



Consumers' willingness to pay (WTP) for organic vegetables in region 02, Philippines

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Key words: Organic vegetables, Willingness to pay (WTP).

<http://dx.doi.org/10.12692/ijb/18.6.92-102>

Article published on June 29, 2021

Abstract

The study investigated consumers' willingness to pay a premium for organic vegetables in urban centers of Region 02. Three classes of vegetables were considered – legumes (mongo, habichuelas, and stringbeans); fruit vegetables (eggplant, ampalaya, tomato, okra and squash); and leafy vegetables (cabbage, pechay, kangkong and ampalaya leaves). The price premiums for organic vegetables ranged from 21.15% to 22.73% for legumes; 23% to 23.34% for fruit vegetables; and 23.9% to 24.8% for leafy vegetables. The effects of the determinants of consumers' willingness to pay a premium were estimated using binary logistic regression. The empirical findings indicate that gender, educational status, household income, visual appearance, labelling, product availability, knowledge, and awareness exhibited a statistically significant positive relationship with consumers' willingness to pay for organic vegetables. On the other hand, age, household size, and price posted a statistically significant negative relationship with consumers' willingness to pay.

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Introduction

Region 02 remains to be largely agricultural, although the importance of agriculture in the economic growth of the region had gradually declined over the years. In 2018, the average share of the agriculture, fishery and forestry sector to the GDP of the region was 30.3% while the service and industry sectors contributed 54.6% and 15.1% respectively (PSA, 2018). The region intensely relies on the production of rice and corn, however, the production of vegetables also abound. Agricultural vegetable production in the region consists of organic and conventional methods. Even so, organic agriculture is relatively insubstantial relative to its conventional counterpart.

Customarily, households in the region consumed conventional vegetables. Among these were – ampalaya (bitter gourd), eggplant, chayote, upo (bottle gourd), squash, okra, carrots, cabbage, pechay (snow cabbage), stringbeans, habitchuelas (snap beans), mongo, and tomato. During the period 2015 – 2016, the regional estimates of annual per capita consumption were high for eggplant at 6.67 kilograms, tomato at 4.96 kilograms, stringbeans at 3.97 kilograms, ampalaya at 3.35 kilograms, and squash at 3.21 kilograms. Regional annual per capita consumption estimates were also high for cabbage at 2.63 kilograms, pechay at 2.38 kilograms, okra at 1.85 kilograms, upo at 1.73 kilograms, and chayote at 1.16 kilograms. Minimal annual per capita consumption estimates were recorded for habitchuelas at 0.68 kilograms and carrots at 0.44 kilograms (PSA, 2017).

In recent years, the demand for organic vegetables had considerably taken the attention of consumers in the region, as a consequence of their growing concerns about food safety, diet and nutrition, health, and environmental quality. Among the organic vegetables sought by consumers were – legumes which include mongo, habitchuelas, and stringbeans; fruit vegetables which include eggplant, ampalaya, tomato, okra, and squash; and leafy vegetables which includes cabbage, pechay, kangkong (swamp cabbage), and ampalaya leaves. Notwithstanding these developments, the growth of the organic

vegetable industry in the Region is quite slow and is confronted by challenges. Generally, the adoption of organic vegetable farming is quite sluggish and the market for organic vegetables is not well developed. Nevertheless, the market for organic vegetables is growing as the number of consumers willing to consume organic vegetables is increasing. There thus remains a need to determine whether consumers in Region 02 are willing to pay a premium for organic vegetables.

Materials and methods

The study was conducted from April 2018 to December 2019 in urban centers in the four provinces of Region 02 (i.e., Cagayan, Isabela, Nueva Vizcaya and Quirino). The specific survey sites were – Tuguegarao City and Aparri in Cagayan; Cauayan City, Ilagan City, Santiago City and Roxas in Isabela; Bayombong and Solano in Nueva Vizcaya; and Diffun and Maddela in Quirino.

