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Urban Demand for Organic Tomatoes in the Kathmandu Valley, Nepal

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Abstract: The purpose of this study is to evaluate the preferential differences of tomatoes attributes using the conjoint approach. It also examines the factors that influence the consumer's willingness to buy organic tomatoes. The higher price of organic tomatoes and the lack of credence through certification are the key deterrents that inhibit the consumers from buy them. The family size, education and knowledge of the health risk in consuming inorganic tomatoes significantly influence the consumer's willingness to buy organic tomatoes. The most preferred combination of tomatoes attributes would be organic tomatoes with high quality and low price.

Key words: Conjoint analysis · Nepal · Organic vegetables · Part-worth · Willingness to buy

INTRODUCTION

The consumers' purchasing decisions are shaped by their subjective experiences, perception towards the food items including the organic products [1] and the internal and external characteristics of the products [2], as they evaluate the set of attributes before deciding to buy [3]. The intrinsic and extrinsic attributes of the perishable commodities, particularly vegetables, are more important in influencing consumer behavior as regards the buying of vegetables from the market. The type of the product, its quality, composition, price and physical appearance are important attributes of the vegetables that are taken into account by the consumers. In general, consumers believe that price is an indicator of quality [4] and hence it is an important factor in consumer's purchasing decision [5]. The external appearance of the food products, nutritional information, brand name and price are other factors that influence the consumer's purchasing decision [6]. Quality of the vegetable too is an important attribute that influences the purchasing decision [7] and is also a dominant factor in the new approach of demand theory [8]. In the recent years, an interest towards organic food production, marketing and consumption has increased both among the farmers, traders, consumers and academics [9] around the world.

Because of the requirements of the strict vigilance during the production and introduction of the products in the Valley market, consumers have different attitudes and preferences towards organic vegetables. The motivational factors that appeal consumers to buy organic food are that they are healthy [9-12] while other studies show that crucial motivations for buying organic products from the market are the environmental and health consciousness, safety and quality concerns [13-17].

The organic sector is taking momentum in developed countries where this venture is one of the biggest growth sectors in the food industries in recent times. Nevertheless, this sector does not remain aloof from the several problems. Higher price, lack of knowledge about the availability, lack of market information, satisfaction with current food items and the sensory defects with organic commodities are some of the deterrents of consumer's willingness to buy organic products [1]. Empirical studies done by several authors [18-22] have shown that certain market segments give higher preference for the products with differential quality parameters. Several researchers used conjoint analysis (CA) to diagnose the preferential variant of the consumers towards several attributes of the food products. CA, which has been used in research for many years [23], is based on the ground that consumer's preference for a good is a function of the specific attributes [24]. Hence, they judge the utility of a product by combining the separate utilities attached to each attribute [25]. The use of the conjoint analysis in research varies from the marketing of horticulture products [7,26-28], processed food [5,29,30], traditional food products [31], assessing agriculture sustainability [32], restaurant attributes [30], consumption of eggs [33] to resources evaluation [34,35].

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Organic production and marketing in Nepal has had a relatively recent start and the credence to organic vegetables through certification has not been initiated yet. Nevertheless, some of the super markets and grocery shops have started selling organic vegetables and many of the restaurants too are serving organic food to the consumers. Recently, there have been growing interests both from the government and non-government sectors for the promotion of organic production and marketing [36]. The farmers around hinterlands too have started producing organic vegetables [37]. The demand of organic vegetables have been increasing in the urban areas [10] due to the growing affluence and inhabitance of people with a higher level of education, increasing awareness about the health and quality of the food products and the transformation of food systems towards healthy and safe consumption [37]. Although the number of market outlets for organic product is increasing, there is still a lack of information in the urban market regarding the consumer's preference for newly introduced organic vegetables such as tomatoes. This renders making decisions a difficult task for the smallholder growers and traders, thereby affecting the effective development of the organic sector. Appropriate policies, therefore, are needed to guide this transformation by understanding the consumer's willingness and preferences towards the organic vegetables.

