Consumers' willingness to pay for organic beef In cagayan valley

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Abstract: This study on "Consumers' willingness to pay for organic beef in Cagayan Valley region" aimed to analyze the consumers' willingness to pay premium for organic beef in Isabela, Quirino, Nueva Vizcaya and Cagayan.

Data was obtained through "face to face" interview with 407 sample respondents using semi-structured questionnaire adopting "Contingent Valuation Methodology" (CVM) and subjected to multivariate Logistic Regression analysis. Descriptive statistics like arithmetic mean, standard deviation, percentages, and ranking were employed to describe the socio-economic characteristics of the respondents. Five level Likert Scale and the Chi-Square test were used to depict the consumers' awareness of organic products and to measure the goodness of fit of the data, respectively.

Majority of the respondents were females, married, with an average age of 47.22, and belonged to household size of 4.7. The respondents were predominantly Roman Catholics, Ilocanos, and had attended formal school. Most of them were government employees earning Php20,000–Php24,999 per month and a quarter belonged to various categories of occupation.

Analysis of the consumers' perception regarding conventional and organic beef in consideration of the given variables revealed that the perceived attributes are significant.

Given the price choice scenario, majority favored the minimum price of Php340/kg. The respondents are willing to pay premium for organic beef if they feel that the price is reasonable and that they get value for their money.

The most important attributes of organic products that have greater influence to consumers' WTP premium for organic beef are price, quality, health factor, and use of synthetic chemicals

Keywords: willingness to pay, organic beef, price, quality, health factor

1. Introduction

A. Rationale

Organic food products are gaining wider acceptance among consumers due to heightened concern to health and environmental issues. The consumption of organic food products is believed to prevent some of the health hazards linked with the consumption of conventional foods (http://www.fao.org/organicag/oa-faq/oa-faq6/en/). Organic farmers use natural farming techniques that don't harm humans and environment (https://www.conserve-energy-future.com/organic-farming-benefits.php). Consumers associate organic food with natural process, care for the environment and animal welfare and the non-use of pesticides and fertilizers (Shafie and Renie, 2009). There seem to be a general consensus that organic food products are healthier and more environment friendly.

Traditionally, households consume conventional fruits, vegetables, rice, poultry, pork, and beef. The promulgation of the Republic Act 10068, also known as Organic Act of the Philippines in 2010 facilitated the implementation of the organic industry in the country. Organic production is an important approach to achieve food safety and minimize health hazards associated with the consumption of conventional foods.

A number of consumer studies have examined the consumption of organic food products in developed countries. Conducting studies on consumer's willingness to pay for organic products and understanding the optimal price are important in the crafting of regulations; licensing and labeling of organic foods; increasing government knowledge about household valuations of agricultural and environmental policies; and in assessing the potential profitability of organic products. However, few consumer studies on organic food products exist in the Philippines. In particular, issues concerning consumers' willingness to pay (WTP) a premium for organic beef has not been rigorously addressed, hence this study.

B. Objectives of the Study

Generally, the study analyzed the consumers' willingness to pay (WTP) premium for organic beef in Cagayan Valley. Specifically, it aimed to: 1) Describe the socio-economic characteristics of the household consumers; 2) Determine the perceptions of the consumers regarding organic beef; 3) Ascertain the factors that influence the consumers' WTP premium for organic beef; and 4) Analyze the effect of the determinants of consumers' willingness to pay premium for organic beef.

2. Research Methodology

A. Project Location and Sample Respondents

The project sites were the urban areas of Cagayan Valley. The areas covered in the study were the provinces of Quirino, Nueva Vizcaya, Isabela, and Cagayan (Plate 1). The sample respondents were calculated using the Slovin's equation with 5% margin of error: $s = N/(1+Ne^2)$; where: s = Sample, N = Population, e = Margin of Error (5%).

The computed samples were apportioned to the provinces and target municipalities and cities based on the number of its population.

B. Survey preparation adopting Contingent Valuation Methodology (CVM)

The existing socio-economic files available from secondary data taken from government agencies like the DA, DTI, and Philippine Statistics Authority (PSA) helped assess the status of the respondents prior to the conduct of the survey. These data and information were used to develop the different scenarios in the Contingent Valuation (CV) part of the survey. The respondents were acquainted with different scenarios regarding the consumption of organic products, which helped them assess their choices in selecting the determinants of WTP for organic products.

