Purchasing decision making and consumer preference for traditional rice in Sri Lanka: A case study in *Kegalle* district

G.A.S.Ginigaddara[1], J.P.S.N. Madushika[2], A.M.K.R. Bandara[3] and S.P Dissanayaka[4]

[1,2,3,4] Department of Agricultural Systems, Faculty of Agriculture,
Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka

Abstract

Consumers at the market have a selection for the rice variety based on the eating and cooking quality, nutritive values and their medicinal properties. This study was conducted in *Kegalle* district, in Sri Lanka to determine the factors affecting on consumer preferences and purchasing decision making on traditional rice varieties at the markets. The primary data were obtained from a sample of 180 rice consumers through structured pre-tested questionnaire. Data were analyzed using binary logistic regression, Friedman test and factor analysis. The results of logistic regression proved that awareness on traditional rice was the main factor significantly influencing on purchasing decision making at the market where other factors such as community, education level, income of household head, presence of household members with non-communicable diseases, and the number of diseased persons in a family ($p < 0.05$) also affect the decision. Eating quality related attributes, nutritive attributes, marketing related attributes, and cooking quality related attributes were identified significantly affecting ($p < 0.05$) on consumer preference of traditional rice through factor analysis. Overall results imply that traditional rice sector needs to identity these trends in the market and production and marketing plans should be made accordingly in order to obtain economic benefits from the industry.

***Keywords*:** Consumer preference, Purchasing decision making, Traditional rice

1. Introduction

Agriculture has changed in a more mechanical and yield oriented way towards the twentieth century after the Second World War. Chemical adherence and intensive farming techniques have caused food safety and at the same time environmental problems. As a result, countries have started to search for new methods in agriculture. Organic farming is one of such methods which has got the challenge to develop all over the world (16).

Organic consumers' profile is defined by demographic variables, lifestyle and environmental attitudes. Regular consumers of organic food tend to be educated, well off and of higher social class (15,18). Squires *et al in* 2001 has uncovered that concern for health, environmental protection, chemical residues in conventional food products, pesticides, nutrition and improved taste and flavor in organic products are some of the factors identified as affecting for going organic foods. Further it has been proved that awareness of food hazards and knowledge of food hazards are higher among females and individuals with more education and income (13,19,18). Similarly, women seem to be more interested in organics than men, and they are more frequent buyers than men (4). Higher income households are more likely to form positive attitudes and to purchase more organic food (7,12).

For centuries, Sri Lanka's staple food has been rice, most consuming it three times a day. As a result it is said that ancient Sri Lankan kings had giants who "moved mountains" in their clans. Rice remains as the major source of calories and proteins of Sri Lankans (14). In recent times, with development of agro technology, new and cheaper varieties of high yielding rice were developed. Then farmers concentrated on growing a handful of varieties which were invented through hybridization with the intention of getting higher yields (9) than the quality grains.

Over the years, concerns over Non-Communicable Diseases, chemical free produce and environmental sustainability has persuaded many people to consume organic rice. Therefore at present a new market trend in Sri Lanka is developing for organic rice, produced and processed by using environmental friendly organic methods. Hence, health conscious consumers are switching back to organically grown traditional rice varieties which ultimately increase the demand for these varieties.

In past, Sri Lanka had over 2,200 varieties of rice listed at the International Rice Research Institute in Philippines (5). More than 400 traditional rice varieties were cultivated in Sri Lanka before the advent of agrochemicals and hybrid rice (9). These different varieties had different values and the ancient farmers used to cultivate these varieties organically taking into consideration the nutritional and medicinal requirements of their families (6).

