

Consumer Willingness to Pay for Organic Rice: With reference to Kurunegala District in Sri Lanka

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Abstract

Consumer willingness to pay is a dynamic phenomenon that depends heavily on consumers' perceptions and attitudes. Organic rice purchasing behavior has been increased in recent years due to the perception that such products are safer, healthier and more environmentally friendly than conventionally produced alternatives. This study was focused to examine: consumers' willingness to pay for organic rice, consumers' perceptions on willingness to pay organic rice, and effect of socio demographic characteristics on willingness to pay for organic rice in Sri Lanka. A questionnaire survey was conducted with 100 consumers selected by multi-stage sampling technique in Kurunegala district which is highly vulnerable for agro chemical based diseases in Sri Lanka. Data analysis was done by using Contingent Valuation Method and Ordered Probit Regression analysis. The study found that 100 percent of consumers have selected organic rice at the same bid price and 96 percent of consumers agreed to pay an additional payment on organic rice. Monthly income, education level, and positive perceptions on organic rice increase willingness to pay for organic rice and price premiums. Consumers who perceive to have low residues of pesticide, higher nutrient and higher quality of organic rice than non-organic rice hold a probability of paying high premium. Consumers' main motivation for buying organic rice is the health concern. Policy makers can identify the range of price increase of such organic rice without damaging the existing demand for organic rice and it is a timely need to introduce new marketing strategies to expand the market segment in organic rice in Sri Lanka.

Keywords: *Consumer perception, Contingent valuation, Ordered probit regression model, Organic rice, Willingness to pay*

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Introduction

Organic rice farming is rapidly demanded area due to health related consequences that are prevailing among farming community in Sri Lanka. A research reveals, organic productions including organic rice are in huge demand owing to its potential to fetch premium price in the global market (Setiyadi et al., 2017; Hazra et al., 2016). Further, a study has revealed that consumers buy organic food because of their desire to avoid the chemicals used in conventional food productions. Use of pesticides in food production is perceived to be associated with long-term and unknown effects on human health (Gomiero, 2018). A research has mentioned although demand for food is rapidly increasing, agricultural practices are the major contributors for environmental degradations. Due to existing negative consequences and concerns of conventional agriculture, an interest in alternative farming systems that are environmentally benign have been promoted. Among these the most demanding alternative farming system is an organic farming. Hence, current research is focused to study on willingness to pay for organic rice by consumers in Sri Lanka.

Willingness to pay is the maximum amount a person would be willing to pay, sacrifice or exchange in order to receive a good or to avoid something undesired and uninterested (Mendis & Edirisinghe, 2013). Farmers, farm families and as well as consumers all over the world now suffer from negative effects of harmful chemical residues in food and water on their health by conventional food productions. Due to these prevailing danger in consumption patterns, markets for organic products are rapidly increasing (Canavari et al., 2007). Organic consumption is recognized as one of the contributors to a healthy life and sustainable environment for living beings

(Anderson et al., 2006). With the global concerns on food safety, many productions are coming to the market labeling as organic due to this current trend in consumption.

Organic food consumption behavior is a common practice among rural community in Sri Lanka from ancient time. Rural people in Sri Lanka have been cultivating many crops for their own consumption from longer times. But commercial cultivation of organic rice and willingness to pay for premium price are the new learning trends among Sri Lankans. A research has mentioned, one of the organic food products with positive trend is the willingness to pay (Setiyadi et al., 2017). Further it says that knowledge on organic rice among consumers is fundamental to induce demand and market for organic rice. A study says that the most important attribute for rice was food safety, followed by taste and size of the grain. Further it has mentioned consumers are willing pay premium prices for the demanded attributes that they are seeking (Hanis et al., 2012). Since the belief of organic rice has beneficial effects for healthy life, it becomes potential to be a new trend in the consumer market. Marketing of organic rice in Sri Lanka constrained by perception of expensive when compare to other rice productions in the market. Hence, producers should think that how to set the selling price of organic rice precisely to generate consumers' interest. So that, it can lead to increase the willingness to pay for organic rice.