Plate 1. Map of Cagayan Valley

C. Gathering and Data Analyses

Primary data was obtained using semi-structured questionnaire adopting CVM floated to 407 target consumers of organic products in selected provinces of Region 02. Other information relevant to selected organic products that were published by concerned government agencies, NGO's, research agencies in gazette papers, journals, etc. were considered as sources of secondary data.

Descriptive statistics like arithmetic mean, standard deviation, percentages, and ranking were employed to describe the socio-economic characteristics of the respondents. Five level Likert Scale was used to determine the consumers' level of awareness on organic products. The Chi-Square test was used to measure the goodness of fit of the data.

The WTP is somehow attributed to the determinants surrounding the consumers, (might be economic, social, cultural or legal aspects) that lead to favorable decision making to purchase organic beef. The data gathered through CVM was treated using multivariate Logistic Regression analysis. This was used to: a) test hypotheses based on the statistical significance of the estimated coefficients to examine validity of WTP; b) estimate the mean WTP for the entire sample; and c) generate a function for predictions.

Logistic Regression Analysis

The logistic formulas are stated in terms of the probability that Y = 1, which is referred to as $\hat{p}$. The probability that Y is 0 is 1 - $\hat{p}$.

$$\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = B_0 + B_1 X$$

The ln symbol refers to a natural logarithm and $B_0 + B_1X$ is our familiar equation for the regression line. The *P* can be computed from the regression equation also. So, if we know the regression equation, we could, theoretically, calculate the expected probability that Y = 1 for a given value of X.

$$\hat{p} = \frac{\exp\left(B_0 + B_1 X\right)}{1+\exp\left(B_0 + B_1 x\right)} = \frac{e^{B_0+B_1 x}}{1+e^{B_0+B_1 x}}$$

Where: *exp* is the exponent function, sometimes written as e. So, the equation on the right is just the same thing but replacing *exp* with *e*. The *e* stands for *exp* that is superscripted value with the *e*, suggesting that *e* is raised to some power.

Estimating Curves

$\text{Logit}[\pi(Y_0) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \ldots + \beta_{30} X_{30}$

Where: Y_0 = willingness to pay, *(1 – if yes; 0 – if no)*
$X_1 \ldots X_{30}$ = independent variables

$\beta_{0\ldots} \beta_n$ = *are parameters to be estimated and tested at 5% and 1% level*

3. Results And Discussion

A. Demographic Profile of the Respondents

The study which covered the provinces of Isabela, Quirino, Nueva Vizcaya and Cagayan in Cagayan Valley region involved 407 sample respondents. Of the four provinces, Isabela has more number (62%) of respondents due to the more number of highly urbanized municipalities and cities in it. The three provinces which include Quirino, Nueva Vizcaya and Cagayan have 12%, 15% and 11% respectively (Figure 1).

Table 1 shows that the respondents were more of females (63.64%) than males (36.36%) and a greater percentage were married (83.29%). Patnaik (2018) reported that females and married respondents are more conscious about use of organic products. The average age of the respondents was 47.22 years, which indicates that the respondents are already of age and mature enough to decide for themselves and to make purchasing decisions.

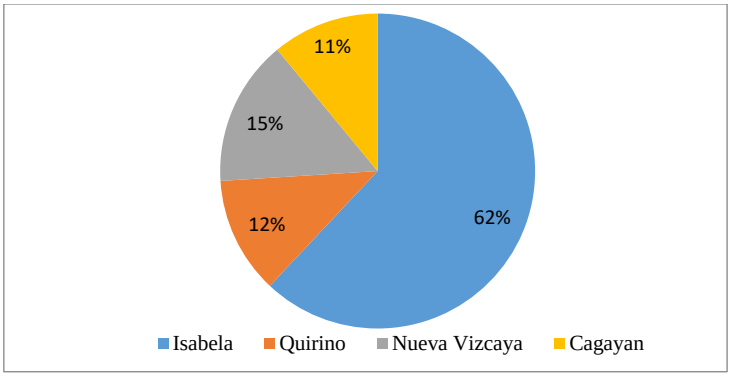

Figure 1. Distribution of respondents by province.

