

Determining Consumers' Preference and Willingness to Pay Premium Prices for Organic Beef in Bangladesh

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Abstract: Beef is widely accepted as an important source of protein and calcium. Consumer demand for beef has been changing over the time due to urbanization, population growth as well as rural-urban migration among the urban dwellers with increasing beef safety. This study aim to investigate the attributes preferences of consumer products and their willingness to pay (WTP) for organic beef in the city of Dhaka in Bangladesh. The total samples were 180 and collection by using a multi-stage sampling technique. Descriptive statistics and probit regression model were used for data analysis. The results showed that consumer perception and WTP for organic beef is largely influenced by the beef attributes such as Quality, safe, taste and nutrient content followed by freshness, beef, production practices, fat content and the habit of the beef hallal certification.. About 73.33% beef consumers are willingness to pay an average of 26.12% price premium per kilogramme. Consumers' gender, education, income and awareness about beef safety are positively significant influence WTP for organic beef. The result shows very constructive information about consumer demand, which contains information about sources of beef sector producers about consumer preferences and willingness to pay for quality and selected beef safety for decision makers, especially government agencies and producers' new cattle production methods and offer pricing and marketing strategies.

Keywords: Consumer preferences, Probit Model, Beef characteristic, Quality, and WTP

1. Introduction

Beef demand among the urban dweller of Dhaka city of Bangladesh has increased for rapid growth of urbanization, population growth, changing consumption patterns, sources of protein and calcium requirements as well as by rural-urban migration and general development, for instance modernization of cities, introduction of the concept of food streets in cities like Dhaka, Chittagong, Rajshahi, Bogra, and Khulna, in the number of hotels and restaurants in urban centers etc. was also be expected to generate additional demand for beef based product over the time. For this reason, beef cattle production systems have changed from the traditional method into the conventional system not only changing the demand and consumption patterns but also to changes in available technology. Beef cattle fattening became a commercially attractive venture and quick money making business. Now-a-day, many seasonal entrepreneurs established cattle fattening farm before Eid-ul-Azha they used Steroids of Dexamethasone group such as Decason, Dexamet, Paradexa, Oradexason, and Predexanol; intravenous drugs of Butaphosphan group like Catophos and Catasol; digestion and appetite enhancers such as Digimax and Potash, antibiotics and other chemicals for months in blatant violation of law. If you give harmful steroids, hormones, and chemical to the cattle, they severely hamper the kidney and liver of the cattle. Due to malfunction of the kidney, more water is retained in the body and the cattle look bigger. Though apparently, the cattle look larger, they ultimately get affected with various diseases which are very harmful to human health and transmitted various diseases to human body like heart attack, blocking heart vanes, cancer, fatness, eye problem, joint pain, stone in kidney and liver problems etc. On the other hand, beef is commonly sold in open market place (butcher shop, road side butcher stall and supermarket meat corner) where the risk of contamination is

the very risk for human health. There is little empirical evidence also on the indicators of beef quality and safety attributes that consumers use in their purchasing decisions, and how much they are willing to pay for these attributes. The present paper attempts to fill in these literature gaps by expanding the already existing literature on consumer choice for beef in Dhaka city. Organic beef is considered to be superior in quality compared to conventional beef since it has been proved that organic beef help prevents several health and environmental hazards. The increasing interest in health and nutrition has enhanced demand for quality of meat and subsequent desire by consumers to pay premiums for meat quality. Therefore, the demands for organic beef are increasing all over the world, as well as in Bangladesh. Given this increasing demand for organic beef, this study was conducted to estimate the market potentials and consumer willingness to pay for organic beef in the Dhaka city of Bangladesh and also analysis which is the socioeconomic factors and relevant meat attributes of organic beef that influence consumers' choice and also affect the premium price that consumers are willing to pay for them.

The specific objectives of the study are;

- 1) To identify the most important attributes which affect consumer preference for beef in Dhaka city of Bangladesh.
- 2) To determine the consumers' WTP price premiums for organic beef
- 3) To examine the influencing factors of consumers preference of beef.