This study focuses the urban consumer's willingness to pay, factors influencing their willingness to buy organic tomatoes and the value they place on the set of attributes of tomatoes. Marketing studies focusing on vegetable consumers at different market segments have been spuriously available in the Nepalese context and use of the conjoint analysis in research area is probably a new endeavor, to the best of our knowledge. This study, hence, aims to contribute to market information that would help in the implementation of an efficient and effective strategic marketing plan for organic tomatoes in the urban market centre of Nepal.

METHODOLOGY

Sampling and Questionnaire Preparation: The present investigation was carried out in the organic and inorganic vegetable markets within the Kathmandu Valley, Nepal which has a particularly high population density and where there is a huge demand for vegetables. Organic vegetables in the Kathmandu valley are generally sold or offered either in the specialized markets such as supermarkets, grocery shops and restaurants or in some cases are directly home delivered. On the other hand, inorganic vegetables are sold openly in the streets and in the city markets [37]. However, there was no definite list of the consumers buying vegetables from these markets and hence problem appeared in the application of the probabilistic sampling procedure. Some of the supermarkets had an exhaustive list of the organic consumers mainly foreigners, civil servant, diplomats and other affluent people. But, still, their tendency to buy organic vegetables was unpredictable and infrequent.

Therefore, before taking sample of the organic vegetable consumers, organic vegetable traders/collectors were approached and asked where they have been supplying these vegetables. With this information, a thorough visit to the selected supermarkets was made and the availability of the organic vegetables was confirmed. After this, convenience sampling was employed. This facilitated the conducting of interviews directly at the homes and offices. Inorganic vegetable consumers were randomly intercepted at the local market and were asked for their participation in the interview. This procedure was applied due to the lack of other alternatives. However, not all of the selected consumers agreed to interviews and the replacement of previously selected consumers had to be done frequently. The non-response variables were simply ignored in the process of data analysis. With this, 100 consumer respondents were selected, 50 each from the local and the specialized market[1]. The sample size seems to be small; however, because of the relative lack in the number of people consuming organic vegetables and practical difficulty in approaching diplomats and foreigners, we decided to limit sample size to 100. It has been mentioned that the median sample size for the preference mapping ranges between 100 to 1000 [38].

The data were collected using a standard questionnaire, hammered out after the pilot study and administered through personal interviews. A pilot study was conducted by randomly intercepting two supermarkets and two inorganic markets, selecting 2 respondents from each. Finally, the questionnaire was structured into three sections viz., the first section embraced the socio-demographic attributes of the consumers, the second section covered consumer's willingness towards organic vegetables and the third section comprised of questions based on conjoint analysis. Before taking an interview, the general information about the survey and its purpose along with the meaning of the terms included in the questionnaire were explained to the respondents. Moreover, individuals with insufficient knowledge about organic tomatoes, their quality, availability and implication on the health were informed before letting them evaluate the product profiles themselves.

[1]Specialized market covers all those markets selling organic tomatoes such as supermarket, grocery shop, home delivered consumers and restaurant offering organic tomatoes and their products

Table 1: Attributes and their levels used for evaluation

Attribute	Attribute levels
Tomato type	Organic tomatoes
	Inorganic tomatoes
Quality	Good quality
	Poor quality
Price (NRs/kg)[2]	40 (low price)
	60 (medium price)
	80 (high price)

Table 2: Eight profiles selected for evaluation using orthogonal design

Profile	Tomato type	Quality	Price (NRs/kg)	Profile representation
1	Organic (O)	Good (G)	80	OG80
2	Organic (O)	Good (G)	60	OG60
3	Organic (O)	Good (G)	40	OG40
4	Organic (O)	Poor (P)	80	OP80
5	Organic (O)	Poor (P)	60	OP60
6	Inorganic (I)	Good (G)	80	IG80
7	Inorganic (I)	Good (G)	60	IG60
8	Inorganic (I)	Poor (P)	40	IP40

Willingness to Pay (WTP): The WTP for organic tomatoes, before and after labeling, were obtained by asking the respondents about how much percentage they would be willing to pay more over the inorganic counterparts. The idea was to see whether the consumers would be interested to pay more premiums towards certified and labeled organic tomatoes as compared to the current situation. In addition, respondents were asked how much willing they would be for organic tomatoes, if the prices were reduced and certification were done. Multivariate data analysis with the logistic regression was done to calculate the consumer's willingness to buy organic tomatoes. A dichotomous choice question stating whether or not they were willing to buy organic tomatoes instead of inorganic tomatoes was asked to the consumers.