In terms of the respondents' household role, slight majority were in the category of spouse with 55.04%, followed by being head of family with 37.84%. This implies that the prerogative to buy food for the family lies on the respondents. Normally, the decision of what food to buy for the family lies on the housewife. Generally, women are the main food shopper in the family. Gan *et al.* (undated) reported that females and households with

children are more likely to consume organic products. The respondents belonged to a good household size of 4.44 to 5.21 considering that the average number of persons per family is 4.7. Households are the centers of demographic, social and economic processes and decisions about consumption among others, occur primarily at the household level (**UN-DESAPD, 2017).** The respondents were predominantly Roman Catholics (89.43%). In terms of their occupation, at least 33.42% were government employees, a quarter (25.31%) belonged to various categories of occupation which include among others barangay officials and health workers, and 17.69% were merchants. As to their ethnicity, 81.82% were Ilocanos and 13.51% were Ibanags, with few (4.67%) having dual ethnicity, such as Ilocano and Tagalog. In terms of their educational status, majority of the respondents had formal schooling, 25.06% attained secondary school; 51.84% attained tertiary school and at least 18.92% attained graduate school. Most of the respondents (81.33%) belonged to the income bracket of Php20,000–Php 24,999; a very small proportion (7.62%) belonged to a higher income bracket of Php 25,000 and above. Akgungor *et al.* (2010) stated that educated individuals and those with higher income show more interest and have more knowledge of organic products.

Table 1. Socio-demographic profile of the respondents.

Particulars	Isabela (n=252)	Quirino (n=49)	Nueva Vizcaya (n=61)	Cagayan (n=45)	Total/ Average	Percent (%)
1. Gender						
Male	83	21	26	18	148	36.36
Female	169	28	35	27	259	63.64
2. Age	48.3	47.80	44.67	48.11	47.22	
3. Marital Status						
Single	17	3	8	4	32	7.86
Married	212	44	47	36	341	83.29
Separated	6	-	2	2	10	2.46
Widow	17	2	4	3	24	6.39
4. Household Role						
Head	85	22	26	21	154	37.84
Spouse	153	24	26	21	224	55.04
Child	9	3	8	3	23	5.65
Others	5	-	1	-	6	1.47
5. Average HHS	4.83	4.94	5.21	4.44	4.86	
6. Religion						
Roman Catholic	226	36	58	44	364	89.43
Protestant	11	-	-	-	11	2.70
INC	11	1	-	-	12	2.95
Others	4	12	3	1	20	4.91
7. Occupation						
Farmer	17	10	3	1	31	7.62
Housewife	39	2	5	7	53	13.02
Merchant/Business	53	7	6	6	72	17.69
Laborer	9	2	-	-	11	2.70
Govt. Employee	79	18	26	13	136	33.42
Student	1	-	-	-	1	0.25
Others	54	10	21	18	103	25.31
8. Ethnicity						
Ilocano	209	46	51	27	333	81.82
Ibanag	36	1	-	18	55	13.51
Others	7	2	10	-	19	4.67

Particulars	Isabela (n=252)	Quirino (n=49)	Nueva Vizcaya (n=61)	Cagayan (n=45)	Total/ Average	Percent (%)
9. Educational Status						
Grade 1-6	12	4	-	1	17	4.18
Secondary School	65	18	6	13	102	25.06
Tertiary School	116	22	49	24	211	51.84
Graduate School	59	5	6	7	77	18.92
10. HH Income (Php)						
10,000 - 14,999	14	4	-	-	18	4.42
15,000 - 19,999	6	12	5	4	27	6.63
20,000 - 24,999	214	33	50	34	331	81.33
25,000 - 29,999	14	-	5	3	22	5.41
30,000 - 34,999	2	-	-	3	5	1.23
35,000 – 39,999	1	-	-	1	2	0.49
40,000 - 49,999	1	-	-	-	1	0.25
50,000 - 54,999	-	-	1	-	1	0.25

B. Consumers' Perception about Organic Beef

Kalyani (2017) found out in his study on "Consumers Perception towards Organic Foods in India" that for more than half of the respondents, natural and organic foods were the same while less than a quarter believed that they were completely different. In Japan, the Ministry of Agriculture, Forestry and Fisheries (MAFF) distinguishes the concept of environment friendly-agriculture from "organic farming" (farming using organic fertilizers, such as manure and compost, instead of chemical ones). The latter is based on no use of chemical fertilizers and agricultural chemicals, while the former is the system in which chemical fertilizers and pesticides are regarded as basically necessary but recommends judicious use (Hayashi, 1991).

Table 2. Perception of respondents about organic beef.