When consider the current organic market in Sri Lanka, the most prevailing problem is the low trust on organic labeling. Producers tend to gain publicity with the presence of the organic label on their productions without proofing whether they are really organic or not. The information being passed to the society with this label is that organic food products are healthier and safer to consume than foods produced using the



conventional methods. Thus, the feeling of fear of consuming foods with chemical residues due to conventional farming has catalyzed the change of consumer behavior towards organic foods ((Atapattu & Wijesinghe, 2018; Aththanayake & Wijesinghe, 2018; Sun, 20).

Zhen (2013) has revealed that with the belief of organic food is more safer to consume, demand for organic food products has been increased despite its premium price rise of about 10-15% or much more compared to the price of conventionally produced products. Another research has mentioned due to demand for organic rice is increasing, especially in the Philippines, Malaysia and Singapore their local production cannot meet the demand (Renzenbrink, 2012). A study has revealed that the market for organically produced foods is growing because consumers are willing to use organic food products due current trend in health conscious (Aryal et al., 2009).

Even though agriculture should provide growing supplies of food and other products, with the growing population, also it works as a major contributor to greenhouse gases emissions, biodiversity losses, agrochemical pollution due to adding hazardous compound, and soil degradation. Hence, in present widely thinking alternative cultivation system is organic farming. As rice is the staple food in Sri Lanka, demand for rice is increasing as there are no other alternative food for Sri Lankans. Also health related issues are prevailing among rice farmers in Sri Lanka due to the chemical usage in cultivations. Only possible alternative to this problem is changing the rice cultivation systems from conventional methods to organic farming systems. But prices for organic products are higher than other productions produced by conventional farming. Therefore it is essential to investigate the consumer buying behavior and willingness to pay for

organic rice before widen the production in Sri Lanka.

In Sri Lankan context, only few studies have been conducted on consumers' willingness to pay for organic rice, consumers' perceptions on organic rice and socio demographic characteristics affecting consumer preference for organic rice. No statistical information is available about Sri Lankan consumers' preference for organic rice, and premium price margins, thus the primary objective of this study is to determine the consumers' willingness to pay for organic rice over non organic rice in Sri Lanka. Secondary objectives are, identifying the consumers' perceptions on willingness to pay organic rice, and effect of socio demographic characteristics on willingness to pay for organic rice in Sri Lanka.

Literature Review

An overview of consumer behavior and willingness to pay for organic rice

Since organically produced food products are considerably expensive than conventionally produced food products, consumers are willing to pay premium for organic food products only when they believe that organic foods possesses sufficient advantages over conventionally produced alternative food products. A study says that consumers tend to buy organic food only if they perceive that organic food is free from chemicals, artificial fertilizers and additives (Sangkumchaliang & Huang, 2012). Consumers who are health conscious and use healthy practices show their preference for organic foods (Gracia & Magistris, 2007) while consumers who value convenience more are less likely to buy organic products (Zakowska-Biemans, 2011). Researchers say that women tend to buy organic food more frequently since they are the predominant food shoppers at home and pay more attention on family health (McEachern &



McClellan, 2002; Pearson et al., 2011; Urena, Bernabeu, & Olmeda, 2008).

Consumer behavior is a psychological phenomenon that effect on marketing because consumers must have positive attitudes about a product before they are interested in purchasing. Organic products in Asian markets are less recognized than in the EU market and knowledge about such products has a slow rate of diffusion. In particular, consumers who purchase organic products in EU market are often knowledgeable and cognitive on the relationship between food and health (Loureiro et al., 2002). Literature says different opinions are present about consumer perception and statistically women are more likely than men to use information about how to be healthy through proper food consumption behaviors (Jaroenwanit & Kantatasiri, 2014).