Attribute Selection for the Conjoint Analysis: In conjoint analysis, the most important decision step is the design phase in which attributes and their levels are to be selected [39]. With the help of a pilot study, three attributes of the tomatoes were affixed viz., types, quality and price. All of the selected attributes and their levels and profiles are presented in Table 1. While there are many factors, conjoint technique requires having a parsimonious model [40] and consumers frequently mentioned these three attributes in the pilot study. The price and quality are the most frequently used attributes in the vegetable preference studies [7]. The tomato types include both the organically grown tomatoes and those grown using agro-chemicals. Although organic tomatoes are not certified and labeled, the consumers believed that organic tomatoes are organically grown. Quality has also two levels: good and poor quality. Attributes such as freshness, appearance, gloss, color, shape and size could be taken as the extrinsic quality parameters while chemical composition including nutritional value could be taken as the intrinsic quality aspects. This study considered only the extrinsic characteristics of the quality. Price has three levels: NRs 40, 60 and 80 per kilogram which were chosen to present realistic situations to the respondents. The price levels were determined on the basis of the price which the tomato consumers have to pay both at the local and specialized markets, at the farm gate and the average price the previous year (2008). At the time of interview, the price of inorganic tomatoes was NRs 40/kg while that of organic was NRs 60 and 80/kg at the farm gate and in the specialized market respectively. It was almost the same in the preceding year.

Given that three attributes with their respective levels were chosen, a full factorial design would include 12 hypothetical profiles (2 x 2 x 3). Therefore, in order to reduce the number of profiles to a manageable number for the respondents, an orthogonal design was generated with eight profiles using SPSS Conjoint 16.0 version. Table 2 presents the eight profiles generated by the orthogonal design.

In order to determine how much the consumer liked a particular profile, each respondent was asked a rating to it on a seven point scale in which one implied extremely not valued/preferred and seven implied extremely valued/preferred profile in the scale. The rating scale in assessing consumer's preferences through conjoint analysis is quite popular these days [41].

[2]USD ≈ 73 Nrs

Empirical Models

Binomial Logistic Regression Model: A set of factors were believed to affect the consumer's decision regarding the purchase of organic tomatoes from the market. The parameter estimates for the willingness to buy organic tomatoes were obtained by applying binomial logistic regression. Like linear regression, the logistic model relates the predictor variables to a dependent variable. This model finds the logistic coefficient which compares the probability of an event occurring with the probability of its not occurring [42]. In our study, the dependent variable is a dummy variable which represents the willingness to buy organic vegetables. This dummy variable was analyzed against other dummy and continuous variables. The relationship between the predictor variables is not a linear function in the logistic model; instead, it is the logit transformation of the θ:

$$\theta_i = \frac{e^{\alpha+\beta_1 x_1+\beta_2 x_2+\ldots\ldots+\beta_i x_i}}{1+e^{\alpha+\beta_1 x_1+\beta_2 x_2+\ldots\ldots+\beta_i x_i}} \quad (1)$$

Where α is the constant in the equation, θ_i is the probability that the response variable y = 1 and β_i is the coefficient of the predictor variable which measures the changes in the ratio of the probabilities, that is, a value close to 0 means that *y* is very unlikely to have occurred and a value close to 1 means that *y* is very likely to have occurred [43].

Following [44], the logistic regression equation (1) could be represented as:

$$Logit\,[\theta_i] = ln\left[\frac{\theta_i(\chi)}{1-\theta_i(\chi)}\right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_i X_i \quad (2)$$

Based on the Equation (2), the empirical model of the effect of a set of explanatory variables on the willingness to buy organic tomatoes from the market can be specified using following linear relationship:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon \quad (3)$$

Where:

- Y = Consumer's willingness to buy organic tomatoes from the market
- X_1 = Sex of the respondent (dummy: 1 if male, 0 otherwise)
- X_2 = Age of the respondent (year)
- X_3 = education status (dummy: 1 if more than 8th grade, 0 otherwise)
- X_4 = Personal income of the respondent (NRs/month)
- X_5 = Family size
- X_6 = Knowledge of the health risk of inorganic tomatoes consumption (dummy: 1 if yes, 0 otherwise)
- X_7 = Thinking quality while buying tomatoes from the market (dummy: 1 if yes, 0 otherwise)
- ε = Disturbance term; α is the constant and β_1, β_2..... β_7 are the coefficients of the independent variables

Logistic regression measures the model estimation fit using -2 log of the likelihood value (-2LL) in which 0 corresponds of a perfect fit [45]. Two additional descriptive measures of goodness-of-fit of the model are the Cox and Snell R^2 and Nagelkerke R^2 [43].