Particulars	Cagayan Valley	Descriptive Rating	X^2	df	Probability value
1. OF help improve the condition of the environment.	3.07	SI	*54.78***	12	*1.98E-07*
2. Effect of synthetic chemicals	3.90	MHa	*168.13***	12	*6.00E-13*
3. a) consumption of conventional beef	2.76	SH	*45.51***	12	*8.41E-06*
b) consumption of organic beef	3.53	MH	*31.88***	12	*1.44E-03*
4. a) taste of conventional beef	2.77	ST	*46.40***	12	*5.91E-06*
b) taste of organic beef	3.60	MT	*30.68***	12	*2.21E-03*
5. Availability of organic products in grocery stores	2.40	SA	*30.66***	12	*2.22E-03*
6. Supply condition of organic beef	1.76	LS	*174.19***	6	*3.40E-13*
7. Sem and condition of organic beef	1.73	LD	*171.05***		2.00E-13

*Note: SI-somewhat improve; MHa-much harsher; SH-somewhat healthy; MH-much healthy; ST-somewhat tastier; MT-much tastier; SA-somewhat aware; LS-little supply; LD-little demand;*** significant at 1% level*

The table shows that the respondents perceived that organic farming (OF) practices somewhat help improved (SI) the condition of the environment as indicated by numerical rating of 3.07. Organic farming restores the organic matter and nutrients that have been lost and improves farm environment. (DA-BAFPS, 2003; Timsina, 2018). Organic farming promotes the use of environment-friendly materials and it employs practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole (NOSB, 1994). The arguments for organic food focus on consumers' health, animal welfare, and different aspects of environmental policy. Searchinger *et al*. (2018) shared that according to the National Food

Administration of Sweden, there is lack of scientific evidence to show that organic food is in general healthier and more environmentally friendly than conventionally farmed food. Recent finding of a new international study involving Chalmers University of Technology, Sweden revealed that organically farmed food has a bigger climate impact than conventionally farmed food, due to the greater areas of land required which result in greater emissions (Chalmers University of Technology, 2018).

The general perception of the respondents as to the effect of using synthetic chemicals to humans, animals and environment fall in the category of "much harsher" (MHa) with a numerical rating of 3.90.

As to how healthy the consumption of conventional beef is, the respondents, opined that consuming conventional beef is "somewhat healthy" (SH) as indicated by the numerical rating of 2.76. On the other hand, the consumption of organic beef is rated "much healthy" (MH) with a numerical rating of 3.53. Maloney (2019) stated that one of the greatest benefits of organic food is the reduced exposure to pesticides, due to the regulations imposed on organic farming operations. O'Connor (2015) attested that "grass-fed beef tends to be higher in some nutrients, contain fewer harmful bacteria-which is good for the health".

In terms of taste, the respondents indicated that organic beef is "much tastier" (MT) with a numerical rating of 3.60 while conventional beef is "somewhat tastier" (ST), with a numerical rating of 2.77 . The ratings indicate that in terms of taste, the consumers show a preference for organic beef. Kalyani (2017) reported that most of the respondents in his study on "Consumers Perception towards Organic Foods in India" believed that organic products have health benefits and better taste. Studies show that those who have tasted organically farmed foods attested that organic products have better taste. The natural and superior taste stems from the well balanced and nourished soil (https://www.conserve-energy-future.com/organic-farming-benefits.php).

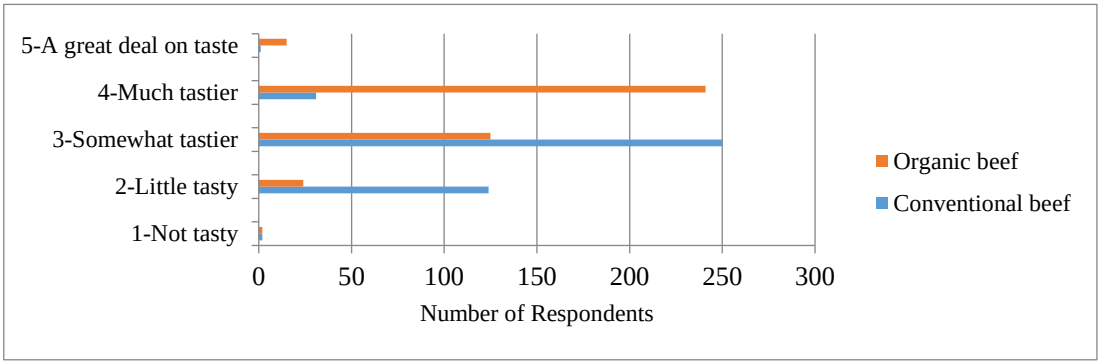

Figure 2. Distribution of consumers' perception on the taste of organic and conventional beef.