Primary data were collected via a pre-tested interview schedule. Data were obtained through personal interviews with consumers. The survey collected qualitative and quantitative data relating to the socio-economic and demographic characteristics of the consumers, consumers' perceptions and attitudes towards the consumption of organic vegetables, their purchases and the market potential of organic vegetables, and their willingness to pay for organic vegetables. Three classes of vegetables were considered in the study – legumes which cover mongo, habitchuels and stringbeans; fruit vegetables which include eggplant, ampalaya, tomato, okra and squash; and leafy vegetables which encompasses cabbage, pechay, kangkong and ampalaya leaves. These are the most commonly sought for vegetables in the region. Simple random sampling was used in selecting the sample respondents for the study. A total of 407 consumers served as respondents. The binary logistic regression model was used to determine the factors that influence the odds ratio of the consumer's willingness to pay for organic vegetables. Stata/SE 12.0 was used in carrying out the binary logistic regression.

The binary logistic model of the relationship between the consumers' willingness to pay for organic vegetables and the explanatory variables is specified as follows:

$$WTP = \beta_0 + \beta_1x_{i1} + \beta_2x_{i2} + \beta_3x_{i3} + \beta_4x_{i4} + \beta_5x_{i5} + \beta_6x_{i6} + \beta_7x_{i7} + \beta_8x_{i8} + \beta_9x_{i9} + \beta_{10}x_{i10} + \beta_{11}x_{i11} + \beta_{12}x_{i12} + \beta_{13}x_{i13} + \beta_{14}x_{i14} + \beta_{15}x_{i15} + \beta_{16}x_{i16}$$

The subscript 'i' denotes the ith observation in the data. The dependent variable (i.e., WTP) and the explanatory variables (i.e., x_1, x_2, \dots, x_{16}) that were used in the study are described and defined in Table 1. The β_s are the vector of unknown parameters to be estimated while β_0 is the constant coefficient or the equation intercept. It should be noted that the estimated coefficients do not directly affect the change in corresponding explanatory variables on the

probability of the outcome. Instead, the coefficients reflect the effect of individual explanatory variables on its log of odds. A positive coefficient means that the odds ratio will increase as the explanatory variable increases. On the other hand, a negative coefficient implies that the odds ratio will decrease as the explanatory variable decreases.

Results and discussion

Of the 407 respondents, 350 (86%) were willing to pay higher premiums for organic vegetables while 57 (14%) were not willing to pay. Of the four provinces in the region, the most number of respondents who were willing to pay higher premiums was posted in Cagayan where 89% of the 45 respondents were willing to pay higher premiums.

Table 1. Description and definitions of the independent variable and explanatory variables.

Variable Coding	Description	Definition
Dependent Variable		
<i>WTP</i>	Consumers' willingness to pay premium for organic vegetables (OVs)	1 – if the respondent is willing to pay a premium for organic vegetables 0 – if the respondent is not willing to pay a premium for organic vegetables
Independent Variables		
<i>Socio-demographic and Economic Variables:</i>		
x_1	Gender	1 – female 0 – male
x_2	Age	Age in years
x_3	Marital status	1 – married 2 – separated 3 – widowed 4 – single
x_4	Role in the household	1 – head of the family 0 – otherwise
x_5	Household size	Number of household members
x_6	Occupation	1 – white collar job 0 – otherwise
x_7	Education	Years of schooling
x_8	Household income	Monthly household income in peso
<i>Product Attributes:</i>		
x_9	Visual appearance and taste	1 – extremely not important 2 – not important 3 – neither important nor not important 5 – important 4 – extremely important
x_{10}	Label	1 – extremely not important 2 – not important 3 – neither important nor not important 5 – important 4 – extremely important
<i>Perception Variables:</i>		
x_{11}	OVs are expensive (Price perception)	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
x_{12}	OVs have more nutrients	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree

Table 1. Continued.

Variable Coding	Description	Definition
x_{13}	OVs are environmentally safe/ ecologically sound	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
x_{14}	OVs are readily available	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
<i>Knowledge and Awareness</i>		
x_{15}	Knowledge of organic agriculture	1 – extremely uninformed 2 – uninformed 3 – neither informed nor uninformed 4 – informed 5 – extremely informed
x_{16}	Awareness of the standards for organic product certification	1 – extremely unaware 2 – unaware 3 – neither aware nor unaware 4 – aware 5 – extremely aware
β_s	Are the vector of unknown parameters to be estimated	
β_o	Constant coefficient or the equation intercept	

Isabela came second of which 88% of the 252 respondents were willing to pay higher premiums. Quirino ranked third where 80% of the 49 respondents were willing to pay higher premiums. The least number of respondents who were willing to pay higher premiums was in Nueva Vizcaya where 77% of the 61 respondents were willing to pay higher premiums. Table 2 shows the premium prices that consumers were willing to pay for organic vegetables.

