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Consumers' willingness and preference towards organic vegetables: A conjoint approach¹

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Introduction

Consumers differ in terms of their purchase behavior and consumption pattern owing to differential socio-demographic alienation, cultural and psychological attributes. At the same time umbrella of attributes of the products also affect consumer's decision. Consumers subconsciously evaluate a complex set of attributes before making their buying decision (Koo *et al.*, 1999). Type of the product, its quality, composition, price and physical appearance among others are important attributes of the vegetables. Now along with the price, quality has become a key concept in the new approach of the demand theory (Lancaster, 1966) and food quality information has turned into a crucial factor when explaining the existing differences between demand profiles (Rodríguez *et al.*, 2007).

In pursuit of comprehensively tapping the attitudes of the vegetable consumers and continuously offering appealing products vis-à-vis making profit, farmers and marketers have to implement well suit strategies. This study's purpose is to evaluate the consumers' attitude and preferences towards organic vegetables using conjoint analysis (CA). CA has been used in research for many years (Green and Srinivasan 1978a). Past research mostly used survey methods that directly measure consumers' attitudes towards products and their attributes. However, they are not complete in gauging interaction as preference of the consumers may depend on the joint influence of product attributes. It is therefore necessary that the joint effect of several product attributes on the final decision to purchase a specific item should be taken into consideration when researching consumer purchase behavior. CA is based on the premise that subjects evaluate the value or utility of a product (real or hypothetical) by combining the separate utilities provided by each attribute (Green and Srinivasan 1978b). It is a decompositional technique, because a subject's overall evaluation is decomposed to give utilities for each predictor variable, and indeed for each level of a predictor variable where the predictor variables are often called attributes, and the dependent variable is often an overall evaluation of a product. Recently, many researchers have adopted conjoint measurement to analyze multiattribute choice in an agricultural context (Bhatta *et al.*, 2009a,b; Gineo, 1990; Padilla *et al.*, 2007).

Research questions

Niche organic markets are gradually developing in Nepal and farmers around the urban and peri-urban continuum have been producing organic vegetables to fulfill the market demand. However, neither market potentiality nor consumers attitude towards organic vegetables has been studied. If the market is to grow rapidly, there needs to be a better understanding of the consumer decision- making processes involved in the choice between organic and inorganic foods along with several other attributes. Following research questions are to be investigated.

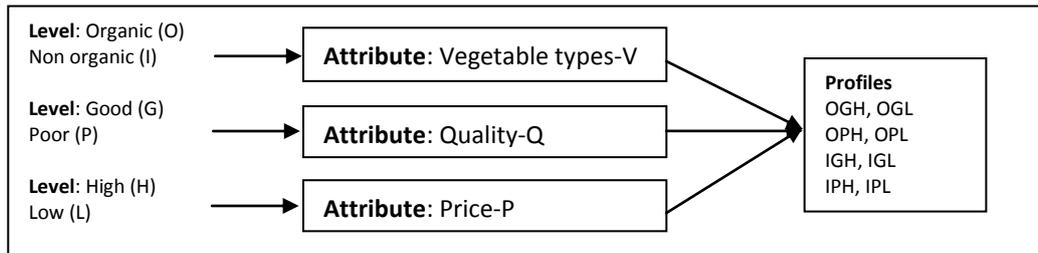
- What factors make consumption appealing to consumers?
- What is the extent of value of such priority in reference to other? And what is the preferential differentiation with respect to socio-demographic profile of the consumers?

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Research methodology

This study has been conducted in some of the organic and inorganic vegetable markets within the Kathmandu Valley, Nepal. Inorganic vegetables are sold elsewhere in the valley while organic vegetables are generally sold either in the specialized markets or are home delivered. Therefore, consumers at such specialized markets and at home were interviewed. A list of frequent organic vegetable consumers was made and purposive selection of organic consumers was attempted as much as possible. Inorganic vegetable consumers were intercepted at the local market and asked for their participation in an interview. The questionnaire design was based on conjoint analysis technique which requires hierarchical steps in designing the questionnaire. The first step is to define all factors affecting consumers' preferences and levels of each factor. Because of the relatively small number of factors and levels, the full profile approach was applied to obtain 8 stimuli describing all possible combination of levels. According to the full profile approach, 8 stimuli (profile) can be derived.



The most common preference model used in CA is the part-worth model (Wittink and Cattin, 1989). In this type of model, preference for a product is assumed to be an additive function of the part-worth of its levels. The importance of each attribute across its different 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.