When asked whether the respondents were aware of the availability of organic options in grocery stores where they usually shop, the rating given was 2.4 corresponding to "slightly aware" (SA). The result indicated that the consumers were at least aware of the availability of organic options in their respective places. Chandrashekar (2014) reported that the reason for not consuming organic products is mainly the non-availability of organic products in the market.

As to the supply condition, apparently, there was "little supply" (LS) of organic beef in Cagayan Valley region as denoted by the numerical rating 1.76. In terms of demand, the overall rating obtained was 1.73 which corresponds to "little demand" (LD).

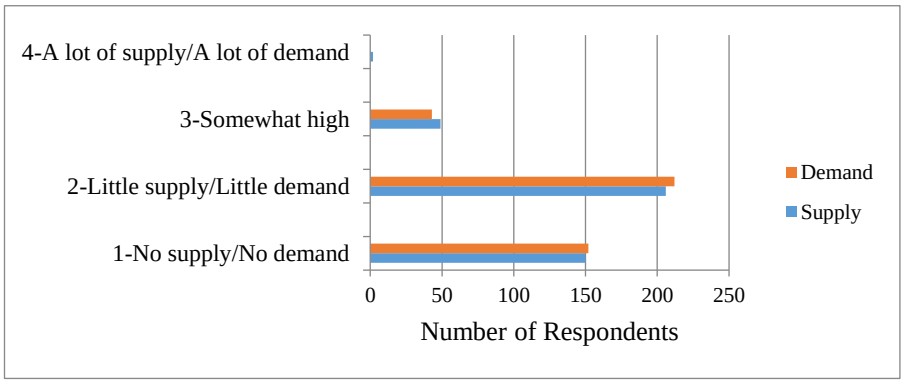

Figure 3. Distribution of consumers' perception on the supply and demand condition of organic beef.

C. Factors Affecting Decision to Choose Organic Beef and WTP.

1. Willingness to Pay (WTP) for Organic Beef

Table 3 reflects the respondents' willingness to pay premium for organic beef. As reflected in Table 3, a greater percentage of the respondents (74.20%) answered in the affirmative while a quarter (25.80%) definitely answered no (N) when asked whether they are willing to pay (WTP) premium for organic beef. This implies that respondents are willing to pay a higher price for organic beef and that organic beef could fetch a higher price compared to conventional beef. Sarma and Raha (2016), reported that 100% of their respondents in Dhaka city, Bangladesh were willing to pay premium price for organic beef. Consumers are willing to purchase organic beef because these beef are free of pesticides, chemical, drug, steroid, etc. The main determinants of WTP are health reasons, consumers' perception and quality. Buyers will be more willing to pay if they believe that a higher price signals higher quality (https://blog.blackcurve.com/9-factors-that-affect-a-customers-willingness-to-pay). When presented with three possible price scenarios, set as minimum, optimum and maximum. Majority (88.37%) of the consumers favored the minimum set price of Php 340/kg, while a few indicated optimum (Php365/kg) and maximum (Php 395/kg) price with 6.64% and 4.98% reporting, respectively.

Table 3.

Particulars	Isabela (n=252)	Quirino (n=49)	NV (n=61)	Cagayan (n=45)	Cagayan Valley (n=407)	Percent (%)
1. Given possible options to buy organic and conventional beef, are you WTP premium for organic beef than conventional beef?						
Yes (Y)	170	36	55	41	302	74.20
No (N)	82	13	6	4	105	25.80
2. *Price of organic beef scenario (per kg)*						
Minimum (Php340)	139	37	54	36	266	88.37
Optimum (Php365)	15	-	2	3	20	6.64
Maximum (Php395)	8	-	5	2	15	4.98

Decision to buy organic beef and price choice scenario.

2. Perception of Consumers on the Price Condition of Organic Beef

Table 4 reflects the consumers' perception on the price condition of organic beef. When asked how realistic the prices of organic beef presented to them, majority (57%) of the respondents were on the "much realistic" (MR)

category with a numerical rating of 3.59. This implies that the respondents realized that the price of organic beef is more expensive compared with other meat products. In contrast, Akgungor *et al.* (2010), reported that consumers do not perceive that organic products have higher prices than conventional counterparts.

