

Consumers' Perceptions and Valuation of an Organic Chicken in Malawi

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유기농 닭에 대한 말라위 소비자 인식 및 가치 추정

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In general, an increase in consumer income increases interest in safe foods and increases consumption of environmental friendly foods. Meanwhile, even in Malawi, interest in safe food and environmentally friendly food has been increasing due to increase in per capita income, but research related to this has not been done yet. The purpose of this study is to estimate the value of environmentally friendly foods in Malawi consumers. For this purpose, we surveyed the consumption patterns and estimated the value of organic chicken for consumers visiting supermarkets. As a value estimation technique, Contingent Valuation Method (CVM) was used. Probit model analysis showed that price, expenditure on regular chicken, and knowledge of organic food affect the willingness to pay for organic chicken. CVM analysis shows that Malawi supermarket consumers are willing to pay MK2,514 (3.59) dollars per kilo of organic chicken, which is 25.7% higher than the average price of a regular chicken. Thus, Malawi supermarket consumers can deduce that they have a higher value for environmentally friendly food than regular food. These findings can be used in formulating policies on food safety by government officials, organic chicken meat marketing strategies by supermarket managers, decision making to enhance organic food production by producers, in order to develop organic food industry.

Key words : *consumers' behavior, contingent valuation method, environmental friendly foods, organic chicken, willingness to pay*

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I . Introduction

One of the trends is a general worldwide increase in customer concern regarding health, diets and food safety. Internationally, this relates to issues such as traceability, animal welfare, diseases and production processes, sustainable agricultural practices, and naturally- and organically-produced beef. However, most South African consumers are generally less concerned about meat safety and animal welfare than their counterparts in other developed countries. Consumers still purchase meat from the informal sector such as street vendors and the informal, highly unregulated sector of unlawful slaughtering, which are highly vulnerable to meat safety concerns (Loureiro and Umberger, 2007). Concerns about animal welfare, sustainable agriculture and production, and health issues such as obesity are also on the rise (Grunert, 2006). Food labelling and trademarks may promote customer assurance to a large extent. Although organically-produced products form a significant international global food trend, this is a small niche market. However, the demand for organic products has rapidly expanded worldwide in recent years.

The National Organic Standards Board of the U. S. Department of Agriculture (USDA) established a national standard for the term “organic,” in which organic food, defined by how it cannot be made rather than how it can be made, must be produced without the use of synthetic fertilizers and pesticides, genetic engineering, growth hormones, irradiation, and antibiotics (Ahmad and Juhdi, 2008). It is important to understand the difference between local and organic producers, as there is often confusion. Even with the possibility for overlap, where a local farm is certified organic, research has shown that only about 5 percent of local food farms are certified organic food producers (Low et al., 2015). It is also noted that in Malawi the difference between local and organic producers cannot be easily spotted. The emergence of organic agriculture came as a result of the desire to produce quality and healthy foods without the use of artificial chemical products (Peart, 2013). Traditionally, however, the main driver of organic food production was two-fold: to satisfy consumers' diverse needs while at the same time increasing farmers' revenue. This organic food production drive has drastically changed, owing to the rise in consumers environmental concerns (Mhlophe, 2015). Consumers are increasingly concerned about the way their food is produced: while they care about the physical properties of their food, they also increasingly consider its social, ethical and environmental attributes (Bridgeman and Lusk, 2011).

Environmental friendly food production is becoming a concern in most developed countries,. Although Malawi is a developing country, there is an increasing concern about environmentally friendly food such as organic food. However, not many studies have been done about consu-

mers' behavior and attitude towards organic food. This study tries to find out the consumers' behavior about organic food in general and specifically the value of organic chicken. Survey data was obtained from supermarket consumers through personal interview. Single bounded referendum format Contingent Valuation Method (CVM) was used for value estimation.

II. Methodology and Model

As contingent valuation method is gaining popularity in agribusiness, the question still remains about the appropriate method of asking the valuation question. This study adopted the single bounded referendum format because it reduces strategic bias that may occur when open ended format was used. A hypothetical situation was designed to determine the value of the organic chicken. Each respondent was asked to accept or reject a suggested additional amount under a hypothetical setting.