2. Materials and Methods

2.1 Study area

The study was carried out in Dhaka mega city of Bangladesh. It is located in central Bangladesh at 23°42'N 90°22'E, on the eastern banks of the Buriganga River and it is situated at elevation 23 meters above sea level. The city lies on the lower reaches of the Ganges Delta and covers a total area of 306.38 square kilometers (118.29 sq mi) and it has about 8.5 million population over 18 million as of 2016. The city was chosen for the high urban population and for the fact a considerable amount of the commercial beef cattle come from all over the country.

2.2 Data Collection

Both the primary and secondary data were used in this study. Primary data was used for the study and multi-stage sampling technique was used to select 180 beef consumers from supermarkets in Dhaka city by using well-structured pre-determine interview schedule. Supporting secondary data were also obtained from the internet, published and unpublished literature.

2.3 Descriptive Statistic

Most of the results of the study is shown in the tabular and descriptive form. Descriptive tools such as frequency distribution, percentages, averages, and classification techniques were used to analyze the respondents' socioeconomic properties and to determine the average amount of respondents willing to pay. It was also used to analyze consumer awareness, preference, and perception, etc.

2.4 Probit Regression Model Analysis

The probit regression was used to examine the influencing factors of consumers' WTP for organic beef. In the first stage is a probit model which defines whether a consumer will pay for organic beef or not, while the second stage is an ordinary least squares regression model to determine the amount consumers will pay for organic beef. Following Raje, Dhobe and Deshpande (2002); Abraham *et al.*(2013);Obi-egbedi,*o et al.* (2017) the probit model was used to assess the effects of the independent variables on the probability of the consumers' WTP for organic beef. The empirical model measuring the probability that a consumer was WTP was expressed as

$$P_i = F(WTP_i) = \frac{1}{1 + e^{-WTP_i}} = \frac{1}{1 + e^{X_i + \varepsilon_i}} \text{-----(1)}$$

Where i=1,2,3, n

P_i is a probability function, which is the consumers yes/no response to the WTP for organic beef. WTP_i is the willingness to pay for organic beef. X_i is a vector of observed characteristics of an individual. They include socio-economic and attitudinal attributes of the consumers. In this study to analyse the factors influencing consumers' willingness to pay for organic beef, equation (1) is expressed implicitly the probit regression model as is:

$$WTP_i^* = \beta_0 + \beta_1 Bids + \beta_2 Educ + \beta_3 Age + \beta_4 Gend + \beta_5 Price + \beta_6 Sour + \beta_7 Incom + \beta_8 Know + \beta_9 Perc + \beta_{10} Hhsz + E_i \text{----- (2)}$$

Where:

WTP_i^* = Consumer willingness to pay for organic beef (Yes =1; 0 = No)

Bids = Amount the consumer will be asked to pay in BDT.

Educ = Educational level of the consumers in years

Age = Age of consumers in years

Gend = Sex of the respondents (Female = 1, Male = 0)

Price = Price of beef in Tk/Kg

Sour = Source of beef (Registered = 1, Unregistered = 0)

Incom = Income of consumers in BDT/month

Know = Consumers' knowledge of organic beef (Aware=1, Not aware=0)

Perc = Perception of consumers on organic beef (1 = No chance of health problem, 0 = chance of health problem)

Hhsz = Household size by number of person

$\beta_1, \beta_2, \dots, \beta_{10}$ are parameters corresponding to estimated variables' coefficient,

E_i = Error Term

The second hurdle which estimates the premium beef consumers are WTP is estimated using a regression truncated at zero. It is expressed as;

$$WTP_{amt_i} = WTP_{amt_i}^*$$

$$\text{if } WTP_{amt_i}^* > 0 \text{ and } WTP_i^* = 0$$

$$\text{if otherwise, } WTP_{amt_i} = X_i' \beta + \mu_i$$

Where

WTP_{amt}^* is the observed response on how much consumers are WTP for the organic beef. χ is the vector of consumer, socioeconomic characteristics, β is a vector of parameters and μ_i is the error term which is randomly distributed.

