be into groups based on their roles and responsibilities. These groups may include farmers, brokers, wholesalers, transporters, retailers, processors, market queens, caterers & food vendors, bakers, institutional feeding matrons, and consumers<br>• Clearly define the roles of each group<br>• Categorise users into primary users (those who will use raw rice) and secondary users (those who will use processed rice products)<br>• Identify different categories of consumers particularly in urban centres and target them<br>• Target youth and children and use them as change agents along the entire value chain. | • Government-<br>• Ministry of Food and Agriculture<br>• Ministry of Trade and Industry<br>• Private sector<br>• Researchers (e.g. CSIR-Science and Technology Policy Research institute; Food research Institute)<br>• Farmers' Association<br>• Trade Associations<br>• All media houses<br>• IT companies<br>• Women in Agricultural Development Directorate<br>• Caterers and Chefs Association<br>• Metropolitan, Municipal and District Assemblies |

## Conclusion and Recommendations

Rice is largely consumed in Ghana but perfumed, aromatic or fragranced rice is mostly preferred in both rice producing area such as Hohoe and urban centre Accra. In Accra, most consumers preferred to buy imported perfumed rice mainly because that is what most traders are selling. However, in Hohoe where rice is produced most traders sell local rice, but the most preferred type is the perfumed rice. These findings suggest that in promoting local rice for increased production, marketing, and consumption as well as utilization, there is the need to consider consumer and traders' preferences. As this study has revealed, there is the need to improve local rice availability, its sensory appeal as well as attributes such as quality and wholesomeness. The proposed local rice promotional plan should be implemented to increase production, marketing, consumption and unitization of locally produced rice in Ghana.

In terms of investment, there is the need for government and private sector to invest in rice production by providing improved and consumer preferred seeds; and supporting farmers with irrigation facilities, inputs and relevant machinery such as tractors and combined harvesters. Investments are also required in post-production activities in the form of facilitating access to

improved handling, milling and processing technologies and equipment; market opportunities; improved packaging and promotional opportunities. In addition to the strategies indicated in the promotional plan, government should pay attention to the following to increase the growth of the local rice value chain:

- Support farmers especially women and youth to acquire land for rice farming
- Increase promotional activities and advertisements
- Make policies to reduce or discourage rice importation
- Build capacity for farmers in new, innovative and appropriate rice production technologies
- Provide farmers with improved and consumer preferred seeds and inputs
- Assist farmers with relevant machinery and equipment
- Organise educational and awareness raising campaigns on benefits of local rice
- Establish a central local rice market and ensure its increased availability on the markets
- Encourage the youth into rice farming
- Educate farmers on appropriate post-production handling techniques to improve quality
- Give financial support and incentives to the farmers
- Improve on packaging
- Government should increase investment in the local rice industry
- Establish State rice farms
- Establish rice processing factories
- Link farmers to interventions programs such as school feeding project, and state institutions such as police, military, prisons, boarding schools. Put in place compulsion measures to ensure that these institutions use local rice
- Improve roads to facilitate transportation of rice from production centres to other parts of the country
- Make policies that will reduce cost of rice production and price of rice on the market

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## Appendices

**Appendix 1 Pairwise Comparisons analysis for factors influencing consumers rice purchase decisions**

| (I) Rice purchase | (J) Rice purchase | Mean Difference (I-J) | Std. Error | Sig.[b] | 95% Confidence Interval for Difference[b] | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Product characteristics | 2 | .593* | .030 | .000 | .534 | .651 |
| | 3 | .015 | .028 | .577 | -.039 | .070 |
| | 4 | .075* | .029 | .009 | .019 | .131 |
| | 5 | -.988* | .035 | .000 | -1.056 | -.919 |
| Sensory characteristics | 1 | -.593* | .030 | .000 | -.651 | -.534 |
| | 3 | -.577* | .033 | .000 | -.642 | -.512 |
| | 4 | -.517* | .031 | .000 | -.579 | -.456 |
| | 5 | -1.580* | .043 | .000 | -1.665 | -1.495 |
| Convenience attributes | 1 | -.015 | .028 | .577 | -.070 | .039 |
| | 2 | .577* | .033 | .000 | .512 | .642 |
| | 4 | .060 | .032 | .062 | -.003 | .123 |
| | 5 | -1.003* | .039 | .000 | -1.081 | -.926 |
| Social factors | 1 | -.075* | .029 | .009 | -.131 | -.019 |
| | 2 | .517* | .031 | .000 | .456 | .579 |
| | 3 | -.060 | .032 | .062 | -.123 | .003 |
| | 5 | -1.063* | .041 | .000 | -1.143 | -.982 |
| Informational factors | 1 | .988* | .035 | .000 | .919 | 1.056 |
| | 2 | 1.580* | .043 | .000 | 1.495 | 1.665 |
| | 3 | 1.003* | .039 | .000 | .926 | 1.081 |
| | 4 | 1.063* | .041 | .000 | .982 | 1.143 |