Hanemann (1984) stated that individuals know which choice maximizes their utility. They will accept a specified price bid (and reject it otherwise) if;

$$v(1, Y - B; s) + e_1 \geq v(0, Y; s) + e_0 \quad (1)$$

The indirect utility function, v , is assumed to equal utility, u . For the suggested bid, 1 if the individual accepts the bid and 0 if the individual rejects the bid, Y is the average annual household income, B is the bid offer, or in this case, the price for the organic chicken and s , represents other socioeconomic characteristics affecting individual preferences including his/her personal motivations and e_j ($\equiv e_1 - e_0$) are independently and identically distributed with mean zero. It can be assumed that e_j follows extreme value distribution.

The utility difference (Δv) can be described as;

$$\Delta v = v(1, Y - B; s) - v(0, Y; s) + (e_1 - e_0) \quad (2)$$

For an individual who is faced with a choice of whether to 'accept' or 'reject' a hypothetical bid level, the probability (P) that the individual will accept or say 'yes' to the offer (B) for the single-bounded model can be expressed in the logarithmic or log-logistic form as

$$P(\text{yes}) = F\eta(\Delta v) = (1 + e^{-\Delta v})^{-1} = \frac{1}{1 + e^{-(\alpha + \beta_i \ln B + \beta_j \ln S)}} \quad (3)$$

where F_η is a cumulative distribution function, $-\Delta v$ is the regression equation and P is the probability of accepting the bid, α is intercept and β_i represents the coefficients of the bid and β_j represent coefficient of the socioeconomic variables. Generally the coefficients of the equation (3) are estimated by maximum likelihood estimation.

To calculate the mean willingness to pay, P is a set equal to 0.5 and the function is solved for the bid. If the negative willingness to pay is excluded, the mean WTP is equal to the integral of the probit function with respect to bid (B):

$$WTP_{mean} = \int_0^{\infty} F_\eta(\Delta v) dB = \frac{1}{\beta} \cdot \ln [1 + \exp(\alpha)] \quad (4)$$

The general formula for the median willingness to pay with logistic function is;

$$WTP_{median} = \int_0^{\infty} F_\eta dB - \int_{-\infty}^0 (1 - F_\eta) dB = \frac{\alpha}{\beta} \quad (5)$$

And the truncated mean WTP is given as;

$$WTP_{truncated} = \int_0^{MaxB} F_\eta(\Delta v) dB = \frac{\alpha}{\beta} \cdot \ln \left[\frac{1 + \exp(\alpha)}{1 + \exp\{\alpha + \beta MaxB\}} \right] \quad (6)$$

III. Survey Data

Determining an accurate value is highly dependent on the way of how a contingent valuation survey is conducted. Contingent valuation may be based upon data collected using postal, telephone, personal interviews or combination of these. Telephone surveys can be more cost-effective than personal interviews, and they allow greater ease of centralized supervision. However, conveying accurate information about the market to the respondent over the telephone can be difficult. The appropriate means of assessing willingness to pay is personal interview (Han et al., 2000). The survey was conducted among 350 respondents from Lilongwe, the capital city of Malawi and was conducted through personal interviews. Out of 350 questionnaires only 300 were used 50 were left out due to incomplete and inconsistent responses. The questionnaires were administered to consumers in supermarkets namely; Shoprite, Spar, Sana, Metro and

Peoples supermarket. The survey was conducted during period of January to February 2017. The survey questionnaire consisted of three parts. The first part sought to ascertain the respondent's personal profile. It contained questions regarding the respondent's social, economic and demographic characteristics, such as, age, gender, income, level of education and area of residence.

Table 1 shows the statistics of 300 respondents interviewed during survey; 84.0% live in urban area and only 16.0% were from rural area; 56.7% were male and 43.3% female; 73.0% were between 20 to 39years of age and 20.7% were 40years and above of which 9.7% were of 40-49years, 10.3% were of 50-59years and 0.7% were of above 60years. The average age of the respondents was 33years. On education, 97.0% had secondary school certificate and bachelors or postgraduate degree and only 3.0% were of primary certificate level. Then on family size, 62.3% responded 1 to 5 members, 36.0% responded 6 to 10 members and 1.7% responded 11 to 13 as their family size. The average family size of the respondents was 5 members. Finally on household income, 76.4% their income was less than 400,000MK¹⁾ of which 32.0% their income was less than 100,000MK, 24.7% their income was 100,000-199,999MK, 19.7% their income was 200,000-399,999MK and 23.7% their income was 400,000MK and above, of which 1.7% was 400,000-599,999MK, 3.7% was 600,000-799,999MK, 5.0% was 800,000-999,999MK and 7.7% their income was above 1,000,000MK. The average household income was 266,000MK.