Briz and Ward (2009) revealed that developing demand for organic products, awareness of organic food are the first step among consumers, yet it does not necessarily equate with its consumption. Literature says strategies that should be used for production and marketing of organic products can be recognized by the consumers' knowledge and their perceived response to organically cultivated and processed rice. The reason is though organic products are credence goods, consumers may not know whether a product has been produced using organic methods until they have reliable information sources (Giannakas, 2002). Therefore, knowledge and awareness about organically produced rice will be critical to consumers' behavioral attitude and their choice of organic rice (Ibitoye, et al., 2014)

According to previous studies, there are several factors which may influence on willingness to pay more for the green labeled products. Rex & Baumann (2007) argue that there are two contrasting

perspectives on green marketing. One is aware customers on environmental values through eco labeling and other perspective is developing supply and demand for the green products. Most of the green marketers are predominantly using the eco labeling as a dominant source of market communication (Rex & Baumann, 2007). According to Laroche et al. (2001) there are some other factors influence organic food purchase intention. They have been divided into five categories such as demographic, knowledge, values, attitudes and behavior (Laroche et al., 2001). Most of the past studies have focused on age, gender, marital status, income, and education level of customers and found that they are the main demographic variables that can influence organic purchase. According to Rao and Bergen (1992) willingness to pay for any product is determined by its intrinsic and extrinsic attributes. Accordingly, in the case of green products, the price premium should be fair to the additional value delivered by the products (Rao & Bergem, 1992).

Rice as the staple food in Sri Lanka

Rice (*Oryza sativa* L.) is the staple food in Sri Lanka and rice production has achieved self-sufficient status in the country (Walisinghe & Gunaratne, 2012). As the staple food of Sri Lanka rice has been performed the most valuable role in feeding the nation since ancient time. According to the historical evidences rice cultivation in Sri Lanka has a long history due to Sri Lanka is an agricultural country from its inception.

Rice as the single most important crop occupying 34 percent of the total cultivated area in Sri Lanka the average 560,000 ha are cultivated during Maha and 310,000 ha during Yala seasons making the total annual extent sown with rice to about 870,000 ha. About 1.8 million farm families are engaged in paddy cultivation island-wide. Sri Lanka



currently produces 2.4 million metric tons of rough rice annually and satisfies around 95 percent of the domestic requirement (Department of agriculture, 2017). Therefore potential for cultivating both organic rice and non-organic rice is high in Sri Lanka due to its food value to compensate ever rising population.

Health related aspects in relation to conventional foods

Especially in Sri Lankan context, recent scientists argue that agricultural products are contained very harmful chemicals like arsenic and those are directly related with serious diseases like kidney failures of the people in respective areas. In Sri Lanka, researchers have mentioned that there are possible adverse effects on human health due to long term exposure to pesticide (Piyasiri & Ariyawardana, 2002). A research has mentioned active ingredients permitted for use by the United Kingdom pesticide manufactures are carcinogenic, mutagenic and have various harmful reproductive effects (Piyasiri & Ariyawardana, 2002). Because of this, markets for “green” and eco-friendly products are rapidly increasing (Canavari & Olson, 2007). Especially the farmers in the Kurunegala district in Sri Lanka are mainly engaging in rice cultivation and highly vulnerable to chronic diseases like kidney failures and some other chemical poison illnesses. People from both developed and developing countries prefer organic over conventional rice, owing to the innumerable health benefits of organic rice. Organic rice has a far greater quality, as compared to conventional foods (Anuradha, 2001).

When consider on food security point of view, researches have mentioned organic food is the safest way to reach to this requirement. Food and Agricultural Organization (FAO) definition for food security states that ‘food security exists where all people at all times have access to sufficient, safe and nutritious food to