There are several major brown and white traditional rice varieties in Sri Lankan markets. These varieties are popular among Sri Lankans and foreign consumers. Some popular brown varieties are *Kuruluthuda, Kaluheenati, Rathdel, Pachchaperumal, Madathawalu* and *Dahanala* while *Suwandel* and *Kahawanu* are popular white varieties. Sri Lankan rice manufacturers and suppliers grow and export traditional rice varieties such as *Kaluheenati, Suwandel, Rathdel, Madathawalu, Hetadha Wee, Ma-Wee, Pachchaperumal* and *Kuruluthuda* in increasing volumes. At the same time, varieties such as *Suwandal, Elhal* and *Rathhal* are known as healthy rice for diabetic patients which are popular in international markets. In 2010, US$ 7 million worth of traditional rice reached the shores of the United Arab Emirates, Canada, United Kingdom, Australia and Italy from Sri Lanka (1).

Rice farming accounts for nearly 40% of the total cultivable land in Sri Lanka where only 5% of lands are cultivated with organic rice while the rest is used for inorganic rice cultivation. Organic rice goes hand in hand with traditional rice varieties. However, Sri Lankan rice farmers are reluctant to cultivate traditional rice against improved and hybrid varieties believing that there are drawbacks of cultivating traditional rice varieties such as lower yields, susceptibility to lodging, taking longer time to harvest and abnormal responsibility to inorganic fertilizer. Organic rice is mostly used for personal consumption mainly at subsistent level. But, unique aroma, taste, texture, nutritive values and medicinal values of traditional rice varieties are making a considerable demand in the market even though the supply is low. Under these circumstances, to realize the market gap which is still remaining for traditional rice, it is important to understand consumer preference and purchasing decision making aspects for traditional rice in the market. Therefore, this study was completed to identify the factors affecting on purchasing decision and consumer preference attributes for traditional rice varieties in Sri Lanka focusing to a case study in *Kegalle* district. The findings would be important to growers for growing highly demanding traditional rice varieties for the market and market planners in the sector for formulation and implementation of marketing plans.

2. Methodology

Quota sampling technique was used to select 30 respondents from each of four traditional rice sales centers and two super markets located in major cities in *Kegalle* district totaling 180 respondents. A pre-tested questionnaire collected information related to general household information, buying and consumption behavior of consumers in different platforms of traditional rice markets.

Descriptive statistical analysis was used to describe the characteristic of traditional rice consumers (TRCs). Logistic regression was used to identify the factors affecting on consumption of traditional rice. The binary variable, traditional rice consumption was used as the dependent variable and the consumer characteristics and household characteristics given in table 1 were used as independent variables for logistic regression. Factor analysis with Varimax rotation was used to identify the groups of factors that influence on consumer preference attributes of selecting traditional rice varieties. The ideal number of factors was determined using the Kaiser criterion (eigen value > 1 rule) (10) and Scree test (2). Varimax factor (VF) loading greater than 0.4 was considered as significant factor loading.

Table 1: Variables used in model for respondents' decision in purchasing traditional rice

Variables	Definition	Unit measurement
KAT	awareness on traditional rice	aware or not aware (aware=1, not aware=0)
C	community	urban or rural (urban=1, rural=0)
AE	age of the oldest person in the household	in years
A	age of the consumer	in years
G	gender of the consumer	male or female (male=1, female=2)
FM	size of the household	number of people living together in one household

HI	income of the household head	monthly income in Sri Lankan rupees
AI	average income of the household	monthly average income in Sri Lankan rupees
EDU	education level of the consumer	none=1, primary=2, secondary=3, university=4 or other =5
OCC	occupation of the consumer	administrative level=1, teaching=2, clerical=3,medical sector=4,self-employment=5, farming=6, un-employed=7, other=8
MD1	Non-communicable disease availability in the household	available or not available (yes=1, no=0)
MD2	number of non-communicable diseased persons in the household	number of non-communicable diseased persons in the family