Relative importance (R_i) could be calculated as:

$$R_i = \{\text{Max}(\alpha_{ij}) - \text{Min}(\alpha_{ij})\} / \sum A_i \text{ for each attribute } i \text{ and attribute importance } A_i$$

As consumers' preferences vary substantially, the CA is applied on an individual level in which every consumer's preferences are modeled by an individual utility function. Therefore, the results were aggregated in for all respondents in the beginning and later they were classified into different homogeneous groups on the basis of certain socio-demographic characteristics of the respondents such as market types and personal and family incomes. In this case, the interest was to see how consumers with these socio-economic characters react to the different vegetables available in the market with their particular attributes and levels.

Table 1: Steps of conjoint analysis

| Step | Technique |
|---------------------------------|---|
| 1. Data collection method | Full profile method |
| 2. Data collection procedure | Person to person interview |
| 3. Preference evaluation method | Metric scale (Rating) |
| 4. Stimulus presentation | Written form |
| 5. Selecting preference model | Part-worth model |
| 6. Estimation method | Ordinary Least Square (OLS) |
| 7. Model fit | Kendall's tau-b and Pearson's correlation |

Source: Modified from Wittink and Cattin (1989), Green and Srinivasan (1978a,b)

Results and discussion

Awareness about organic products

A majority of the consumers (92%) expressed that they had heard of organic vegetables (Figure 1). This highlights that majority of urban consumers have knowledge on organic products. Most of the respondents who are aware of organic products are having higher level of education and economically better off. In contrary those who are unaware about such products are mostly housewives with no formal education and lack personal income.

A total of 68% of the consumers always think quality while buying vegetables from the market. Similarly 45% always give preference in buying organic vegetables (Figure 2). Periodicity of consumers who sometimes think quality of vegetables and give preference to organic vegetables is lower than former group. Thus results show that most of the consumers are more or less conscious on quality of the food products, however, buying of organic vegetables from the market is not satisfactory.



Figure 2. Consumers' thinking quality and giving preference towards organic vegetables from the market

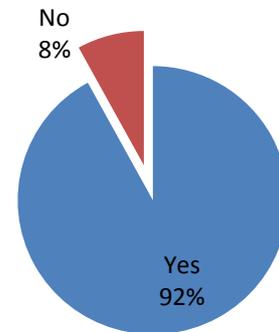
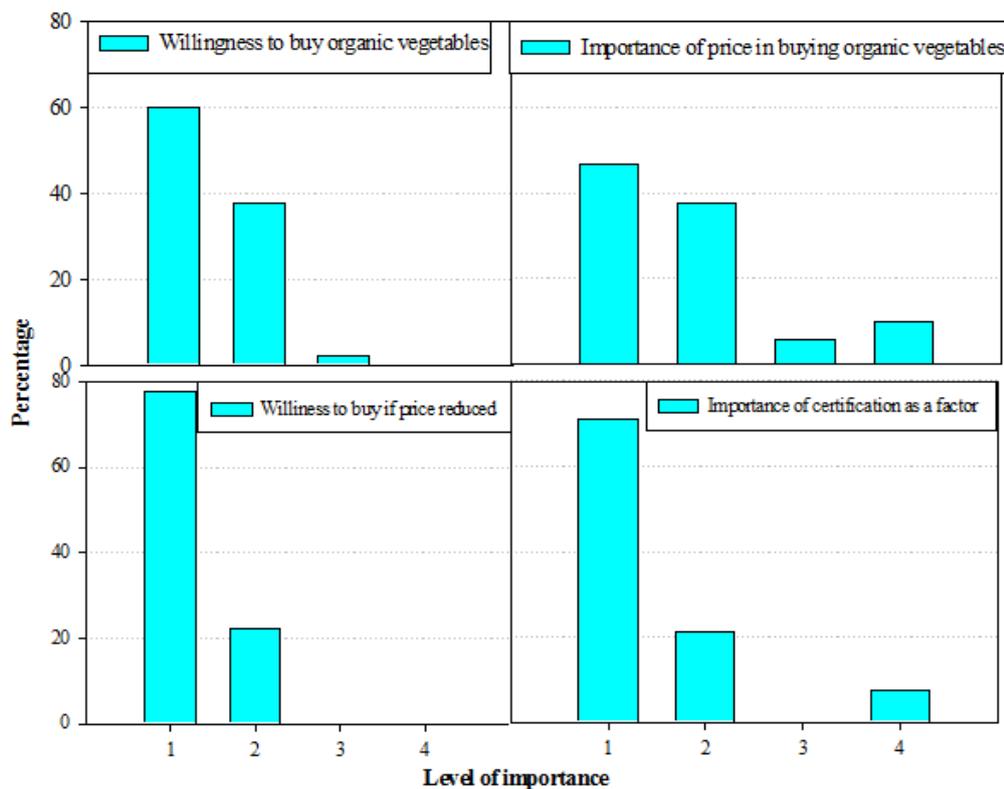


Figure 1. Consumers awareness about organic products in the market

Regarding the willingness to buy organic vegetables from the market, 60% of the respondents are extremely willing to buy followed by 37.8% who are somewhat willing (Figure 3). Almost 78% of the respondents are extremely willing to buy organic vegetables followed by 22.2% who are somewhat willing to buy them if prevailing price of the organic vegetables were reduced somewhat. Majority of the consumers (46.7%) expressed that price is extremely important to make decision whether to buy organic followed by 37.8% of the consumers who think price is somewhat important determinant of purchase decision. Regarding certification and labeling, most of the consumers viewed that this is an essential activity for up scaling organic market and convincing the consumers.