Table 1. Basic statistics of the respondents

Basic information	Mean	Detailed information	Number of respondents	Percentage
Residence		Lilongwe urban	252	84.0
		Lilongwe rural	48	16.0
Gender		Female	130	43.3
		Male	170	56.7
Age	33	Below 20	19	6.3
		20-29years	115	38.3
		30-39years	104	34.7
		40-49years	29	9.7
		50-59years	31	10.3
		Above 60	2	0.7

1) MK denotes Malawi currency Malawi Kwacha and \$1 is about 720MK in 2017.

Basic information	Mean	Detailed information	Number of respondents	Percentage	
Education	5	Primary certificate	9	3.0	
		Sec. school certificate	114	38.0	
		Bachelors degree	101	33.7	
		Post graduate	76	25.3	
Family size		1-5people	187	62.3	
		6-10people	108	36.0	
		11-13people	5	1.7	
Household income		266,000	Less than 100,000	96	32.0
			100,000-199,999	74	24.7
			200,000-399,999	59	19.7
		400,000-599,999	22	7.3	
		600,000-799,999	11	3.7	
		800,000-999,999	15	5.0	
		> 1,000,000	23	7.7	

The second part was asking the respondent about consumption behavior and the knowledge of organic food and how frequent the respondent buy organic food. The results in Table 2 show that the majority of the respondents (76.0%) know about organic food. Out of this 76.0%, 39.3% know very well, and 36.7% know a little about organic food. Only 24.0% don't know anything about organic food. Excluding the respondents who don't know about organic food, buying behavior on organic food was asked. The result shows that 40.8% of the respondents sometimes buy organic food followed by 27.6% buy organic food very often, 19.3% always buy organic food, 11.4% rarely buy organic food and 0.9% never buy organic food.

Table 2. Consumer buying behavior and knowledge on organic food

Variables	Buying behavior and knowledge	Number of respondents	Percentage (%)
Knowledge	Know very well	118	39.3
	Know a little	110	36.7
	Don't know	72	24.0
	Total	300	100

Variables	Buying behavior and knowledge	Number of respondents	Percentage (%)
Buying behavior	Always buy organic food	44	19.3
	Very often buy organic food	63	27.6
	Sometimes buy organic food	93	40.8
	Rarely buy organic food	26	11.4
	Never buy organic food	2	0.9
	Total	228	100

Likert scale of 5 was used to find out to what extent consumers consider health and environmental factors when buying meat in supermarket and traditional market. Fig. 1 shows results for health factor, 70.3% of the respondents responded medium and above of which 35.3% medium, 21.7% high and 13.3% very high. On environmental factor, results shows that 50.7% of the respondents responded medium and above of which 23.3% medium, 15.7% high and 11.7% very high. Therefore the respondents are more concerned with health factor than environmental factor when buying meat in supermarket and traditional market. This outcome can be due to the direct effect of the health factor on consumers than environmental factor which has indirect effect.

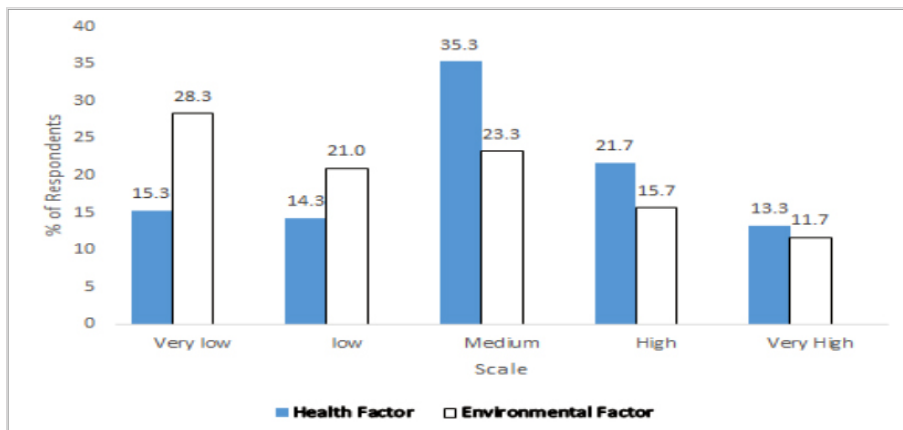


Fig. 1. Health and environmental factors.

The third part was eliciting consumer WTP for organic chicken. A hypothetical situation was designed to determine the value of the organic chicken. The average price of a regular chicken sold in the supermarket was 2,000MK. To determine the initial bid, we conducted a pilot survey with an open-ended question that asked the respondents the maximum additional amount they are

willing to pay for an organic chicken instead of regular chicken. Using the responses from this pilot survey, the bids were set from 100 to 900MK with the interval of 200MK.