Conjoint Model: This study employed conjoint approach using the part-worth model which is one of the most common preference models used in the conjoint analysis [25,38,40,46]. In this model, preference for a product is formed by a linear combination of the utilities of its parts [47].

Following [26], the part-worth function representing the additive utility model can be written as:

$$Y_{it} = \beta_{i1} + \beta_{i2}\,tomatoes\,type + \beta_{i3}\,quality + \beta_{i4}\,price + \varepsilon_{it} \quad (4)$$

Where Y_{it} is the dependent variable representing i^{th} individual's preference for the t^{th} profile of tomatoes. The β_{in} are estimated coefficients for each of the specified levels of tomatoes (*1 if organic tomatoes, 0 otherwise; 1 if good quality, 0 otherwise*) which represent the utilities for the levels and ε_{it} is a random error term.

The ordinary least square (OLS) regression was used in this study to determine the part-worth utilities for different attribute levels. The part-worth utilities so obtained were used to find the importance of the product attributes. The importance of each attribute across its levels is indicated by the range of the part-worth estimates for that attribute; that is, by subtracting the minimum part-worth for the attribute from the maximum part-worth. Once the attribute importance estimate has been determined, the relative importance of each attribute can be calculated as a percentage of the total importance scores of all the attributes in the model.

For determining the degree of the fit of the model to the data, calculated part-worth for the levels within each factor can be summed to produce a predicted value for the dependent measure [48], which can then be correlated with the actual ratings on the dependent measure. Therefore, model fit was tested using the Pearson's correlation coefficient. A higher and significant value of

the Pearson's correlation coefficient signifies the fit of the model [5] which means that original and predicted preferences are on a par.

RESULTS AND DISCUSSION

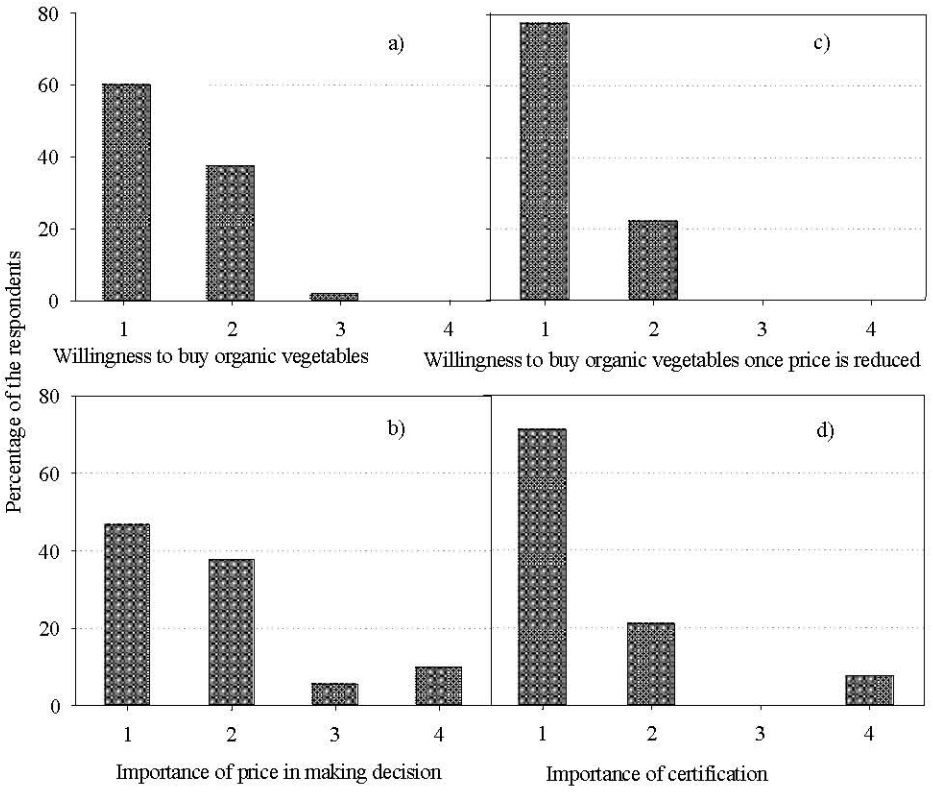
Sample Description: Table 3 presents a summary of the sample characteristics of the respondents. The analysis of the sample indicates that it was biased towards female respondents since more than twice as many female respondents as the males had been selected. This, of course, is because women are mainly responsible for buying food items consumed in the household, including vegetables. This also shows the patriarchal family structure in Nepal in which females have to perform household chores including management of the foodstuffs while male's principal task is looking after the economic affairs.