3. Results and Discussions

The results of the analyses on the factors that influence the consumers' preferences and willingness to pay for beef attributes are presented respectively in the following sub-headings.

3.1 Socio-Economic Characteristics of Potential Consumers of Organic beef

The demographic and socio-economic characteristics of consumers should affect their willingness to pay for organic beef. Table 1 describes the socio-economic characteristics of the consumer, including;

Table 1: Demographics information of Potential Organic beef Consumers (N=180)

Variable	Frequency	Percentage (%)
Gender		
Male	142	78.89
Female	38	21.11
Age		
30< Year	57	31.67
31-40 Years	63	35.00
41-50 Years	48	26.66
> 50 Years	12	6.67
Marital Status		
Married	152	84.44
Single	28	15.56
Educational background		
HSc or equivalents	41	22.78
Diploma or equivalents	12	6.67
Graduate	59	32.78
Post Graduate or equivalents	37	20.55
Above the Post Graduate	31	17.22
Household size		
0-2 Persons	11	6.11
3-5 Persons	137	76.11
Above 5 Persons	32	17.78
Employment status		
Public sector	25	13.89
Private sector	83	46.11
Self-employed	42	23.33
Housewife	25	13.89
Others	05	2.78
Outlet where organic beef is bought		
Supermarket Meat Corner	53	29.44
Butcher shop	75	41.67
Roadside butcher stall	41	22.78
Others	11	6.11
Awareness on organic beef		
Yes	132	73.33
No	48	26.67
Household income per month (BDT.)		
<25000.00	27	15.00
25001.00-50000.00	87	48.34
50001.00-100000.00	29	16.11
100001.00-150000.00	24	13.33
150001.00—200000.00	9	5.00
>200000.00	4	2.22
Religion of the consumers		
Muslim	146	81.11
Non-Muslim	34	18.89

Source: Authors survey, 2016

gender, age, marital status, labor status, education, household size and primary occupation, etc. Gender is an important variable in a particular social situation in Dhaka, strongly influenced by a social or economic phenomenon and globalization is no exception. Therefore, the variable gender was examined for this study. Gender pay of consumers was female, while 21.11 were women, indicating that the majority of consumers are a man whose main responsibility in the home is to provide the family. The kind of consumer may also affect the purchase decision for fresh meat products. Because of traditional sociological norms, female consumers can better understand the nutritional qualities of meat and meat. The attitude of the consumer was also influenced by gender. Male consumers are less likely to buy meat and are more likely to consider the place of origin of livestock as the primary factor in the purchase decision. The age of respondents is one of the main characteristics of

understanding their views on specific problems; at a great age, maturity refers to people in this sense, age becomes more important to investigate the reaction. The age distribution shows that about 31.67% of consumers are less than 30 years old. And only 6.67% are over 50 years old. This may indicate that most respondents are young people who want to eat meat and have the responsibility to make their purchase decision. According to Amao *et al* (2006), people in this category will need more proteins that match their body composition. Civil status is one of the most important social indicators. In a developing country like Bangladesh, it has undergone many changes. Individual perceptions and attitudes may also differ because of the marital status of individuals because marriage gives people a more responsible and aging understanding and gives answers to the questions asked. Of the total consumers, 84.44% were married and 15.56% were single. Determining the size of the consumer's household can also have a significant impact on the purchase decision on the variety of meat due to the greater financial burden to feed larger families. Given the intensive nature of the preparation of a variety of meat products, larger households may also have an advantage in terms of meat demand. Consumer households showed that the majority (76.11%) of the respondents have between 3 and 5 people in their household. The large size of the family implies an increase in family costs, as almost all members depend on the family. Ogwumike, (2002) reported that the number of people in a household is closely related to consumption. Emphasize that total spending and household size are positive and directly related. A person's income plays an important role in shaping an individual's economic situation which, in turn, will affect the responses to a problem with them. The researcher, therefore, in this study attempted to investigate income and has a variable. It turned out that 48.34% of the consumers' turnover between BDT 50001.00-100000.00 per month, while 16.11% of income consumers were BDT 100000.00 -150000.00 in the study area. As a result, most (48.34%) of meat consumers earn a high income. The preference for beef may be associated with sheep income level; it is closer to the study area. Education is one of the most important characteristics that can influence the person's attitude and how people view and understand certain social phenomena. Consumer education can also significantly affect the likelihood of purchasing a variety of meat products. A variety of meat certainly represents an atypical beef product.