The respondents were asked how much more additional amount they are willing to pay. Table 3 and Fig. 2 shows the actual question which was asked in the questionnaire.

Table 3. Explanation of organic chicken suggested to respondents



<p>The questions below are very important to this survey. The hypothetical chicken will be suggested but take the situation as real. Please carefully decide and give your truthful answer. Assume CHICKEN A is a pack of non-organic chicken weighing 1 kg being sold in supermarket. Also assume CHICKEN B is the same as CHICKEN A except it is an organic. The price of CHICKEN A is 2,000MK.</p>	
<p>CHICKEN A</p> 	<p>CHICKEN B</p> 
<p>Non Organic Chicken (Grown under conventional practices and chemical treatment) Weight: 1 kg</p>	<p>Organic Chicken (Grown without antibiotics or growth hormones) Weight: 1 kg</p>
<p>Price: 2,000MK</p>	<p>Price: 2,000MK + ()MK</p>
<p>Q. Are you willing to pay () MK MORE for organic chicken? 1) Yes 2) NO</p>	

Fig. 2. Question to elicit WTP on organic chicken.

Table 4 shows the summary of responses to the single bounded question. When five different groups of 60 respondents were asked different additional amounts of money on the price of organic chicken, the probability of accepting the bid was as follows; when an additional of 100MK was asked out of 60 respondents, 90% responded yes; when an additional of 300MK was asked out of 60 respondents, 73% responded yes; when an additional amount of 500MK was asked out of 60 respondents, 75% responded yes; when an additional amount of 700MK was asked out of 60 respondents, 73% responded yes and finally when an additional amount of 900MK was asked out of 60 respondents 63% responded yes.

The responses in Table 4 can be shown graphically in Fig. 3. The graph shows a negative slope which means that as the bid amount increases the percentage of consumers accepting the bid decreases. This is inline with the previous CVM studies.

Table 4. Summary of responses to the single bounded questions

BID amount (MK)	Total No. of respondents	Yes	No	Probability of yes (%)
100	60	54	6	90
300	60	44	16	73
500	60	45	15	75
700	60	44	16	73
900	60	38	22	63
Total	300			

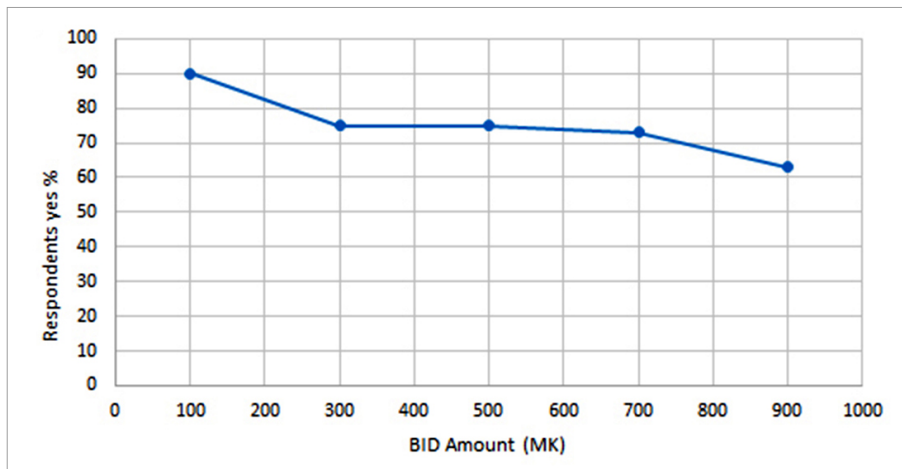


Fig. 3. Probability of yes responses (%)

IV. Estimation Results

Equation 3 in Chapter 2 is the estimation equation for the probit model. Table 5 are the descriptions of included variables that affect the consumers' behavior and the value of the organic chicken. The expenditure on chicken is how much percentage out of the total food expenditure a consumer spends on chicken monthly. Knowledge of organic food refers the level of knowledge a consumer has on organic food.