Premium prices for organic legumes

During the study period, the average market price for a kilo of conventional mungo, habichuelas and stringbeans were PhP 80, PhP 52 and PhP 40, respectively. Across provinces, the highest premium price that would be paid for a kilo of organic mungo was registered in Cagayan which is 22.50% higher than the price of conventional mungo. High premium prices for organic mungo were also noted in Quirino (22.31% higher) and Nueva Vizcaya (21.29% higher). The lowest premium price for a kilo of organic mungo would be paid by consumers in Isabela (20.93% higher). At the regional level, the average premium

price the consumers were willing to pay for a kilo of organic mungo was PhP 97.05 which is 21.31% higher than conventional mungo. Provincial results indicate that the highest premium price for a kilo of organic habichuelas would be paid by consumers in Cagayan (22.08% higher).

In contrast, consumers in Isabela (20.88% higher) would pay the lowest premium price for organic habichuelas. Consumers in Nueva Vizcaya and Quirino would be willing to pay premium prices of 21.54% and 21.48% above conventional habichuelas, respectively. Region-wise, the average premium price the consumers were willing to pay for a kilo of organic habichuelas was PhP 63 which is 21.15% above the price of conventional habichuelas.

Province-wise, the highest premium price for a kilo of organic stringbeans would be paid by consumers in Nueva Vizcaya and Quirino which were 22.83% above the price of conventional stringbeans. High premium prices for organic stringbeans were likewise recorded in Isabela (22.73% higher).

Table 2. Premium prices for organic vegetables.

PRICE	PROVINCE								REGION 02	
	CAGAYAN		ISABELA		NUEVA VIZCAYA		QUIRINO		n = 350	Percent (%)
	n = 40	Percent (%)	n = 223	Percent (%)	n = 48	Percent (%)	n = 39	Percent (%)		
Mongo										
The price of 1 kg of conventional mongo is PhP80.00. How much would consumer pay more for the organic type of the same quantity?										
25% above (PhP 100.00)	25	62.50	96	43.05	23	47.92	21	53.85	165	47.14
20% above (PhP 96.00)	10	25.00	72	32.29	15	31.25	15	38.46	112	32.00
15% above (PhP 92.00)	5	12.50	55	24.66	10	20.83	3	7.69	73	20.86
Premium price for organic mongo (PhP/kg)	98.00		96.74		97.03		97.85		97.05	
Percent above base price	22.50%		20.93%		21.29%		22.31%		21.31%	
Habitchuelas										
The price of 1kg of conventional habitchuelas is PhP52.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above(PhP 65.00)	23	57.50	88	39.46	24	50.00	18	46.15	153	43.71
20% above (PhP 62.40)	10	25.00	82	36.77	14	29.17	14	35.90	120	34.29
15% above (PhP60.00)	7	17.50	53	23.77	10	20.83	7	17.95	77	22.00
Premium price for organic habitchuelas (PhP/kg)	63.48		62.86		63.20		63.17		63.00	
Percent above base price	22.08%		20.88%		21.54%		21.48%		21.15%	
Stringbeans										
The price of 1 kg of conventional string beans is PhP40.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above(PhP 50.00)	25	62.50	132	59.19	32	66.67	25	64.10	214	61.14
20% above (PhP 48.00)	10	25.00	81	36.32	11	22.92	11	28.21	113	32.29
15% above (PhP 46.00)	5	12.50	10	4.48	5	10.42	3	7.69	23	6.57
Premium price for organic stringbeans (PhP/kg)	49.00		49.09		49.13		49.13		49.09	
Percent above base price	22.50%		22.73%		22.83%		22.83%		22.73%	
Ampalaya										
The price of 1 kg of conventional ampalaya is PhP60.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 75.00)	28	70.00	140	62.78	34	70.83	23	58.97	225	64.29
20% above (PhP 72.00)	10	25.00	80	35.87	13	27.08	7	17.95	110	31.43
15% above (PhP 69.00)	2	5.00	3	1.35	1	2.08	9	23.08	15	4.29
Premium price for organic ampalaya (PhP/kg)	73.95		73.84		74.06		73.08		73.80	
Percent above base price	23.25%		23.07%		23.43%		21.8%		23%	
Eggplant										
The price of 1 kg of conventional eggplant is PhP44.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 55.00)	30	75.00	145	65.02	38	79.17	25	64.10	238	68.00
20% above (PhP 52.80)	9	22.50	78	34.98	8	16.67	13	33.33	108	30.86
15% above (PhP 50.60)	1	2.50			2	4.17	1	2.56	4	1.14
Premium price for organic eggplant (PhP/kg)	54.40		54.23		54.45		54.15		54.27	
Percent above base price	23.64%		23.25%		23.75%		23.07%		23.34%	
Okra										
The price of 1 kg of conventional okra is PhP40.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 50.00)	32	80.00	150	67.26	38	79.17	28	71.79	248	70.86
20% above (PhP 48.00)	5	12.50	53	23.77	5	10.42	10	25.64	73	20.86
15% above (PhP 46.00)	3	7.50	20	8.97	5	10.42	1	2.56	29	8.29
Premium price for organic okra (PhP/kg)	49.45		49.17		49.38		49.38		49.25	
Percent above base price	23.63%		22.93%		23.45%		23.45%		23.13%	