A higher level of education would give a more informed and open attitude to unusual food on the share of consumer education. It appears that about 22.78% of respondents were trained to involve upper secondary education, 32.78% were graduates and 20.55% were trained at the postgraduate level. The number of respondents who graduated from higher education was influenced by beef quality and safety. The city of Dhaka of Bangladesh is based on income, age, qualifications, work status and household size.

3.2 Consumer Perception for Organic beef in Dhaka city

Consumer perception of beef safety is an important determinant of beef consumption. The objective of this study is the author of the association between beef in health. There

is a link between attitudes and perceptions. Consumer willingness to pay for beef is largely influenced by their attitude and as such, consumer perceptions are important when making decisions on demand. The researcher examined consumer perceptions about the quality, benefit and environmental risks associated with organic beef consumption. Each perceptual response was measured on a five-point scale with a score of (-1 for strongly disagreed "+1 by - strongly agreed.) Positive scores were 0.5 for agreement, 1 strongly agrees, -1 for total disagreement and -0, 5 for disagreement. As shown in Table 2, consumer perceptions of organic beef were generally positive. Approximately 69.44% of consumers strongly agreed to 20% agreed that consumed organic beef increases their health. The average score for Health Survey was 0.37. In the overpayment of the organization in the taste of petroleum was 0.36% (20.46%). Only 69.44% of consumers believed that organic beef reduced risk of disease score was 0.31. The results showed that scores were obtained by the 0.34 Benefit Perception Index (BPI). Average, consumers who were alert to organic beef, had a lower performance perception index. Consumers' perceptions of the negative impact of organic beef consumption were also positive. About 56.11% strongly agreed and 37.78% agreed that organic beef

consumption has no adverse effect. In addition, 46.67% strongly agreed and 32.78% agreed that, compared to conventional beef, quality, and content, organic beef has a higher nutritional value for human health. This gave average scores of 0.46, 0.42 and 0.58, respectively, and on average, means scores gave a Quality Perception Index (QPI) of 0.49. About 40.56% strongly agree with Production of Organic Beef makes the environment safe, 53.89% and highly agreed. Organic beef production is better for the environment and only 57.22% strongly agree with livestock to promote more sustainable agriculture with average scores of 0.52, 0.48 and 0.41, respectively. However, consumers who knew organic beef (0.47%) had a lower PIT than those who did not know organic beef (53.4%) with an index of 0.30. More than half of consumers felt that organic beef had less or no environmental risk and that the environmental risk perception (EPI) index was 0.47. The results presented on the prospects for beef and veal provide an overview of the consumer decision-making processes that are important for innovation and product differentiation in the city of Dhaka as well as for public health policy decisions regarding consumption meat in general and special consumption of beef.