1: Extremely important, 2: Somewhat important, 3: Somewhat unimportant, 4: Don't know

Figure 3: Consumers' willingness to buy organic vegetable

Aggregate conjoint results

All of the estimated coefficients except for that of vegetable types are significantly different from zero at 0.01 level of probability. Higher part worth is given to low price as compared to others. The most preferred profile of attributes is found to be organic vegetables with high quality and low price and the least preferred combination of attributes is non organic vegetables with poor quality and high price which is exactly similar to the result of raw eaten vegetables. This clarifies that mostly consumers are interested to consume organic vegetables provided their prices are reduced to some extent. Moving down to low price from high creates more value to a consumer than increasing quality of vegetables from poor to good.

The estimated part worth model is:

$$Y_i = 4.10 + 0.34Z_{11} + 0.84Z_{21} + 0.99Z_{31}$$

(28.18**) (2.31^{ns}) (5.75**) (6.72**)

$N = 90, R^2 = 0.954, \text{Pearson's } r = 0.977**, \text{Kendall's Tau-b} = 0.992**$

Where, Z_{11}, Z_{21}, Z_{31} are the levels of vegetables, quality and price respectively, values in the parentheses indicate t statistic and ** indicate significant at 0.01 level of probability, ns means statistically non-significant

Preference ratings and predicted rating preferences are on a par. Kendall's tau-b shows a strong correlation (0.992) ($P < 0.001$). This reveals that there is a significant correlation between the observed and estimated preferences scores. The Pearson's correlation coefficient shows significantly strong relation between original rating and predicted preference ratings.

Price comes first with a relative importance of 45.42% followed by quality (37.71%) and vegetable types (15.77%). Average citizen in developing country is price motivated because of low purchasing power and less awareness about health and environment. Equally important is the lack of knowledge about the existence of better quality and organic vegetables in the market.

Conjoint models as per market types

Higher utility is associated with the lower price (1.14) followed by high quality (0.65) for the consumers of local market whilst higher utility is associated with the organic vegetables (1.13) followed by quality (1.01) for the consumers of specialized market (Figure 4). At the local market, utilities for organic vegetable are negative while it is appreciably higher and positive in the specialized market. All the part-worth utilities are highly significant. High value of multiple R show that additivity of the model has met while both coefficients of correlations are found highly significant in both markets envisaging better fit of the model.

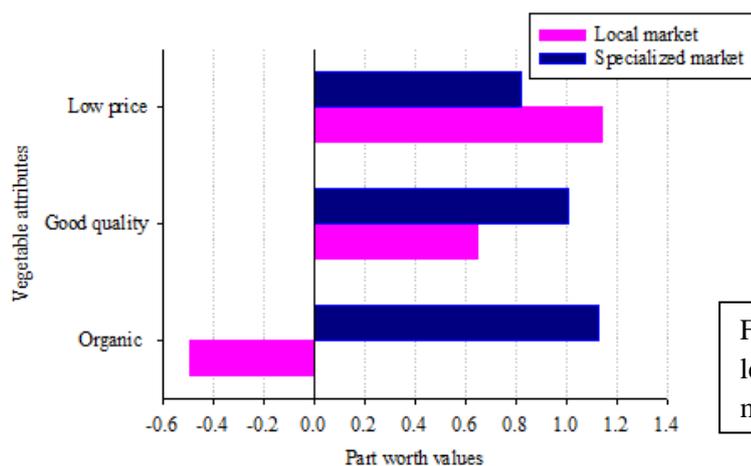


Figure 4. Part worth utilities of the selected levels of vegetable attributes according to market types

Conjoint models as per personal income

Consumers were grouped into three homogenous groups on the basis of personal income viz., with <8000, 8000-11000 and >11000 NRs/month personal income. Personal income goes on increasing utility value placed in organic vegetables is increasing with increasing personal income. With lower income group, highest utility is given to price (1.08) as compared to quality (0.85) and organic vegetables (0.16). With increasing personal income, utility

associated to quality is more or less similar whilst that of price becomes different. All the utility values related to levels of attributes of different groups are significantly different except that of vegetable types for low and medium income groups (Figure 5). The degree with which utility placed to organic vegetable increases is substantially higher with increasing income of the consumers and it is being significant at high income group. Very negligible importance is given to vegetable types by the lowest income group. This is obvious because of low purchasing power of this group of the consumers. As the personal income increases, the importance attached to price in each group starts declining, nevertheless this is the dominant attribute (Figure 5).