Source: Field survey 2015

3. Results and Discussion

3.1 Demographic Characteristics

Descriptive analysis revealed that almost all the TRCs are aware on the medicinal and nutritive values of traditional rice while only 15% of non-traditional rice consumers (NTRCs) are aware of traditional rice. Almost all the TRCs and NTRCs were educated in the sample where 9% TRCs had schooled up to grade eight while the value was 27% of NTRCs. Similarly, 14% of TRCs were degree holders while the value is 10% of NTRCs. Furthermore, results revealed that majority of traditional rice consuming households consisted with members having non-communicable diseases compared to non-traditional rice consuming households. Majority of TRCs were urban dwellers compared to NTRCs. There were 51% female respondents who purchase traditional rice compared to the value 49% for males. Stobelaar *et al*, 2006 also proved that the awareness and the purchasing decision making for organic foods is higher among females than males. Majority (76%) of household heads of the TRCs in the sample had average monthly income of lesser than 30,000.00LKR (147 LKR= 1 USD) (Table 02).

Results of the study further revealed that, majority of TRCs are willing to consume red rice varieties than white rice varieties assuming that red types have more medicinal and nutritional properties than white types. Among both red and white types, *Kaluheenati*

(24%), *Suwandel* (20%) and *Kuruluthuda* (19%) varieties were commonly consumed in *Kegalle* district (Figure 1). *Kurulutuda* was highly preferred by consumers since it gets lesser cooking time. *Suwandel* is preferred by consumers due to its taste and good smell.

3.2 Purchasing Decision Making of Traditional Rice Varieties

The results of logistic regression demonstrated that type of the community, awareness on traditional rice, education level, income of household head, availability of non-communicable diseases in the household and the number of non-communicable diseased persons in the household significantly affect ($P<0.05$) on purchasing decision making of traditional rice varieties where the awareness being the main factor influencing on purchasing decision of traditional rice varieties in the market.
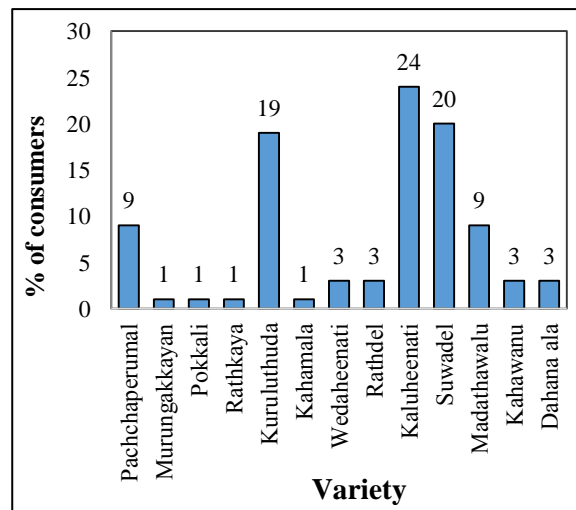

Figure 1: Percentage distribution of preference for traditional rice varieties in *Kegalle* district

Factors such as average income in the household, age, gender and occupation of the respondent, and household size were not significantly affected ($P>0.05$) on purchasing decision of traditional rice in the market (Table 2).

3.3 Consumer Preference Attributes for Traditional Rice Varieties

The scree plot of factor analysis is given in figure 2 and it reveals that the plot level off at the forth factor indicating that first four factors should be retained and interpreted.

Table 2: Probabilities of variables from logistic regression

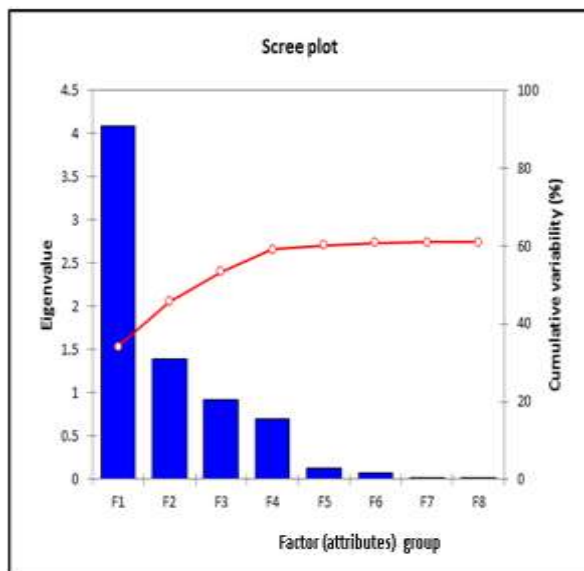| Variables	Pr>chisq
KAT	**<0.0001**
C	**0.0010**
AE	0.9808
A	0.0666
G	0.2458
FM	0.2493
HI	**0.0185**
AI	0.7430
EDU	**0.0060**
OCC	0.0772
MD1	**0.0005**
MD2	**0.0164**