Table 4. Perceived price condition of organic beef by the consumers in Cagayan Valley.

Particulars	Isabela (n=252)	Quirino (n=49)	NV (n=61)	Cagayan (n=45)	Cagayan Valley (n=407)	Percent (%)
1 - Not realistic (NR)	3	0	0	1	4	0.98
2 - Little realistic (LR)	29	1	0	0	30	7.37
3 - Somewhat realistic (SR)	98	13	3	3	117	28.75
4 - Much realistic (MR)	116	35	47	34	232	57.00
5 - A great deal of reality (GDR)	6	0	11	7	24	5.90
Numerical Rating	3.37	3.69	4.13	4.02	3.59	
Descriptive Rating	SR	MR	MR	MR	MR	
X^2= 90.88 *** df= 12	Probability. =2.00E-13					

***=*significant at 1%*

The variations of predictive and expected values of perceived attributes by the consumers in all four provinces are significant (Prob>2.00E-13) with a Chi Square (X^2) value of 90.88. The result implies that the perceived attributes of the consumers particularly "much realistic" (MR) for the price condition of organic beef is valid.

3. Buying Habit of Consumers

The buying habit of consumers normally determines the quantity of their purchases and the frequency at which they do their purchases.

Table 5. Quantity of organic beef usually purchased by the consumers in Cagayan Valley.

Particulars	Isabela (n=252)	Quirino (n=49)	NV (n=61)	Cagayan (n=45)	Cagayan Valley (n=407)	Percent (%)
None	108	32	60	40	240	58.97
Less than 1 kg	110	13	1	3	127	31.20
2-3 kg	31	4	-	2	37	9.09
4-5 kg	3	-	-	-	3	0.74
Average (kg)	0.80	0.5	-	0.20	0.57	

Majority (58.97%) of the respondents reported that they don't normally buy organic beef. Of those who buy, they buy less than a kilo. It is quite obvious that beef is not the choice food item among the respondents.

Table 6. Number of times household buys organic beef in a month.

Particulars	Isabela (n=252)	Quirino (n=49)	NV (n=61)	Cagayan (n=45)	Cagayan Valley (n=407)	Percent (%)
Once	71	8	2	2	83	20.39
Twice	31	3	-	-	34	8.35
Thrice	16	2	2	-	20	4.91
Four Times	3	1	-	-	4	0.98
Others (on occasion)	131	35	57	43	266	65.36

In terms of the number of times the household buys organic beef in a month. Majority of the respondents (65.36%) reported that it was only occasionally that they buy. At least 20.39% indicated that they purchased once a month. This result concurs with the findings of the study conducted by Gan *et al.* (*undated*) where about two-thirds of their respondents (68.31%) occasionally purchased organic products. Somewhat less than a third

(28.99%) were frequent purchasers. Pearson and Henryks (2008), concluded in their study that a large percentage of customers, who are spread throughout the community, purchase organic products only occasionally. It clearly shows that beef is not an everyday dish on a typical Filipino dinner table. It is because compared to other food items, beef is more expensive.

4. Factors Influencing the Purchase Intention of Consumers

The influence of product awareness on the consumers' purchasing decision for organic beef fall in the category, "somewhat influenced" (SWI)". Product awareness, in terms of availability and quality of organic products somehow influence the purchase intention of consumers.

Table 7. Perceived influence on the purchase intention of consumers in Cagayan Valley.

Particulars	Cagayan Valley	Descriptive Rating	X^2	df	Probability value
1. Product awareness	3.49	SWI	*108.78***	12	*3.00E-13*
2. Price of organic beef	3.38	SWI	*61.72****	9	*4.48E-07*
3. Product promotion	3.25	SWI	*60.78****	12	*1.63E-08*
4. Family and Friends	3.28	SWI	*54.92****	12	*1.87E-07*
5. Product appearance	3.33	SWI	*88.84****	12	*3.00E-13*
6. Environmental factors	3.30	SWI	*57.65****	12	*6.03E-08*
7. Health factors	3.94	MI	*119.11****	12	*8.00E-13*

Note: *SWI-somewhat influence; MI-much influence; ***significant at 1%*

The respondents reported that price "somewhat influenced" (SWI) their purchasing decision. Ozguven (2012) pointed that price influence organic food buyers. Consumers don't want to buy organic foods because of price. The common notion is that organic foods are expensive. He further revealed that consumers everywhere, appear to be price sensitive and look for value for money when buying food products.