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

**Appendix 2 Relationships between habit, attitude and health perception and some food-related variables**

| Dependent Variable | Parameter | B | Std. Error | t | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound |
| Purchase Perfumed in the Past | Intercept | 1.343 | .122 | 11.012 | .000 | 1.104 | 1.583 |
| | Attit23M | .028 | .020 | 1.413 | .158 | -.011 | .067 |
| | FamilM | .008 | .026 | .304 | .761 | -.043 | .059 |
| | HabitM | -.102 | .020 | -5.163 | .000 | -.141 | -.063 |
| | HealthP12M | -.009 | .023 | -.398 | .691 | -.055 | .036 |
| Currently Purchase Perfumed | Intercept | 1.622 | .125 | 12.923 | .000 | 1.375 | 1.868 |
| | Attit23M | .010 | .020 | .475 | .635 | -.030 | .050 |
| | FamilM | -.001 | .027 | -.025 | .980 | -.053 | .051 |
| | HabitM | -.156 | .020 | -7.639 | .000 | -.196 | -.116 |
| | HealthP12M | -.004 | .024 | -.173 | .863 | -.051 | .043 |
| Purchase Perfumed in Future | Intercept | 1.802 | .142 | 12.724 | .000 | 1.524 | 2.080 |
| | Attitude | .000 | .023 | -.015 | .988 | -.045 | .045 |
| | Familiarity | -3.15 | .030 | -.001 | .999 | -.059 | .059 |
| | Habit | -.173 | .023 | -7.528 | .000 | -.219 | -.128 |
| | Health Perception | -.020 | .027 | -.737 | .461 | -.073 | .033 |
| Purchase non-Perfumed in the Past | Intercept | 1.532 | .175 | 8.746 | .000 | 1.188 | 1.876 |
| | Attitude | -.030 | .028 | -1.056 | .291 | -.086 | .026 |
| | Familiarity | .061 | .037 | 1.660 | .098 | -.011 | .134 |
| | Habit | -.036 | .028 | -1.268 | .205 | -.092 | .020 |
| | Health Perception | .100 | .033 | 3.008 | .003 | .035 | .165 |
| Currently Purchase non-Perfumed | Intercept | 1.759 | .157 | 11.224 | .000 | 1.451 | 2.067 |
| | Attitude | -.037 | .025 | -1.476 | .141 | -.087 | .012 |
| | Familiarity | -.045 | .033 | -1.351 | .177 | -.110 | .020 |
| | Habit | .026 | .025 | 1.028 | .305 | -.024 | .076 |
| | Health Perception | .105 | .030 | 3.521 | .000 | .046 | .163 |
| Purchase non- | Intercept | 1.728 | .158 | 10.902 | .000 | 1.416 | 2.039 |
| | Attitude | -.015 | .026 | -.603 | .547 | -.066 | .035 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Perfumed in future | Familiarity | -.038 | .034 | -1.143 | .253 | -.104 | .028 |
| | Habit | .010 | .026 | .404 | .687 | -.040 | .061 |
| | Health Perception | .093 | .030 | 3.101 | .002 | .034 | .152 |
| Health benefits | Intercept | .779 | .118 | 6.592 | .000 | .547 | 1.011 |
| | Attitude | -.008 | .019 | -.421 | .674 | -.046 | .030 |
| | Familiarity | .014 | .025 | .564 | .573 | -.035 | .063 |
| | Habit | .002 | .019 | .126 | .900 | -.035 | .040 |
| | Health Perception | .216 | .022 | 9.628 | .000 | .172 | .260 |
| Economic benefits | Intercept | .890 | .140 | 6.362 | .000 | .615 | 1.165 |
| | Attitude | -.031 | .023 | -1.358 | .175 | -.075 | .014 |
| | Familiarity | .030 | .030 | 1.025 | .306 | -.028 | .088 |
| | Habit | .029 | .023 | 1.255 | .210 | -.016 | .073 |
| | Health Perception | .169 | .027 | 6.387 | .000 | .117 | .222 |
| Preference for Imported rice | Intercept | 1.265 | .096 | 13.114 | .000 | 1.075 | 1.454 |
| | Attitude | -.001 | .016 | -.078 | .938 | -.032 | .029 |
| | Familiarity | .007 | .020 | .326 | .744 | -.033 | .047 |
| | Habit | -.056 | .016 | -3.582 | .000 | -.087 | -.025 |
| | Health Perception | -.017 | .018 | -.942 | .347 | -.053 | .019 |
| Increased local rice Production | Intercept | .948 | .076 | 12.520 | .000 | .799 | 1.097 |
| | Attitude | -.021 | .012 | -1.742 | .082 | -.045 | .003 |
| | Familiarity | .016 | .016 | 1.010 | .313 | -.015 | .048 |
| | Habit | -.005 | .012 | -.417 | .677 | -.029 | .019 |
| | Health Perception | .093 | .014 | 6.513 | .000 | .065 | .122 |
| Increased local rice Consumption | Intercept | 1.015 | .069 | 14.711 | .000 | .880 | 1.151 |
| | Attitude | -.028 | .011 | -2.469 | .014 | -.050 | -.006 |
| | Familiarity | -.001 | .015 | -.058 | .953 | -.030 | .028 |
| | Habit | -.003 | .011 | -.266 | .790 | -.025 | .019 |
| | Health Perception | .084 | .013 | 6.435 | .000 | .059 | .110 |
| Adverse effects | Intercept | 1.581 | .095 | 16.656 | .000 | 1.394 | 1.767 |
| | Attitude | .052 | .015 | 3.381 | .001 | .022 | .082 |
| | Familiarity | -.023 | .020 | -1.157 | .248 | -.063 | .016 |
| | Habit | .054 | .015 | 3.529 | .000 | .024 | .085 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Health Perception | .024 | .018 | 1.342 | .180 | -.011 | .060 |
| Challenges | Intercept | 1.349 | .131 | 10.281 | .000 | 1.091 | 1.607 |
| | Attitude | .086 | .021 | 4.060 | .000 | .044 | .128 |
| | Familiarity | .024 | .028 | .862 | .389 | -.031 | .078 |
| | Habit | -.001 | .021 | -.037 | .970 | -.043 | .041 |
| | Health Perception | .065 | .025 | 2.616 | .009 | .016 | .114 |