Table 2. Continued.

PRICE	PROVINCE								REGION 02	
	CAGAYAN		ISABELA		NUEVA VIZCAYA		QUIRINO		n = 350	Percent (%)
	n = 40	Percent (%)	n = 223	Percent (%)	n = 48	Percent (%)	n = 39	Percent (%)		
Squash										
The price of 1 kg of conventional squash is PhP28.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 35.00)	32	80.00	155	69.51	32	66.67	25	64.10	244	69.71
20% above (PhP 33.60)	6	15.00	48	21.52	10	20.83	7	17.95	71	20.29
15% above (PhP 32.20)	2	5.00	20	8.97	6	12.50	7	17.95	35	10.00
Premium price for organic squash (PhP/kg)	34.55		34.30		34.21		34.10		34.44	
Percent above base price	23.39%		22.50%		22.18%		21.79%		23%	
Tomato										
The price of 1kg of conventional tomato is PhP32.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 40.00)	35	87.50	160	71.75	35	72.92	25	64.10	255	72.86
20% above (PhP 38.40)	4	10.00	45	20.18	13	27.08	8	20.51	70	20.00
15% above (PhP 36.80)	1	2.50	18	8.07			6	15.38	25	7.14

Premium price for organic tomato (PhP/kg)	39.76	39.42	39.57	39.18	39.45					
Percent above base price	24.25%	23.19%	23.66%	22.44%	23.28%					
Ampalaya Leaves										
The price of 1 kg of conventional ampalaya leaves is PhP 20.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 25.00)	32	80.00	184	82.51	40	83.33	30	76.92	286	81.71
20% above (PhP 24.00)	6	15.00	29	13.00	7	14.58	8	20.51	50	14.29
15% above (PhP 23.00)	2	5.00	10	4.48	1	2.08	1	2.56	14	4.00
Premium price for organic ampalaya leaves (PhP/kg)	24.75	24.78	24.81	24.74	24.78					
Percent above base price	23.75%	23.90%	24.05%	23.70%	23.90%					
Cabbage										
The price of 1 kg of conventional cabbage is PhP40.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 50.00)	34	85.00	183	82.06	38	79.17	37	94.87	292	83.43
20% above (PhP 48.00)	6	15.00	40	17.94	9	18.75	1	2.56	56	16.00
15% above (PhP 46.00)					1	2.08	1	2.56	2	0.57
Premium price for organic cabbage (PhP/kg)	49.70	49.64	49.54	49.85	49.66					
Percent above base price	24.25%	24.10%	23.85%	24.63%	24.15%					
Kangkong										
The price of 1 kg of conventional kangkong is PhP32.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 40.00)	37	92.50	201	90.13	40	83.33	30	76.92	308	88.00
20% above (PhP 38.40)	3	7.50	20	8.97	7	14.58	7	17.95	37	10.57
15% above (PhP 36.80)			2	0.90	1	2.08	2	5.13	5	1.43
Premium price for organic kangkong (PhP/kg)	39.88	39.83	39.70	39.55	39.79					
Percent above base price	24.63%	24.47%	24.06%	23.59%	24.34%					
Pechay										
The price of 1 kg of conventional pechay is PhP40.00. How much would the consumer pay more for the organic type of the same quantity?										
25% above (PhP 50.00)	38	95.00	219	98.21	46	95.83	36	92.31	339	96.86
20% above (PhP 48.00)	2	5.00	3	1.35	1	2.08	2	5.13	8	2.29
15% above (PhP 46.00)			1	0.45	1	2.08	1	2.56	3	0.86
Premium price for organic pechay (PhP/kg)	49.90	49.96	49.88	49.79	49.92					
Percent above base price	24.75%	24.90%	24.70%	24.48%	24.80%					