Source: Developed by authors

Figure 2: Scree plot of different factor (attributes) groups of consumer preference

Table 3 presents the factor loadings. The results revealed that eating quality related factors namely aroma, taste, texture and cooking quality acquire higher loadings on factor 1 indicating that these factors are the most preferred ones by the TRCs. The second factor was loaded with nutrient related variables namely medicinal value, nutritive value and grain color where the third factor loaded with marketing related variables namely brand name and packaging material. Cooking time, grain size and cooking quality were loaded to fourth factor which might be called as cooking quality related factors and they were the least attributes preferred by the consumers. Cooking quality was loaded in both eating quality and cooking quality related factors (Table 3). According to Chen *et al* (3), the desire for

the cooked texture has been one of the important consumer preferring factor for rice around the world. Similarly these findings also prove that the eating quality related factors such as aroma, taste, texture and cooking quality as the most consumer preferred factors for consuming traditional rice. Zefu *et al* (20) have also mentioned that the eating quality related factors, nutritive value related factors and cooking quality related factors are considered as important factors among few other factors which are considered in the rice production areas of the world.

Table 3: Factor loadings for consumer attributes

Variable	F1	F2	F3	F4
Aroma	**0.6193**	0.4788	0.0160	-0.1104
Taste	**0.8299**	0.2794	-0.0081	0.1186
Texture	**0.8863**	0.1939	-0.0082	0.2000
Cooking quality	**0.6092**	0.1656	0.0556	**0.5052**
Cooking time	0.0292	-0.1458	-0.1022	**0.4043**
Grain size	0.3035	0.1117	0.0718	**0.7609**
Grain color	0.2261	**0.5067**	-0.0402	0.3414
Nutritive value	0.2086	**0.9764**	-0.0017	0.0564
Medicinal value	0.1872	**0.9437**	-0.0142	0.0421
Price	0.0540	0.0241	0.1653	0.0961
Brand name	0.0124	-0.0026	**0.7594**	0.0519
Packaging material	-0.0231	-0.0881	**0.5245**	0.0197

5. Conclusions

Understanding attributes of consumer preference of traditional rice has been found out to be consistent with the notion that preference characteristics are inherent in such products. The result of this study showed that eating quality related factors and nutritional factors are the most important factors predicting consumer preference towards consuming traditional rice. The next important factors are marketing factors and cooking quality related factors. Further it was found that awareness on traditional rice is the main factor influencing on deciding to purchase of traditional rice. Urban consumers purchase traditional rice more compared to rural consumers. When consumer is educated, there is a higher purchasing decision making power than a non-educated consumer. Existence of non-communicable diseases in the family and the number of diseased persons in the household affects significantly and positively on purchasing decision of the respondents. Overall results imply that traditional rice has a good perception in general among rice consumers in *Kegalle* district in Sri Lanka.

Findings from this study would help stakeholders in the organic traditional rice industry to understand the underlying pattern of consumer preference attributes and their purchasing decision making on traditional rice which will ultimately assist in production and market decision making process and strategic planning in the industry.

7. References

[1] Anonymous. Rice and Cereal Based Products. Available online at http://www.srilankabusiness.com/food-and-beverages/rice-and-cereal-based-products.html. Retrieved on 02nd August, 2016, (2016).

[2] Cattell, R. B.. The screen-test for the number of factors. *Multivariate Behavioral Research*. 1(2): 245-76, (1966)

[3] Chen, M., Bergman, C., Pinson, S., and Fjellstrom, R. Waxy gene haplotypes: Associations with apparent amylose content and the effect buthe environment in an international rice germplasm collection. Journal of Cereal Science. 47: 536-545, (2007).