Table 2: Consumers' attitude and perception for organic beef in Dhaka city

Beef attributes and consumer's perception declaration		Number of Consumers					Mean Score		
		Strongly Disagree (Score=-1)	Disagree (Score=-0.5)	Neutral (Score=0)	Agree (Score=0.5)	Strongly agree (Score=1)	Consumer aware	Consumers not aware	Overall
Benefit	Organic beef is healthier	4 (2.22%)	10 (5.56%)	5 (2.78%)	36 (20.00%)	125 (69.44%)	0.29	0.34	0.37
	Organic beef are safe food	4 (2.22%)	6 (3.33%)	8 (4.44%)	37 (20.56%)	124 (69.40%)	0.29	0.35	0.36
	Organic beef are testier	1 (0.56%)	7 (3.89%)	13 (7.22%)	46 (25.56%)	113 (62.78%)	0.29	0.34	0.37
	consumers to allow organic beef for dietary choices	2 (1.11%)	11 (6.11%)	5 (2.78%)	65 (36.11%)	97 (53.89%)	0.24	0.47	0.29
	Organic beef reduced risks of diseases	4 (2.22%)	10 (5.56%)	5 (2.78%)	36 (20.00%)	125 (69.44%)	0.42	0.27	0.31
	Benefit Perception index (BPI)						0.31	0.35	0.34
Quality	Organic beef have no harmful effect	5 (2.78%)	1 (0.56%)	5 (2.78%)	68 (37.78%)	101 (56.11%)	0.21	0.33	0.46
	Organic beef is higher in nutrient content	13 (7.22%)	16 (8.89%)	8 (4.44%)	59 (32.78%)	84 (46.67%)	0.31	0.27	0.42
	High meat quality in organic beef	11 (6.11%)	0 (00%)	18 (10.00%)	87 (48.33%)	64 (35.56%)	0.21	0.21	0.58
	Organic beef are superior quality	5 (2.78%)	1 (0.56%)	5 (2.78%)	68 (37.78%)	101 (56.11%)	0.21	0.33	0.46
	Quality Perception index (QPI)						0.24	0.27	0.49
Environmental risk	Production of organic beef make the environment safe	4 (2.22%)	12 (6.67%)	21 (11.67%)	70 (38.89%)	73 (40.56%)	0.21	0.27	0.52
	Organic beef production is better for the environment	2 (1.11)	13 (7.22%)	17 (9.44%)	51 (28.33%)	97 (53.89%)	0.24	0.28	0.48
	cattle promote a more sustainable agriculture	0 (00%)	5 (2.78%)	19 (10.56%)	53 (29.44%)	103 (57.22%)	0.46	0.13	0.41
	Environmental Perception index (EPI)						0.30	0.23	0.47

Source: Field survey 2016

3.3 Consumers' willingness to pay a price premium for organic beef

Willingness to pay (WTP) for organic product measures the additional price a consumer will pay for an organic product above the price that is asked for a comparable conventional

product (Kalogeras *et al.*, 2009; Biswas, 2016). These excess prices that are above the fair price that is justified by the true value of the product (Rao & Bergen, 1992; Vlosky *et al.*, 1999), may serve as indicators of demand for that product (Tse, 2001). Across the world, the relationship between price premiums of organic products and consumer's willingness to

pay is vital for the launch of organic products to the market (Kyriakopoulos & Oude Ophuis, 1997). For this study, consumer willingness to pay an amount for organic beef per kg is presented in Table 3. From the table, the majority (73.33 %) of the consumers were willing to buy organic beef while 26.67% were not willing to buy. This indicates consumers' awareness of the importance of meat safety.

Table 3: Consumers' willingness to pay price premium for organic beef

Variable	Description	Percentage (%)
Willingness to pay for organic beef	Yes	73.33
	No	26.67
Minimum premium mean WTP for organic beef per kilogramme.	BDT 550.50	63.18
Maximum premium mean WTP for organic beef per kilogramme.	BDT 710.73	36.82
Mean WTP for organic beef per kilogramme = BDT 630.62		
Average price of conventional beef per kilogramme = BDT 500.00		
Consumers are willingness to pay price premium for organic beef per kilogramme = 26.12%		

Source: Author Estimation from field survey data 2016

The maximum amount consumers were willing to pay as premium per kg in order to buy beef it was BDT 710.73, the minimum amount was BDT 550.50 and the average amount was BDT 630.62 per kilogram which was similar with Obiegddi o *et al.* 2017. The majority (73.33 %) of the consumers were willing to pay extra price 26.12% for organic beef per kilogram while only 26.67 % were not willing to pay the extra price for organic beef in the study area. The consumers who were not willing to pay a premium to buy organic beef indicated lack of information or knowledge on food safety, cattle fattening practices, organic beef and conventional beef, etc.