Table 3: Sample description

Socio-demographic attributes	Percentage distribution
Gender	
Male	31
Female	79
Family size	
<4	36
4-6	47
>6	17
Personal income (†NRs/month)	
<8000	43
8000-11000	18
>11000	39
Residence	
Nepali	82
Foreign[3]	18
Education	
Lower level[4]	11
School level[5]	27
University level	62
Mean age in year	41.82 (8.41)

†1 US $ ≈ 73 NRs

Value in the parenthesis indicates standard deviation



Where, 1: Extremely willing/important; 2: Somewhat willing/important; 3: Somewhat unwilling/unimportant; 4: Don't know

Fig. 1: Consumer's willingness towards organic vegetables (a): How willing are you towards organic vegetables; (b): How important is the price in buying organic vegetables; (c): How willing are you to buy organic vegetables once prices are reduced; and (d): How important is the certification in purchase decision of organic vegetables

[3] Diplomats, tourists, those working in international non-governmental organizations and others who are not Nepali citizen but were found buying vegetables from the market or home delivered

[4] This includes consumers who don't have formal education up to 8th grade of education

[5] This includes consumers with 9th to 12th grades of education

Table 4: WTP more (%) for the unlabelled and labeled organic tomatoes by the consumers (%)

WTP (%)	Unlabelled	Labeled
<20	42.2	7.8
20-40	45.6	35.6
40-60	7.8	44.4
>60	4.4	12.2
Modal value	20-40	40-60

Most of the consumers purchasing vegetables had medium family size (4-6 members) with low personal income (NRs <8000/month). Consumers with higher education tend to be overrepresented in the sample because this study was conducted in the Kathmandu Valley where a large percentage of the shopping population is made up of inhabitants with higher levels of education. Out of the interviewed respondents, 18% were foreigners.

Consumers' Willingness to Purchase Organic Tomatoes: Figure 1 depicts the consumer's willingness and importance of price and certification on making decisions in buying organic tomatoes. Almost 60% of the respondents would be extremely willing to buy if they know that organic tomatoes are good for health and are easily available (Figure 1a). However, the willingness to buy and the ability to buy have obviously different meanings. Those who have the willingness to buy and are able to afford it generally pursue the decision to buy organic tomatoes from the market whilst those who have the willingness to buy but don't have the ability to afford them generally do not opt for stuff. This has been further buttressed by the fact that almost 47% of the respondents said that price is an important element for them to consider in buying organic tomatoes (Figure 1b).

Almost 78% of the respondents would be extremely willing to buy organic vegetables (Figure 1c) if the prevailing price of the organic tomatoes were reduced by 20-30%. Currently, organic tomatoes are 50-100% more expensive than the inorganic counterparts. The high priced tomatoes sometimes are out of the affordable limit for the poorer class consumers. Interestingly, those who were somewhat unwilling to buy organic tomatoes would be willing to buy them if their price were reduced. It reveals that price is a crucial factor in making influencing decision regarding the buying of organic tomatoes. The results pinpoint the necessity of a large scale production of organic tomatoes so as to minimize the price. There is also the need to disseminate knowledge and create awareness among the consumers about organic vegetables.