[4] Davis, A., Titterington, A.J. and Cochrane, A. Who buys organic food? A profile of the purchasers of organic food in N. Ireland, *British Food Journal*, 97(10): pp. 17-23, (1995).

[5] Daniel, D. Returning to our roots. Available online at http://echelon.lk/home/returning-to-our-roots/. Retrieved on 18.10.2016, (2016).

[6] Gammanpila, U. Are we truly self-sufficient in rice?Available online at http://udayagammanpila.com/story/are-we-truly-self-sufficient-in-rice/. Retrieved on August 5, 2016 (2013).

[7] Grunert, K.G. and Kristensen, K.. On some factors influencing consumers' demand for organically grown foods, in Mayer, R.N. (Ed.), Enhancing Consumer Choice, American Council on Consumer Interests, Columbia, MI, pp. 37-48, (1991)

[8] Jayawardana, S.S.B.D.G. Past present and future of the golden grain, rice in Sri Lanka. In *Rice Congress 2000*, Eds D.S. de Abeysiriwardana, D.M.N. Dissanayake, and L.Nugaliyadde, Department of Agriculture, Peradeniya, pp 15-23, (2003).

[9] Jayawardena, S.N., Muthunayake, M.M.P. and Abesekara, S.W. Present status of varietal spread of rice in Sri Lanka. Annals of Sri Lanka Depart. Agric., 12: 247-256, (2010).

[10] Kaiser, H. F. The application of electronic computers to factor analysis. Educational and Psychological Measurement. 20: 141-51, (1960).

[11] Liyanaarachchi, G.D., Kottearachchi, N. and Samarasekera, R., Volatile profiles of traditional aromatic rice varieties in Sri Lanka. Journal of the National Science Foundation of Sri Lanka. 42(1), pp.87–93. DOI: http://doi.org/10.4038/jnsfsr.v42i1.6683, (2014).

[12] Magnusson, M., Arvola, A., KoivistoHursti, U., Aberg, L. and Sjoden, P. Attitudes towards organic foods among Swedish consumers, *British Food Journal*, 103(3): pp. 209-26, (2001).

[13] McIntosh, W. A., Acuff, G. R., Christensen, L.R. and Hale, D. Public perceptions of food safety, The Social Science Journal, 31(3): pp 285-292, (1994)

[14] Mendis ASri Lanka grain and feed annual, USDA foreign agricultural service, Global Agricultural Information Network. pp 3-4,(2006).

[15] Padel, S. and Foster, C. Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food, British Food Journal, 107, 8: pp 606-625, (2005)

[16] Rehber, E. and Turhan, S. Prospects and challenges for developing countries in trade and production of organic food and fibers-The case of Turkey, *British food journal*, Vol. 104 No:3/4/5, p.371-390, (2002).

[17] Squires, L., Juric, B. and Cornwell, T.B. Level of market development and intensity of organic food consumption: cross-cultural study of Danish and New Zeland consumers, *Journal of Consumer Marketing*, 18(5): pp. 392-409, (2001)

[18] Stobelaar, D. J., Casimir, G., Borghuis, J., Marks, I., Meijer, L. and Zebeda, S.

Adolescents' attitudes towards organic food: a survey of 15 to 16-year old school children, International Journal of Consumer Studies, 31, 4: pp 349-356, (2006).

[19] Torjusen, H., Lieblein, G. Wandel, M. and Francis, C.A. (2001) Food system orientation and quality perception among consumers and producers of organic food in Hedmark Country, Norway, Food Quality and Preference, 12: pp: 207-216.

[20] Zefu, L., Jianmin, W., Jiafa, X. and Masahiro, Y. Mapping of quantitative trait laci controlling physico chemical properties of rice grains (*Oryza sativa* L.) Journal of Breeding Science. 53, 209-215, (2003).