The lowest premium price for organic stringbeans would be paid by consumers in Cagayan (22.5% higher). At the regional level, the average premium price the consumers were willing to pay for a kilo of organic stringbeans was PhP 49.09 which is 22.73% higher than the price of conventional stringbeans.

Premium prices organic fruit vegetables

During the study period, the average market price for a kilo of conventional ampalaya, eggplant, okra, squash and tomato were PhP 60, PhP 44, PhP 40, PhP 28 and PhP 32, respectively. By province, consumers in Nueva Vizcaya posted the highest premium price for a kilo of organic ampalaya which is 23.43% higher than the price of conventional ampalaya. High premium prices for organic ampalaya were likewise observed in Cagayan and Isabela which are 23.25% and 23.07% higher than conventional ampalaya, respectively. A relatively lower premium price for organic ampalaya was disclosed in Quirino (21.80% higher). Regional estimates show that the average premium price the consumers were willing to pay for a kilo of organic ampalaya was PhP 73.80

which is 23% higher than the price of conventional ampalaya.

Among the provinces, the premium price for a kilo of organic eggplant was highest in Nueva Vizcaya which is 23.75% above conventional eggplant. High premium prices for organic eggplant were similarly accounted for in Cagayan and Isabela at 23.64% and 23.25% above the price of conventional eggplant, respectively. The premium price for a kilo of organic eggplant was lowest in Quirino at 23.07% above conventional eggplant. At the regional level, consumers were willing to pay an average premium price of PhP 54.27 for a kilo of organic eggplant which is 23.34% higher than the price of conventional eggplant.

Across provinces, Cagayan posted the highest premium price for a kilo of organic okra which is 23.63% above its conventional counterpart. Similarly, high premium prices for a kilo of organic okra were observed in Nueva Vizcaya and Quirino at 23.45% above conventional okra. The lowest premium price

for organic okra was registered in Isabela at 22.93% above conventional prices. Region-wise, the average premium price the consumers were willing to pay for a kilo of organic okra was PhP 49.25 which is 23.13% higher than the price of conventional okra. At the provincial level, the highest premium price for a kilo of organic squash was posted in Cagayan which is 23.39% more than the price of conventional squash.

In contrast, the lowest premium price for a kilo of organic squash was recorded in Quirino (21.79% higher). Meanwhile, high premium prices for organic squash were observed in Isabela (22.50% higher) and Nueva Vizcaya (22.18% higher). Region-wise, the average premium price the consumers were willing to pay for a kilo of organic squash was PhP 34.44 which is 23% higher than the price of conventional squash.

Table 3. Binary logistic regression coefficient estimates of the factors influencing consumers' WTP for organic vegetables (OVs).