As with price, the respondents in Cagayan Valley were "somewhat influenced" (SWI) by product promotions. So much money is being poured by companies in advertisements to create a market for their products. Austin-Rong *et al*. (2017) revealed that different sales promotion indeed influenced consumers' purchase intention and organic food were more attractive to consumers in the scenario of high prices compared to regular food due to the prices/gifts bundled with the product.

The respondents reported that they were "somewhat influenced" (SWI) by their friends and families. The result implies that there is an element of trust in this scenario and makes it effective. It is a normal happening, esp. in the rural and sub-urban areas that friends and families are being consulted and they play a major role in the decision making and purchasing decision is part of it.

Product appearance "somewhat influenced" (SWI) the purchase intention of respondents. The consumers are driven to purchase if the appearance of the product suits their standards. Also, the respondents were "somewhat influenced" (SWI) by environmental factors.

The extent of influence of health factors on the purchasing decision of consumers for organic beef is in the "much influence" (MI) category. The result indicates that health factors are major considerations in the decision to buy or not to buy organic beef.

Shafie and Rennie (2009) reported that food safety, human health and environmental concern along with sensory attributes such as nutritive value, taste, freshness and appearance influence organic food consumers.

The variations of predictive and expected values of consumers' perceived attributes in the four provinces in Cagayan Valley are significant at 1% level. The result implied that the perceived attributes particularly "somewhat influence" (SWI) in terms of the influence of product awareness, price, promotion, family and friends, appearance, environmental factors and "much influence" (MI) in terms of influence of health factors on the purchase intention of consumers are true and reliable.

D. WTP Analysis of the Respondents on Organic Beef in Cagayan Valley

The analysis of WTP of the consumers for organic beef in Cagayan Valley region considers all (407) the respondents (Table 8). This model has entered all 28 variables considered in the study as indicated below.

Model: logit ywtp = -8.43 + 3.58e-06(X_1) - 0.61(X_2) + 0.42(X_3) - 0.15(X_4) + 0.01(X_5) + 0.07(X_6) - 0.03(X_7) + 0.03(X_8) - 0.04(X_9) - 0.26(X_{10}) - 0.45(X_{12}) + 0.26(X_{13}) + 0.22(X_{14}) + 0.32(X_{15}) + 0.48(X_{16}) + 0.52(X_{18}) + 0.03(X_{19}) – 0.50(X_{20}) - 0.52(X_{21}) + 0.54(X_{22}) + 0.02(X_{23}) + 0.13(X_{24}) + 0.18(X_{25}) + 0.01(X_{26}) - 0.30(X_{27}) - 0.70(X_{28}) - 0.10(X_{29}) – 0.09(X_{30})

The logistic regression model indicated with positive and negative influences to the decision of the consumers' WTP for organic beef in the region. It has a negative constant value (β_0 = -8.43) which means that if the explanatory variables will not contribute to the decision of the consumers' WTP for organic beef, then the consumers are not likely to buy organic beef. This implies that it is not the priority of the consumers to buy beef considering their limited household budget.

The model has a better Linear regression model as indicated by the LR Chi Square value of 187.13 which is significant at 1% level (Prob>chi2 = 0.00***). The Pseudo R^2 indicated that the model accounted for 40.45% of the total variance.

Table 8 shows the determinants for WTP of consumers for organic beef in Cagayan Valley. The significant explanatory variables which have positive influences to the WTP of the consumers are product price (β_8 = 0.03), health factors influence (β_{16} = 0.48), synthetic chemicals (β_{18} = 0.52), and quality (β_{22} = 0.54). For variables with less influence to the consumers' WTP for organic beef are gender (β_8 = -0.61), taste (β_{20} = -0.50), harmful effects of OP (β_{21} = -0.52), and awareness of organic products (β_{28} = -0.70).

Results of the study conducted by Pearson and Henryks (2008), on "Marketing Organic Products: Exploring some of the pervasive issues", revealed that the most important attributes of organic products are health, quality, and environment. Similar findings were reported by Uesongkonsate and Satiteerakul (2016) where consumers' attitudes and intention to buy organic foods are related to health, environment and food safety.