3.4 Factors Influencing Willingness to Pay for Beef

A probit regression model was used to identify socioeconomic factors that could affect the WTP of organic beef consumers. The result of the WTP consumer determinant for organic beef in Dhaka City is presented in Table 4. The model provides a good correction to the data with the Chi square value statistically significant ($P < 0.01$) than that of the Resudo R^2 indicates that 65% of variations of the dependent variable (WTP) are explained by the independent variables. The diagnostic tests show that the Probit regression model corresponds to the analysis. Under regressors, consumer spending, consumer awareness, consumer education, consumer income and the source of organic beef demand are important factors that influence the consumption of WTP's consumption of organic beef. The genus is positive and significant ($P < 0.01$), WTP consumers for food safety on organic beef. The result implies that, in comparison with male counterparts, female consumers are more likely to pay for food safety information in biological beef protein. The result of the marginal effect shows that consumer WTP for food safety information increases by 0.012%. Knowledge of food safety information in a positive and significant way ($P < 0.05$) affects the WTPs for information on food safety. Consumer awareness of food

safety information increases the mortality rate by 1.05%. The estimated education coefficient was positive and significant ($p < 0.05$). The positive sign on education indicated that higher education respondents have more WTP for organic beef. The marginal effect indicated that an increase in the unit of the number of years spent by the school increased the chance that WTP consumers for organic beef increased by 1.01%. He also believed that education promotes a positive attitude towards change.

Table 4: Probit regression of the factors influencing willingness to pay for organic beef

Variables	Coefficient	Standard error	Marginal effect
Consumers age	0.2852	0.3915	0.4121
Gender (Sex)	0.9521***	0.3211	0.1254
Awareness	0.5236**	0.8492	1.0541
Household size	0.2566	0.1832	0.0051
Years of education	1.2892**	0.6834	1.0114
Income	0.9956***	0.2141	0.3241
Average price	-0.8432	0.5244	0.3111
Source of purchase	0.9452**	0.3721	0.0211
Perception of cattle breed	0.3121	0.4186	0.0821
BIDS	0.41228	0.510	0.8111
Constant	0.1884**	0.0915	0.0251s
Log-likelihood ratio	-53.50**		
Chi-squared	24.59**		
Resudo R^2	0.647		

Note: *** Significant at 1% **Significant at 5% and *Significant at 10%

Source: Author Estimation from field survey data 2016

This finding is similar to Huang (1993), which found that more educated consumers were more WTP for organic products. The conclusion is also consistent with the results of Du Toit and Crafford (2003), which showed that respondents with higher education were willing to buy organic food. The positive and significant organic source of beef purchased ($P < 0.05$) affected PPO for organic beef. The effect of awareness on WTP was positive and significant; indicating an increase in awareness of organic beef increased the probability of WTP by 5.9%. The source of purchased beef increases the WTP of consumers by 0.02%. Other variables included in the model (consumer age, household size, average price, supply and perception of livestock do not significantly affect consumer WTP for food safety information in the organic beef). In addition, the average monthly average wage and WTP are directly related. It is expected that the increase in consumer income will be its beef will, as it can now afford a small organic beef expensive compared to conventional beef. The results are consistent with those who reported that WTP for healthy nutrition and the socio-economic characteristics of the respondents are positively related. The results show that the distance to organic beef catches and WTP is negatively related.

4. Conclusion and Recommendation

This study analyzed consumer willingness to pay a premium for organic meat in Dhaka, Bangladesh. Researchers have also identified socioeconomic factors, product characteristics and perceptual factors that affect the WTP for organic meat. The results show that 73.33% of consumers were willing to

pay an additional 26.12% price for organic meat per kilogram, while only 26.67% were not willing to pay an additional price for meat quality to pay and socio-economic factors of consumers' affect their WTP premiums for organic meat compared to conventional meat. It is therefore recommended that Bangladesh produces beef with these characteristics, as these characteristics affect the market, consumer acceptance and willingness to pay, and this information may also serve as a guide to developing the first organic meat in Bangladesh, as there is a strong demand for organic meat. The result could, therefore, help governments, politicians, producers, and marketers to take into account the potential of the product market in the near future.

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