Variable description	WTP (y)	Coef.	Std. Err	z	P> z	[95% Conf. Interval]	
Socio-demographic and Economic Variables:							
Gender	x_1	1.617711	.4723654	3.42	0.001***	.6918913	2.54353
Age	x_2	-.1250509	.0218862	-5.71	0.000***	-.1679471	-.0821547
Marital status	x_3	.6736641	.48535	1.39	0.165 ^{ns}	-.2776044	1.624933
Role in the household	x_4	.2826383	.5076473	0.56	0.578 ^{ns}	-.7123321	1.277609
Household size	x_5	-.342927	.1505036	-2.28	0.023**	-.6379085	-.0479454
Occupation	x_6	.4058312	.4978953	0.82	0.415 ^{ns}	-.5700257	1.381688
Educational status	x_7	.9311127	.4757625	1.96	0.050**	-.0013647	1.86359
Monthly household income	x_8	.0001803	.0000486	3.71	0.000***	.000085	.0002757
Product Attributes:							
Visual appearance and taste	x_9	.0616704	.6691479	-0.09	0.027**	-1.373176	1.249835
Label	x_{10}	1.199144	.5642425	2.13	0.034**	.093249	2.305039
Perception Variables:							
OVs are expensive (price perception)	x_{11}	-1.734194	.4908479	-3.53	0.000***	-.7721493	-2.696238
OVs have more nutrients	x_{12}	.5318483	.5884167	0.90	0.366 ^{ns}	-.6214273	1.685124
OVs are environmentally safe/ecologically sound	x_{13}	.6813259	.4718184	1.44	0.149 ^{ns}	-.2434211	1.606073
OVs are readily available	x_{14}	1.483839	.4694722	3.16	0.002***	.5636906	2.403988
Knowledge and Awareness:							
Knowledge of organic agriculture	x_{15}	1.198248	.4778735	2.51	0.012**	.2616333	2.134863
Awareness of the standards for organic product certification	x_{16}	.0440648	.5112295	0.09	0.031**	-.9579267	1.046056
	_cons	1.078473	1.483416	0.73	0.467	-1.82897	3.985915
Number of observations	=	407	** Significant at 5% level of significance				
LR $\chi^2(16)$	=	336.08	*** Significant at 1% level of significance				
Prob > χ^2	=	0.0000	ns – Non significant				
Pseudo R ²	=	0.704					

Provincial estimates reveal that the highest premium price for a kilo of organic tomato would be paid by consumers in Cagayan (24.25% higher). In contrast, consumers in Quirino (22.44% higher) would pay the lowest premium price for a kilo of organic tomato. Consumers in Isabela and Nueva Vizcaya would be willing to pay premium prices of 23.19% and 23.66% above the price of conventional tomatoes, respectively. The regional estimates indicate that the average premium price the consumers were willing to pay for a kilo of organic tomato was PhP 39.45 which

is 23.28% higher than the price of conventional tomato.

Premium prices for organic leafy vegetables

For the duration of the study, the average market price for a kilo of conventional ampalaya leaves, cabbage, kangkong and pechay were PhP 20, PhP 40, PhP 32 and PhP 40, respectively. Across provinces, the highest premium price that would be paid for a kilo of organic ampalaya leaves was registered in Nueva Vizcaya which is 24.05% higher than the price

of conventional ampalaya leaves. High premium prices for a kilo of organic ampalaya leaves were, likewise, observed in Isabela, Cagayan and Quirino which were 23.90%, 23.75% and 23.70% higher than the price of conventional ampalaya leaves, respectively. Region-wise the average premium price the consumers were willing to pay for a kilo of organic ampalaya leaves was PhP 24.78 which is 23.9% higher than the price of conventional ampalaya leaves. At the provincial level, the highest premium price for a kilo of organic cabbage was recorded in Quirion which is

24.63% higher than the price of conventional cabbage. In contrast, consumers in Nueva Vizcaya (23.85% higher) would pay the lowest premium price for a kilo of organic cabbage. Consumers in Cagayan and Isabela were willing to pay premium prices that are 24.25% and 24.10% higher than the price of conventional cabbage, respectively. At the regional level, the average premium price the consumers were willing to pay for a kilo of organic cabbage was PhP 49.66 which is 24.15% higher than the price of conventional cabbage.

Table 4. Binary logistic regression odds ratio of the factors influencing consumers' WTP for organic vegetables (OVs).