For the corresponding Odds Ratio values of those significant explanatory variables that have greater influence to the consumers' WTP for organic beef are quality (X_{22} = 1.72), synthetic chemicals (X_{18} = 1.69), health factors influence (X_{16} = 1.62), and price (X_8 = 1.04). The explanatory variables with decreasing influence to the WTP of the consumers for organic beef are taste (X_{20} = 0.60), harmful effect of OP (X_{21} = 0.59), and awareness OP (X_{28} = 0.49).

Table 8. Measure of Determinants for WTP of Consumers of Organic Beef in Cagayan Valley.

Variables	**Coefficient** (β)	**Odds Ratio**	**z**	**P>|z|**
X_1 - HHI	3.58e-06	1.00	0.12^{ns}	0.90
X_2 - Gender	-.61	.54	-1.82*	0.07
X_3 – Marital Status	.42	1.52	1.53^{ns}	0.13
X_4 – Educ Attainment	-.15	.86	-0.81^{ns}	0.42
X_5 - Age	.01	1.01	1.11^{ns}	0.27
X_6 - HHS	.07	1.07	0.88^{ns}	0.38
X_7 - Occupation	-.03	.97	-0.52^{ns}	0.60
X_8 - Price	.03	1.04	7.93***	0.00
X_9 - Packaging	-.04	.96	-0.10^{ns}	0.92
X_{10} - Promo	-.26	.77	-0.85^{ns}	0.40
X_{12} - Aware Certification	-.45	.64	-1.54^{ns}	0.12
X_{13} - Price Influence	.03	1.03	0.10^{ns}	0.92
X_{14} - Envi Influence	.22	1.24	0.88^{ns}	0.38
X_{15} - Appearance Influence	.32	1.38	1.27^{ns}	0.20

Variables	Coefficient (β)	Odds Ratio	z	P>|z|
X_{16} - Health factors Influence	.48	1.62	1.96**	0.05
X_{18} – Synthetic chemical	.52	1.69	2.34**	0.02
X_{19} – Healthy OP	.03	1.03	0.11^{ns}	0.91
X_{20} – Taste OP	-.50	.60	-1.7^{*}	0.08
X_{21}- Harm Effect OP	-.52	.59	-2.61***	0.01
X_{22} – Quality OP	.54	1.72	1.92**	0.05
X_{23} - Improve Soil Fertility	.02	1.02	0.08^{ns}	0.93
X_{24} - ImprvSoil Flora&Fauna	.13	1.14	0.42^{ns}	0.67
X_{25} - Environmentalist	.18	1.19	0.89^{ns}	0.37
X_{26} – WTP convert OP	.01	1.01	0.04^{ns}	0.97
X_{27} – Govt. Sudsidies	-.30	.74	-1.27^{ns}	0.20
X_{28} - Awareness OP	-.70	.49	-2.62***	0.01
X_{29} – Family Friends Influence	-.10	.90	-0.46^{ns}	0.65
X_{30} - Promo Influence	-.09	.92	-0.32^{ns}	0.75
Constant	-.84	.0002	-3.40***	0.001

****significant at 1% level; **significant at 5% level; ns-not significant*

5. Conclusion And Recommendations

A. Conclusion

Based on the findings of this study on "Consumers' willingness to pay for organic beef in Cagayan Valley region", it can be concluded that the respondents were aware of the harmful effects of consuming conventional beef and the consumption of organic beef is "much healthy".

In terms of supply and demand condition, the perception of respondents is that there was "little supply" (LS) and also, "little demand" (LD) for organic beef.

Majority of the respondents favored the minimum price of Php340/kg and they are willing to buy organic beef if they feel that the price is reasonable and that they get value for their money.

Result of the WTP analysis revealed that price, health factors, quality, and synthetic chemicals are significant explanatory variables which have positive influence to consumers' WTP for organic beef in Cagayan Valley region. While harmful effects, and awareness of organic products have less influence to consumers' WTP for organic beef.

B. Recommendations

The following are recommended for implementation and further study:

1. Government regulations on prices of organic products must be set at reasonable amount to make organic products more affordable to a wider range of consumers.
2. Government subsidies be given to farmers to help and encourage them convert to organic farming.

Organic products promotion must be given attention and there should be wider dissemination of health benefits derived from organic products to increase consumers' awareness on organic products..

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