As regards certification and labeling, a majority of the consumers opined that these two are essential for enlarging the organic market (Figure 1d) and drawing the appeal of the consumers. Currently, organic tomatoes which come in the markets are not certified. Therefore, the consumer's faith towards these products has been, circumspect, at best. It emphasizes the need for certification and labeling in order to convince the consumers.

Table 4 shows the consumer's willingness to pay more for the unlabelled and labeled organic tomatoes as compared to the inorganic counterparts. Most of the respondents would be willing to pay less than 20% and 20-40% more for the unlabelled[6] organic tomatoes while they would be willing to pay 40-60% more for the labeled[7] organic tomatoes. Similarly, the percentage of respondents who would be willing to pay more than 60% would increase almost three times once the organic tomatoes are labeled. By contrast, the percentage of consumers who would be willing to pay less than 20% more has declined to almost five times once tomatoes were labeled as compared to the unlabelled counterparts. This conspicuously demarcates the importance of certification and labeling. Because of the lack of certification to organic tomatoes, its market is running on the personal trust. Therefore, certification and labeling are needed for convincing the potential consumers and hence ultimately expand the organic market. However, the incremental cost due to certification has to be taken into account.

Binomial Regression Model: The hypothesis that the certain socio-economic profile of the consumer influences the extent of his/her willingness to buy organic tomatoes from the market can be accepted based on the estimated logistic regression model presented in Table 5. All variables incorporated in the model had an expected direction of relationship. Except the family size and sex, the others are positively affecting. This is in accordance with *a priory* expectation. The family size, knowledge of health risk and education of the respondents had substantial effects on the identical variable as witnessed

[6]Currently none of the organic vegetables is certified and labeled

[7]It is expected that certification process will start soon and hence it is a future scenario

Table 5: Logistic regression results of the consumers' decision on the willingness to buy organic vegetables

Variables	Coefficients	SE	p-value	dy/dx
Intercept	-0.699	3.80	0.854	
Age (year)	0.064	0.053	0.226	0.006
Personal income (NRs/month)	0.116	0.123	0.345	0.011
Family size	-0.948	0.459	0.039	-0.092
Sex	-1.82	1.61	0.258	-0.238
Knowledge of health risk	3.66	1.80	0.048	0.491
Education	3.07	1.27	0.016	0.440
Quality consideration	1.16	1.228	0.367	0.092

-2LL = 20.28, Omnibus tests of model coefficients (x^2, df, sig.)= 91.09, 7, 0.00

Cox and Snell R^2= 0.60; Negelkerke R^2= 0.84; Percentage correct = 91

Table 6: Estimated utilities of across the samples and at the market segments

		Utility		
Factors	Levels	Across the sample	Local market	Specialized market
Tomato types	Organic	0.81	-0.69	2.30
	Inorganic	0.00	0.00	0.00
		*β = 0.81**	*β = -0.69***	*β = 2.30***
Quality	Good	1.51	1.28	1.74
	Poor	0.00	0.00	0.00
		*β = 1.51***	*β = 1.28***	*β = 1.74***
Price	NRs 40	-2.00	-2.80	-1.20
	NRs 60	-3.00	-4.20	-1.80
	NRs 80	-4.00	-5.60	-2.40
		*β = -0.05***	*β = -0.07***	*β = -0.03***
Constant		*6.35***	*8.51*	*4.13*
Pearson's R	0.967**	0.986**	0.971**	

Note: **, * indicate significant at 0.01 and 0.05 levels of probability respectively,

by the significant values of their coefficients. Of the factors that significantly influenced the willingness to buy organic tomatoes from the market, consumer's knowledge of the health risk of inorganic vegetable consumption, particularly tomatoes, had the most dramatic influence on the willingness to buy organic tomatoes as reflected by its highest marginal effect and larger coefficient followed by the education level of the consumers. This implies that health awareness related to food consumption is very important in motivating the consumers to buy safe and healthy food items from the market. Similarly, education is also a very important parameter that brings this kind of awareness. A person with a higher level of education can think and judge which one is good for the health and which one not. The family size was another significant variable affecting the willingness, albeit in a negative direction, which was as per expectation. A large family size means more expenditure on food and vegetables. Therefore, a large sized family, in order to cut down the expenditure on food items, has to opt for cheaper vegetables, including tomatoes.