Variable description	WTP (y)	Odds Ratio	Std. Err	z	P> z	[95% Conf. Interval]	
Socio-Demographic and Economic Variables:							
Gender	x1	5.041535	2.381447	3.42	0.001***	1.99749	12.72451
Age	x2	.882452	.0193135	-5.71	0.000***	.8453985	.9211294
Marital status	x3	1.961411	.9519707	1.39	0.165 ^{ns}	.7575965	5.078076
Role in the household	x4	1.326625	.6734578	0.56	0.578 ^{ns}	.4904989	3.58805
Household size	x5	.7096901	.1068109	-2.28	0.023**	.5283964	.9531858
Occupation	x6	1.500549	.7471165	0.82	0.415 ^{ns}	.5655109	3.981617
Educational status	x7	2.537331	1.207167	1.96	0.050**	.9986362	6.446839
Monthly household income	x8	1.18000	.0000487	3.71	0.000***	1.000085	1.000276
Product Attributes:							
Visual appearance and taste	x9	1.940192	.6291279	-0.09	0.027**	.2533012	3.489768
Label	x10	3.317276	1.871748	2.13	0.034**	1.097735	10.02457
Perception Variables:							
OVs are expensive (price perception)	x11	.664358	2.780338	-3.53	0.000***	-2.164413	14.82385
OVs have more nutrients	x12	1.702075	1.001529	0.90	0.366 ^{ns}	.5371772	5.393118
OVs are environmentally safe/ecologically sound	x13	1.976497	.9325475	1.44	0.149 ^{ns}	.7839413	4.983204
OVs are readily available	x14	4.409843	2.070299	3.16	0.002***	1.757145	11.06722
Knowledge and Awareness							
Knowledge of organic agriculture	x15	3.314306	1.583819	2.51	0.012***	1.29905	8.455889
Awareness of the standards for organic product certification	x16	1.04505	.5342605	0.09	0.031**	.3836876	2.846404
	_cons	2.940185	4.361519	0.73	0.467	.1605788	53.83455
Number of observations	=	407				** Significant at 5% level of significance	
LR chi ² (16)	=	336.08				*** Significant at 1% level of significance	
Prob > chi ²	=	0.0000				ns – Non significant	
Pseudo R ²	=	0.704					

Across provinces, Cagayan posted the highest premium price for a kilo of organic kangkong which is 24.63% above conventional prices. Similarly, high premium prices for a kilo of organic kangkong were observed in Isabela and Nueva Vizcaya which were 24.47% and 24.06% above the price of conventional kangkong, respectively. The lowest premium price for a kilo of organic kangkong was registered in Quirino at 23.59% above conventional okra. Region-wise, the average premium price the consumers were willing to pay for a kilo of organic kangkong was PhP 39.79

which is 24.34% higher than the price of conventional kangkong.

By province, the highest premium price for a kilo of organic pechay was noted in Isabela which is 24.90% higher than the price of conventional pechay. Comparatively, high premium prices for a kilo of organic pechay were, likewise, observed in Cagayan (24.75% higher), Nueva Vizcaya (24.70% higher) and Quirino (24.48% higher). The regional estimates show that the average premium price the consumers

were willing to pay for a kilo of organic pechay was PhP 49.92 which is 24.80% higher than the price of conventional pechay.

Determinants of consumers' WTP for organic vegetables

Table 3 presents the binary logistic regression coefficients of the factors influencing consumers' WTP for organic vegetables (OVs) while Table 4 shows the binary logistic regression odds ratio. Among the socio-demographic and economic variables, gender, educational status and monthly household income exhibited a statistically significant positive relationship with consumers' WTP for organic vegetables. Age and household size posted a statistically significant negative relationship with consumers' WTP for organic vegetables. On the other hand, marital status, the consumer's role in the household and occupation were found to be statistically non-significant. The expected odds ratio of gender is 5.04 which suggests that female consumers are 5.04 times more likely to pay higher premiums for organic vegetables than male consumers. The expected odds ratio of educational status is 2.54 which indicates that consumers with higher levels of education are 2.54 times more likely to pay higher premiums for organic vegetables than consumers who are less educated. The expected odds ratio of monthly household income is 1.18 which implies that consumers with higher monthly household income are 1.18 times more likely to pay higher premiums for organic vegetables than those with lower monthly household income. The expected odds ratio of age is 0.88 which suggests that older consumers are 0.88 times less likely to pay higher premiums for organic vegetables than younger consumers. The expected odds ratio of household size is 0.71 which suggests that consumers with larger household sizes are 0.71 times less likely to pay higher premiums for organic vegetables than consumers with smaller household sizes.