Table 5. Description of variables

Variable name	Description
Price	Price bids 100, 300, 500, 700, 900 (MK)
Expchi	Expenditure on chicken (%)
Knowofd	Knowledge on organic food
Income	Monthly household income ('000 MK)
Family size	Number of people living in a house
Age	Age of the respondent (years)
Residence	Area of respondents residence, Urban : 1 Rural : 2
Mstatus	Single : 1 and Married : 2
Gender	Female : 1 and Male : 2
Education	1 : Primary, 2 : Secondary, 3 : Bachelors 4 : Post graduate

The linear probit model was selected for further analysis because this functional form is superior to the log and share models in terms of the goodness of fit measures based on McFadden R-squares and model chi-square statistics resulting from the likelihood test. Table 6 shows parameter estimates based on linear probit model.²⁾ The estimated p-value of the price, expenditure of chicken and knowledge on organic food are found to be statistically significant at 5% level. On the other hand the estimated p-value of income and family size appears to be not statistically significant. However, the coefficients shows that an increase in income and family size by one unit results in an increase in willingness to pay. Similarly an increase in the percentage expenditure on chicken leads to an increase in willingness to pay. But the coefficient of price bid is negative which shows an increase in price results in a decrease in willingness to pay.

Table 6. Results of probit regression

Variables	Coefficient	Standard error	P-value ($P > Z $)
Price	-0.000693	0.000301	0.021
Expchi	0.019625	0.004849	0.000
Knowofd	0.214448	0.106834	0.045

2) Due to the statistical insignificance, variables such as Age, Residence, Mstatus, Gender, Education were not included in the probit regression model.

Variables	Coefficient	Standard error	P-value ($P> Z $)
Income	0.000109	0.000378	0.772
Family size	0.045491	0.039209	0.246
Constant	-0.235863	0.359715	0.512
Log likelihood			-148.74
% Right prediction			35.46
Pseudo R ²			0.12
Number of obs			300.00

Based on the estimated results, the mean, median and truncated mean price can be calculated based on the equation (4), (5) and (6). Table 7 below shows the estimated WTP.

Table 7. Estimated additional WTP for organic chicken

	Mean	Median	Truncated mean (0-900)
WTP (MK)	1,285	1,071	514
WTP (US \$)	1.84	1.53	0.73

The estimated WTP varies between 514MK (\$0.73) to 1285MK (\$1.84). Kumar and Managi (2009) concluded that the variation of prices shows that it is not possible to find a single number that correctly represents consumers' WTP. The estimated additional WTP is 514MK (\$0.73), when the mean is truncated between zero and the maximum bid which is 900MK. The basic price of the chicken per kg on the market was set at MK2,000 (\$2.85). Consumers are willing to pay an additional amount of MK514 (\$0.73) per kg for organic chicken. The value for organic chicken is 25.7% higher than the regular chicken.

V. Summary and Conclusion

The objective of the study was to estimate the value of organic chicken. The consumer survey was done in the supermarket in Lilongwe city of Malawi and 300 samples were obtained for further analysis. The objective was accomplished by adopting a contingent valuation method (CVM) with single bounded referendum format questionnaire. The data was analyzed using

probit regression model to identify factors that affect the price of the organic chicken. The additional value of the organic chicken was estimated.

The responses on the single bounded question shows that the higher the bid the less willingness to pay. The linear probit results shows that estimated p-value of the price bid, expenditure of chicken and knowledge on organic food are found to be statistically significant at 5% level. On the other hand the estimated p-value of income and family size appears to be not statistically significant. The estimated expected additional amount of MK514 (\$0.73) with the basic price which was set at MK2,000 (\$2.85), it gives a price of MK2,514 (\$3.59) per kg of organic chicken. The value for organic chicken is 25.7% higher than the regular chicken.

The results of this study have shown that the increase in income leads to increase in willingness to pay for organic food. Therefore it is expected that rise in household income for Malawian consumers will lead to higher demand for organic food. The willingness to pay more for an organic chicken than regular chicken show that consumers value organic foods more than regular foods. The majority of the Malawian supermarket consumers are concerned about health and environmental factor. Therefore there is a prospective market for organic food in coming years. It is also found out that the more knowledge consumers have about organic food, the higher the probability of purchasing organic food. This means that dissemination of information about organic food to consumers will lead to more consumption of organic food.

These findings can be used in formulating policies on food safety by government officials. Supermarket managers can use it in organic chicken meat marketing strategies such as promotion of organic food through advertising about organic chicken, setting the average price for organic chicken and market segmentation. Organic food producers can also use the findings of this study in their decision making about price, quantity and quality of their products. All of these will result in the development of the Malawian organic food industry. Finally, the limitation of the study is that due to time and budget constraints, the questionnaire site was restricted to supermarkets in the capital city of Malawi.

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