The model fits the data very well ($p<0.00$) as indicated by the higher value of the Omnibus test. The lower value of the log likelihood also indicates the fit of the model. The model has a high percentage of correctness (91%). The higher values of the Cox and Snell R^2 and Negelkerke R^2 also support the goodness-of-fit of the model. Therefore, the fit of the model proved that the variables tested in this study were valid to explain the extent of the willingness to buy organic tomatoes from the market.

Conjoint Analysis: Table 6 presents the average value of the part-worth utilities estimates of the Equation (3) based on the conjoint analysis across the samples. In order to further highlight the preferential differences towards several attributes of the tomatoes by the homogeneous group of consumers at different market segments, they were disaggregated to two groups: consumers generally buying tomatoes at the local market and consumers buying at the specialized market. Then, conjoint analysis was employed accordingly.

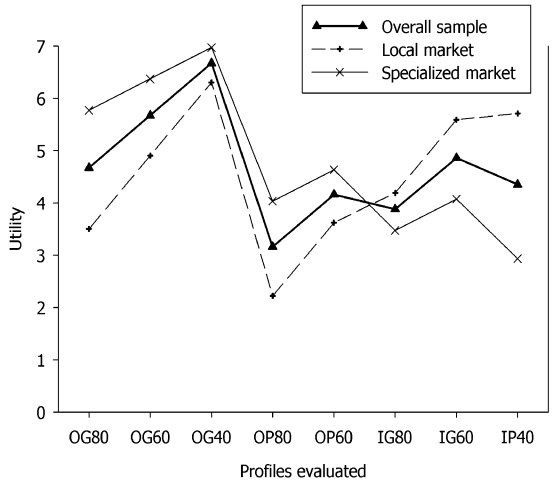


Fig. 2: Average of the estimated utility scores for the eight product profiles

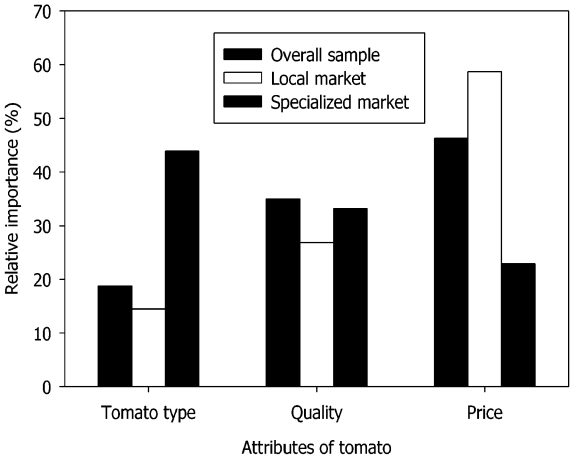


Fig. 3: Relative importance of vegetable attributes across the samples and at the two markets

The estimated coefficients in the aggregate conjoint model across the consumers are significantly different from zero. It shows that the good quality of tomatoes achieves the highest utility followed by the tomato types whilst the price has a negative utility value. The utility score to the organic tomatoes at the local market is negative and so is the price. This shows that organic tomatoes do not hold an appeal for the consumers at the local market. This would also mean that they have a lower level of awareness about the organic tomatoes, their existence and health implications. In addition, consumers at the local market are accustomed to buy inorganic tomatoes. During the data collection, it was also noticed that many of the consumers at the local market have not had heard of organic vegetables and their associated qualities.

Conversely, substantially higher utility has been given to organic tomatoes by the shoppers at the specialized market. This is because they are accustomed to buy organic vegetables and also are relatively affluent to afford to do so.

The coefficient for the price is negative in all cases and the utility associated to low priced tomatoes (NRs 40/kg) is higher which is in concordance with the economic theory [31]. Moving towards low priced tomatoes (NRs 40/kg) from high (NRs 80/kg) creates more value to the consumers across the samples than moving towards organic from inorganic tomatoes and good quality from the poor. The movement of utility at the different price levels is higher for the consumers at the local market than at the specialized market. This gives an impression that consumers at the local market are price sensitive and those at the specialized market are production sensitive. In contrast, part-worth model across the samples reveals that consumers are quality sensitive.