The product attribute variables visual appearance (i.e., freshness, size, color, damage-free and firmness) and tastes were found to have a statistically

significant positive relationship with consumers' WTP for organic vegetables. This suggests that consumers are more willing to pay higher premiums for organic vegetables if they are fresh, have the right size, have vibrant color, damage-free and firm. The expected odds ratio indicates that consumers are 1.94 times more likely to pay higher premiums for organic vegetables that are more visually appealing relative to those with unpleasant visual appearance. Likewise, labelling was found to have a statistically significant positive relationship with consumers' WTP for organic vegetables. The expected odds ratio for labelling indicates that consumers are 3.32 times more likely to pay higher premiums for organic vegetables with labels relative to those without labels. The price perception variable (i.e., OVs are expensive) was found to have a statistically significant negative relationship with consumers' WTP for organic vegetables. The expected odds ratio for the price perception variable suggests that consumers who perceive organic vegetables to be expensive are 0.66 less likely to pay higher premiums relative to those who perceive organic vegetables to be reasonably priced. The perception variable, OVs are readily available in the market, was found to have a statistically significant positive relationship with consumers' WTP for organic vegetables. Findings suggest that consumers who strongly perceived organic vegetables to be readily available are 4.41 times more likely to pay higher premiums for organic vegetables relative to those who think otherwise. Results further reveal that consumers' WTP for organic vegetables is not statistically related to consumers' perception of its being more environmentally safe/ecologically sound and having more nutrients.

Consumers' knowledge of organic agriculture and their awareness of the standards for organic product certification exhibited a statistically significant positive relationship with consumers' WTP for organic vegetables. Findings indicate that consumers who were extremely informed about organic agriculture are 3.31 times more likely to pay higher premiums for organic vegetables than those who were

uninformed. Additionally, consumers who were extremely aware of the standards for organic product certification are 1.05 times more likely to pay higher premiums for organic vegetables relative to those who were unaware of the standards for organic product certification.

Conclusion

Results of the binary logistic regression suggests that among the socio-demographic and economic variables, gender, educational status and monthly household income exhibited statistically significant positive relationship with consumers' WTP for organic vegetables. Age and household size posted statistically significant negative relationship with consumers' WTP. On the other hand, marital status, the consumer's role in the household and occupation were found to be statistically non-significant. The product attribute variables labelling, and visual appearance and tastes were found to have statistically significant positive relationship with consumers' WTP. The price perception variable (i.e., OV's are expensive) was found to have a statistically significant negative relationship with consumers' WTP. On the other hand, the perception variable, OV's are readily available in the market, was found to have a statistically significant positive relationship with consumers' WTP for organic vegetables. Consumers' knowledge of organic agriculture and awareness of the standards for organic product certification exhibited statistically significant positive relationship with consumers' WTP.

Consumer awareness campaigns on the benefits of organic farming can be an effective means of increasing consumers' willingness to pay for organic vegetables. Promotional campaigns which encourage consumers to know more about organic vegetable production can include activities such as: (1) the observance of an "Organic Farm Produce Month" in all municipalities of Region 02 or possibly nationwide; (2) fairs dedicated to organically grown vegetables at the municipal and provincial level (i.e., Organic Vegetable Exposition); and (3) requiring local radio stations to broadcast, half an hour per

week, promotional programs on organic agriculture (i.e., "AGRI ORGANIK TAYO"). Consumers could hardly differentiate organically grown vegetables from their conventional counterparts, hence, they give premiums for organic labels. This suggests that certification must be intensified along the supply chain of organic vegetables. To make OV's readily available to consumers, supermarkets should be encouraged to allocate a section for organically grown vegetables. Likewise, a market day for organic vegetables in every municipality could also be observed. The visual appearance of OV's are crucial to consumers' willingness to pay price premiums, therefore, wholesalers and retailers should provide the necessary care when handling them. Finally, the premium for organic vegetables should not exceed 21.15% to 22.73% for legumes; 23% to 23.34% for fruit vegetables; and 23.9% to 24.8% for leafy vegetables as consumers would not be willing to pay a premium which is higher.

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