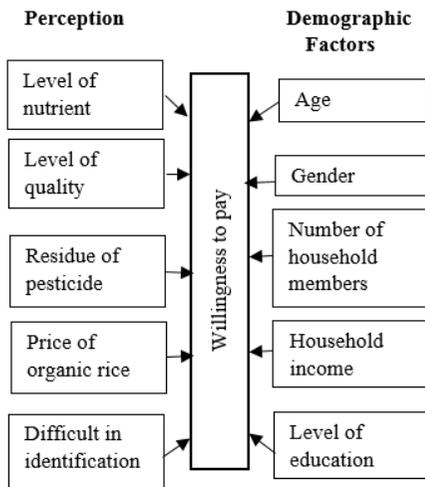
meet their daily dietary needs and food preferences for an active and healthy life’. Similarly, the United States Department of Agriculture (USDA) defines ‘food security for a household means access by all people at all times to sufficient food for an active and healthy life’. In this light, it is worthwhile to think on consumption of organic food instead of conventionally produce food to maintain food security concerns.

Growing organic rice rather than commercially produced conventional rice is the environmentally healthy choice and it is a fast growing agricultural segment in Sri Lanka during recent decades. However, organic farming faces challenges such as higher management cost, the risks of learning new farming methods, a fragmented industry that is still young, higher cost of marketing the value of organic rice, and the higher cost of consumer engagement. Further, Shantha (2012) has revealed that willingness to pay extra for organic products was less than anticipated. Thus, this study attempted to assess what consumers prioritize in terms of purchasing organic rice and further estimate the price premium for organic rice.

Hence, the main argument of the study is that whether consumers are willing to pay additional amount of money to purchase organic rice and what is the most preferable percentage of premium they are willing to offer for organic rice. Further, it should be assessed how far the demographic variables and perception on organic rice influence on this decision. According to the previous literature in other countries, health and environmental consciousness have direct influences on consumer willingness to pay. Based on these literature, following conceptual frame work was depicted for the present study (Figure 01).



Figure 01: Conceptual framework



Source: Researchers developed

Methodology

Data Collection

Primary data were collected from 100 consumers selected by multi-stage sampling technique in Kurunegala district. Five Divisional Secretariats (DS) were selected in first stage and ten Grama Niladari (GN) divisions were selected from selected DS divisions as second stage. Selected DS divisions for the study were Bingiriya, Paduwasnuwara, Ibbagamuwa, Ganewatta, and Kuliypitiya. Ten households were selected from each GN division and finally total of hundred households were selected as third stage to collect data. Head member of the each family was interviewed to gather data.

Consumer Perception was measured using five point Likert scale statements ranging from much higher perception (5) to much lower perception (1). The criteria of measurement of perception on organic rice were the belief of level of nutrients of organic rice, level of quality of organic rice, level of residue of pesticide of

organic rice, price of organic rice and difficulty in identification of real organic rice. Willingness to pay for organic rice was assessed by using Contingent Valuation methods that asked hypothetical questions from respondents. Age, number of household members, gender, monthly household income and education level were also obtained (Table 01).

Table 01: Descriptions of scales of measurements

Variables	Description
Age	Age in years
Gender	Male, Female
Household members	Embers in numbers
Monthly household income	10000 - 30000
	31000 – 60000
	61000 – 90000
	90000<
Education	O/L
	A/L
	Diploma
	Graduate Degree
	Post graduate degree
Perception on organic rice	Nutrient content of organic rice
	Quality of organic rice
	High price of organic rice
	Difficulty in identification organic rice
	Residue of pesticide in organic rice

Source: Survey Data

Data Analysis

Data were analyzed using the Stata 14 statistical software. An Ordered Probit Regression was carried out to determine the impact of independent variables on consumers’ Willingness to Pay for organic rice.

The Contingent Valuation method was used to determine consumer preference



for rice with the ‘organic’ attribute. Contingent Valuation method has been traditionally used to evaluate consumer preferences for non-market (e.g. environmental) goods. However, in recent years contingent valuation has been applied to measure consumer preferences for new products or products with new attributes or features, such as genetically modified products (Kaneko & Chern, 2005; Loureiro & Hine, 2002) or eco-labeled products (Loureiro & Hine, 2002). In this case, contingent valuation approach allows to concentrate on the ‘organic’ attribute and measure consumer Willingness to Pay for this specific attribute.