In order to corroborate how well the model fits the data and check the internal validity of the model, the Pearson's correlation coefficient was done. The higher and significant values obtained for this coefficient show that there is a strong correlation between the observed preference and those estimated by the conjoint models.

For illustrative purposes, Figure 3 depicts the estimated value of the utility scores for the eight product profiles under evaluation. Of all the product profiles considered, organic tomatoes with good quality and low price (OG40) has the highest utility scores across all consumers and consumers at two different market segments followed by the organic tomatoes with good quality and medium price (OG60) and the least preferred combination of attributes is the organic tomatoes with poor quality and high price (OP80) for all consumers and consumers at the local market. At the specialized market, the least preferred product profile is the inorganic tomatoes with poor quality and low price (IP40). The conjoint models at the two market segments and across all consumers infer that consumers would prefer good quality tomatoes which are organically produced and have a relatively lower price.

The relative importance of the vegetable attributes across all samples and at both the market segments have been depicted in Figure 4. The highest importance has been attached to the price followed by quality across all consumers and by the consumers at the local market whilst for those at the specialized market, it is the tomatoes type followed by the quality. This discerns that price still is a dominant factor for consumers, in general,

while for the specific group of consumers who are used to the consumption organic tomatoes; it occupies the least of priorities. Moreover, because of the narrow difference between the relative importance attached to the price and quality across all consumers, it can also be said that the effect price captures could be decreased by imparting better quality on the products. In other words, tomato producers could tap a higher price by imparting better quality without the fear of losing the market share as a result of price increase. The assurance of better quality parameters such as grading, sorting, certification and labeling, can bring a competitive advantage which could be considered as a good marketing strategy [14].

To put in a nutshell, consumers are willing to buy organic tomatoes. However, the concern towards higher price and the provision of certification should be reckoned. Because of the lack of assured market for organic tomatoes and also the relatively scattered consumers, most of the producers have to take a risk and as a result they are not motivated enough to produce more. Also, certification adds another cost component. The cost of production in the present context, plus the cost a farmer has to incur for certification, will eventually skyrocket the price of the organic commodities which might deter the consumers further from buying them. Therefore, an attempt should be paid towards the consolidation of the smallholder organic farm and initiation of the cooperative certification through the maintenance of internal quality control system. This will, to some extent, reduce the cost that would otherwise incur for the certification of individual farms.

CONCLUSION

The results of this study give some insights regarding the urban consumer's preference for organic tomatoes. Most of the consumers are now showing a positive inclination towards organic tomatoes and would be willing to buy them, provided they are cheaper and certified. The most important factors which turn the urban consumers away from organic tomatoes are their relatively high price and the lack of credence associated with the produce. Consumers would be willing to pay a higher premium, provided the tomatoes are certified. Of course, at the present moment too, most of the consumers are paying relatively high for organic tomatoes. However, the number of organic consumers is limited, at best. The results also show that most of the consumers at the local market would also be willing to buy organic tomatoes, provided they know the benefits of organic consumption.

A wide range of socio-economic variables were affecting the consumers' willingness to buy organic tomatoes from the market. The results of logit analysis has shown that the knowledge regarding the health risk of inorganic tomato consumption, education and family size are the main factors that influence a consumer's decision to buy organic tomatoes. The conjoint model across the consumers shows a higher preferential value of the organic tomatoes as compared to the inorganic tomatoes. Similarly, the value given to organic tomatoes by the consumers at the specialized market is substantially higher than that given at the local market. The most preferred combination of tomatoes, irrespective of the market segments, would be the organic with both a good quality and a low price.

The estimation of the relative importance of the factors suggests that consumer purchase decision for tomatoes is basically governed by the attribute price, with discernible differences at the different market segments. This reveals that preferences of the consumers differ according to the market segment. This reveals the necessity that the production and marketing of the agricultural produce should address this preferential difference. The findings also support the potential of organic tomatoes in the urban Nepali markets, which is indicated by the higher willingness to pay and the preference towards organic tomatoes. This study is the first attempt to penetrate the Nepali organic vegetable markets, taking tomatoes as a case example. It has opened avenues for further research with a bigger sample size and market segmentation based on the socio-demographic variables of the consumers.

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