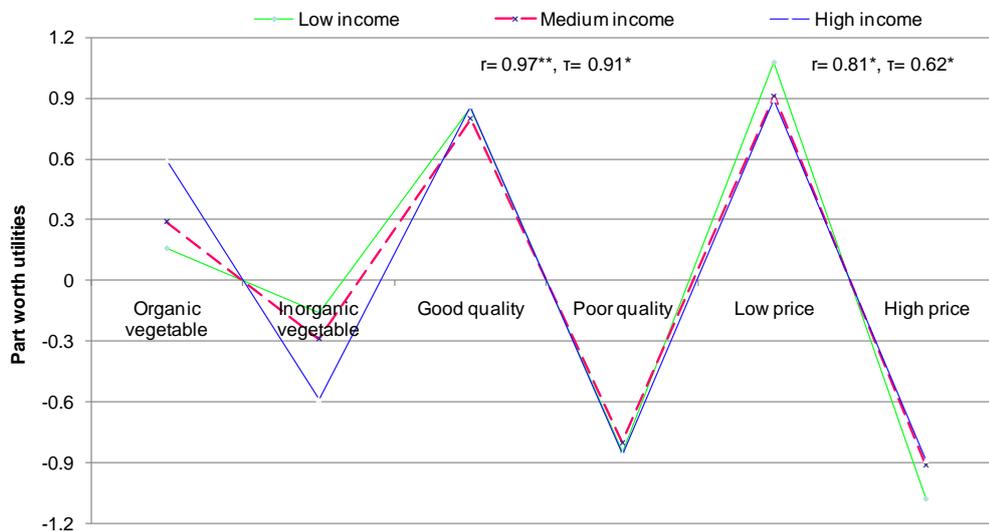


Figure 5. Part worth utilities of different factor levels according to personal income groups

Conclusion

- Most of the consumers with better income, higher education and small family size are willing to pay more for organic vegetables, however, there is the need for certification and labeling to give credence to the organic products.
- Grouping of consumers into homogeneous groups show that there is the need for development of niche organic market focusing particular segment of the consumers in the market.
- This is the first attempt in market penetration using CA. Further studies are needed with more sample size and some quantitative price information focusing different products.

References

- Bhatta G D and Doppler W. 2009. Consumer willingness to pay and preference towards vegetable attributes at Kathmandu Valley: A conjoint approach. Paper presented at 2nd Ph D conference, Athens University, Athens, Greece, 13-16 April 2009.
- Bhatta G D; Doppler W; KC K and Shrestha G. 2009. Changing agriculture land use practice towards organics in peri-urban areas of Nepal: Through producers and consumers perspective. Paper presented at International Symposium on Environment, Energy and Water in Nepal: Recent Researches and Direction for Future' organized jointly by University of Yamanashi and Institute for Global Environment Strategies, Japan on 31 March - 2 April, Kathmandu, Nepal.
- Gineo W M. 1990. A Conjoint/Logit Analysis of Nursery Stock Purchases. *Northeastern Journal of Agricultural and Resource Economics*. 19:49-58.
- Green P E and Srinivasan V. 1978a. A general approach to product design optimization via conjoint analysis. *Journal of Marketing*. 45:17-37.
- Green P E and Srinivasan V. 1978b. Conjoint analysis in consumer research: Issues and outlook. *Journal of Consumer Research*. 5(9), 103.
- Koo L C; Tao F K C and Yeung J HC. 1999. Preferential segmentation of restaurant attributes through conjoining analysis. *International Journal of Contemporary Hospitality Management*. 11(5):242-250.
- Lancaster K. 1966. A new approach to consumer theory. *Journal of Political Economy*. LXXIV (2):132-157.
- Rodriguez E; Lacaze V and Lupin B. 2007. Willingness to pay for organic good in Argentina: Evidence from a consumer survey. International conference on organic agriculture and food security, 3-5 May 2007, FAO, Italy.
- Padilla C; Spiller P V A and Henry G. 2007. Consumer preference and willingness to pay for an officially certified quality label: Implications for traditional food producers. *Agricultura Technica*. 67(3):300-308.
- Wittink D and Cattin P. 1989. Commercial use of conjoint analysis: an update. *Journal of Marketing*. 53:91-96.