Contingent Valuation method asks hypothetical questions from respondents about their Willingness to Pay for products with specific attributes. Evaluation of consumers responses to these questions also allows estimation of the proportion of the population (i.e., market share) willing to purchase a product with specific attribute at alternative prices (Louviere et al., 2000).

The product attribute examined in this study is the ‘organic’ characteristic and questions used are in a dichotomous choice format, which is, respondent is asked to identify his/her choice to buy or not to buy a product at the stated price premium. Surveyed individuals were initially asked if they would purchase organic rice or non-organic rice at the same bid price, i.e., price differential (PDA) equal to zero.

If respondents indicated a preference for organic rice, they were subsequently asked if they would be willing to pay a randomly selected premium bid, i.e. price differential (PDB) greater than zero, to consume organic rice over non organic rice. If they did not indicate a preference for organic rice at 0 % premium, a follow up question with a price bid was not asked.

The initial and follow-up bids were expressed in terms of a percentage premium over the product price. So the approach controls for cross-price effects (Lusk & Hudson, 2004) and percentage premiums are a valid measure of price regardless of the variability in the quality and quantity of products purchased by households. The percentage price premium bids used for organic rice were 0% for initial bid and 5, 10, 15, 20 and 30 % (for follow-up bid) above non organic rice prices.

The three possible responses to the bid scenarios are (0) a “no” to the first bid (i.e., no preference for organic rice over non organic rice at 0% premium), (1) a ‘yes’ followed by a ‘no’ (preference at 0% premium, but no preference at higher premium) (2) a ‘yes’ to both bids (preference at 0% premium and preference at higher premium), The sequence of questions defines the following ranges for the true Willingness to Pay (WTP) values: $(-\infty, PDA]$, $[PDA, PDB]$, $[PDB, \infty)$. The following three discrete outcomes of the bidding process are observable:

0	WTP < PDA
D = 1	PDA < WTP < PDB
2	PDB < WTP

Where, WTP is the individual’s willingness to pay function for ‘organic’ attribute.

The general form of model,

$$Y^* = X\beta + u \quad (1)$$

According to the model, the choice probabilities are,

- Y = 1 (if $Y^* < 0$)
- Y=2 $\gamma_1 < Y^* < \gamma_2$
- Y=3 $\gamma_2 < Y^* < \gamma_3$
- Y=4 $\gamma_3 < Y^* < \gamma_4$
- Y=5 $\gamma_4 < Y^* < \gamma_5$
- Y=6 $\gamma_5 < Y^* < \gamma_6$



Where Y^* is price premium, X is a vector of explanatory variables, β is a conformable vector of coefficients and u is a random variable accounting for unobservable characteristics.

According to this study, the Ordered Probit Regression model is,

$$Y = \beta_0 + \beta_1AGE + \beta_2GEN + \beta_3HM + \beta_4INC + \beta_5EDU2 + \beta_6EDU3 + \beta_7EDU4 + \beta_8EDU5 + \beta_9EDU6 + \beta_{10}PER + \quad (2)$$

Where,

- Y = Price premium
- β_0 to β_1 = Regression coefficients
- AGE = Age
- GEN = Gender
- HM = Household members
- INC = Monthly household
- EDU 2 = Up to O/L
- EDU 3 = Up to A/L
- EDU 4 = Diploma
- EDU 5 = Graduate degree
- EDU 6 = Post graduate degree
- PER = Perception

Results and the Discussion

Table 02 explains that percentage values of consumers' willingness to pay for different price premiums for organic rice.

Table 02 Results of the bid scenario

Price Premium (%)	Response (%)
0	4
5	53
10	26
15	14
20	2
30	1

Table 02 shows that in average, 53% of consumers willing to pay 5% price premium for organic rice than conventional rice price. And 26% of consumers willing to pay 10% of price

premium for organic rice than conventional rice price. Therefore, in-between 5% - 10% of price premium will be paid by total of 79% of respondents in the population. And also, results show that at least 96% of consumers pay 5% of price premium for purchasing organic rice than conventional rice price.

Results obtained from the Ordered Probit Regression model (Table 3 – Appendix A) revealed that the model is significant at 5% level. The coefficient of the continuous variables represents the change in the willingness to pay for organic rice given a unit change in the variable.

Number of household members is statistically insignificant when considering the willingness to pay for the organic attribute in rice. It has a negative relationship with the willingness to pay for organic rice.

When increase in numbers of household members, it decreases the probability of willingness to pay. In this light, one can argue that, when number of household members are increasing, cost of living will rise up and then organic purchasing power will go down with price premiums.

Both age and gender are statistically insignificant (Table 3) when considering the willingness to pay for the organic attribute in rice. It shows that gender and age are not influential factors to decide the percentage of price premium for organic rice. But in the literature, it says that women tend to buy organic food more frequently since they pay more attention on family health (McEachern & McClean, 2002; Pearson et al., 2011; Urena, Bernabeu, & Olmeda, 2008).

Monthly income is statistically significant and positive driver of consumer



willingness to pay (Table 3) a premium for organic attribute in rice. It reveals that, when income is higher, willingness to pay for organic rice is higher. Hence, income is a positive predictor for willingness to pay for organic rice.

Education level of the consumer has positive relationship with the willingness to pay (Table 3) for organic rice. When increase in level of education, it increases the probability of willingness to pay. It explains that level of education is a positive driver for willingness to pay for organic attribute in rice.

Perception about organic rice (nutrient content, residues of pesticide, quality, difficulty in identification, high price) has a positive relationship with the willingness to pay for organic rice (Table 3). Highest perception towards organic rice showed by the perception of higher nutrient content in organic rice than conventional rice. Therefore, maintaining such qualities is important to increase the willingness to pay.

Consumers, who perceive to have low residues of pesticide in organic rice than non-organic rice, hold a probability of paying a high premium for organic rice than non-organic rice.

Results elaborated that consumers' main motivation for buying organic rice is the health concern rather than price of the organic rice or to support local economy through organic consumption. Hundred percent of respondents had chosen health concern as the main motive to willingness to pay for organic rice. In economic point of view, consumers take decisions to balance marginal utility in any purchasing. According to the consumer behavior theory, consumers make their own decisions to balance the marginal health utility and marginal price for one unit of

quality-food products. Hence, we can argue that organic rice producers should consider the utility of price and health attributes of organic rice.

Conclusion

The study found that majority of the consumers (96%) agreed to pay an additional payment on organic rice at least in the study area where highly vulnerable to chronic diseases due to chemical usage in agriculture. However, 4% of consumers refused to pay any additional payment for organic rice even though it is healthy and environmentally friendly product.

Among selected explanatory variables under final model, consumers' income was the most influential variable for willingness to pay decision on organic rice. As consumers' income increased, they have shown higher bidding level for organic rice.

Further, consumers' educational level and perception on organic rice (cumulative value of six criteria) have positive impact on willingness to pay for organic rice. However, age and gender do not reflect significant impact on willingness to pay decision for organic rice.

Thus, policy makers can impose price discrimination strategy for different income categories and local organic rice producers could be encouraged for further production. In conclusion, the outcome of this study can be used as a tool for revising the existing pricing policies on organic rice in Sri Lanka.

Further; policy makers can identify the range of price increase for organic rice without damaging the existing demand and it is a timely need to introduce new marketing strategies to expand the market segments in organic rice in Sri Lanka.



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Appendices

Appendix A

Table 3 Estimation results of the willingness to pay model for organic rice

Variable	P value	Co-efficient
Age	0.141	0.0159
Gender	0.803	-0.0731
No. of members in household	0.767	-0.0413
Monthly income	0.002*	0.2026
O/L	0.098	0.7849
A/L	0.003*	1.4511
Diploma	0.009*	1.6340
Graduate degree	0.002*	1.6319
Perception (measured by six criteria)	0.012*	1.3937