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Factors affecting organic productions and its consumption approaches towards consumers: A case study of Punjab province

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Abstract

The growth of the organic market as a food trend has been the most debated issue, especially about concern for health and preservation of the environment. The evolution of this market has forced producers and companies to seek, through studies and surveys with the population, knowledge of the characteristics of consumers and the motivations that lead them to choose this segment. The attributes classified as intrinsic and extrinsic to the product are comprehensive and diverse, which greatly reinforce the purchase decision. However, the buyer's desire is strongly linked to economic factors since these products are more expensive than conventional ones. This study aimed to detect influencing factors of organic production and its consumption. A direct and structured descriptive research (survey) was carried out with 230 organic food consumers in Punjab, through the application of semi-structured questionnaires by applying Ordered Probit Model. This study results revealed that the consumption level of organic product depends on working status, consumer's income, family size, health conscious regarding its nutritional worth as a cognizant customer.

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Introduction

With intelligent and automatic technology, food production has started to change, and production has been increased due to diversity, cost advantages and mass production. Consumer habits have also been changed due to the increase and diversification of foodstuffs that people need. These foods commonly cause rapid consumption of people to consume many diseases, especially cancer and obesity (Mie et al.,

2017) Organic farming is a form of production in which no chemical, pesticide, fertilizer and plant regulators are applied during sowing, harvested, transported and stored, even reaches the consumers access (Hong, 2018). The main purpose of this form of agriculture is to produce all kinds of food and nutrients offered to the consumption of people, as well as production that does not harm human and nature in the production (Noor et al., 2019b).
The items that draw attention in the definition of the organic agriculture can be summarized; the use of

chemical drugs, fertilizers and hormones is strictly prohibited. For plant nutrients, plant residues, animal fertilizers are used, plant alternation is carried out to protect nature and the environment and increase production and biological control is applied in pest and weed control (Noor et al., 2019a). Taking into consideration the eco system, it aims to direct consumer preferences with a production style that cares about plant, soil, animal and human health. Each stage of this form of agriculture is carried out based on the control of the certification bodies, and the products that produce successful production receive certification (Lernoud and Willer, 2019).

The organic agriculture is increasing and accepted in the world (Pacifico and Paris, 2016) in remote markets with the adoption of consumers who were consumed by themselves, individuals sold in nearby markets for the first time. Recently, changes in foodstuffs and its hazardous effects on health and environment provoked the consumers towards to Organic products (Hong, 2018). In addition, the concepts of healthy and balanced nutrition have become increasingly important due to the studies on the awareness of consumers. In this context, the issue of organic food consumption has gained an important place as a new quality center (Vittersø and Tangeland, 2015).

An organic market segment has emerged that will enable people to access healthy and quality foods (Khan, 2016). In general, it is observed that the market for organic foods is expanding (Qasim et al., 2019). On the other hand, the proportion of consumers who regularly buy Organic products remains low (Stanton and Cook, 2019).

The purpose of this research was to determine the factors affecting the Organic product consumption. Thus, it is thought that Organic products will be important in terms of forming marketing strategies and examining the size of the consumer.

Material and Methods

A survey was conducted at Rawalpindi division, Punjab province with the representative of organic farming (Farmers) to determine the factors affecting the organic agriculture production and recent trends in consumer behavior towards consumption of organic products. The number of questionnaires to be conducted using the proportional sampling method has been determined. In this method, the sample size was determined by using 95% confidence interval and 5% margin of error. The equation used in determining the number of surveys is shown (Taherdoost, 2017).

$$n = \frac{N * P * (1-p)}{(N-1) * \sigma_P^2 + P * (1-P)} \quad \text{.......................................} (1)$$

Where;
n: Sample size,
N: Number of consumers (households),
σ_p^2: Variance,
r: Deviation from the mean (5%),
$Z_{\alpha/2}$: scale value (1.96),
p: Share of households consuming organic products in total (82%). In the study, p and q values were determined with 100 preliminary surveys.

$$Q_p^2 = \left(\frac{r}{Z_{\alpha/2}}\right)^2 \quad \text{...} (2)$$

$$Q_p^2 = \left(\frac{0.05}{1.96}\right)^2 = (0.0255)^2 = 0.000651$$

$$= \frac{394684 * 0.82 * 0.18}{(394683 * 0.000651) + (0.82 * 0.18)} \cong 227$$

Considering that there may be deficiencies or mistakes in the surveys to be carried out, it was found appropriate to carry out additional surveys up to 1% of the sample size. In this context, a survey was conducted with 227+ (227x0.01) = 230 households.

The organic product Consumption levels were acquired to determine the factors affecting the Organic product and Consumption status of the consumers in Punjab. The Organic product Consumption status of each consumer is classified as low, medium and high. Those who consume little or not at all (low) are coded into 0, sometimes those who consume (medium) 1 and 2 for those who consume continuously (high) are divided into three categories. Thus, Ordered Probit Model was used in order to determine the factors affecting the Organic product Consumption level of the consumers.

Ordered Probit Model (Güney and Giraldo, 2019, Arumugam, 2017) is the most suitable model for the data set in which the dependent variable receives sequential natural number values.

Ordered Model where the dependent variable is encoded as 0 low, 1 medium and 2 high for each awareness, attitude and behavior is expressed as follows.

$$y_i^* = \beta' X_i + \varepsilon_i \,, \varepsilon_i \colon F(\varepsilon_i\, i\, |\theta\,),$$
$$E(\varepsilon_i\, |X_i) = 0\,, and\, Var(\varepsilon_i\, |X_i) = 1 \ldots (3)$$

y^* when dependent variable cannot be observed, β vector of estimated coefficients, x is a vector of the explanatory variables, vector of error terms (considered to be normally distributed as $\varepsilon \sim N[0,1]$), and F means any distribution that can be considered in the research.

$$y_i = 0 \quad if\, y_i \leq \mu_0\,,$$

$$y_i = 1 \quad if\, \mu_0 < y_i \leq \mu_1\,,$$

$$y_i = 1 \quad if\, \mu_1 < y_i \leq \mu_2\,, \quad \ldots\ldots\ldots\ldots (4)$$

While μ_j, represents breakpoints or threshold values, y is the value observed for y^* breakpoints vary according to the individual characteristics of the participants.

The above observation mechanism was the result of the hidden bounded dependent variable shown below. Since consumers with similar socio-economic characteristics and environmental awareness, attitudes or behaviors will have similar breakpoints, breakpoints are expected to show normal distribution (Irandoust, 2016, Rezai et al., 2015).

If ε is assumed to be normally distributed for observations, the possibility of choosing a specific order by a participant can be expressed as follows (McFadden and Huffman, 2017).

$$rob[y_i = j] = Prob[y_i^*\, is\, in\, the\, jth\, range\,] =$$
$$\Phi(\mu_j - \beta' X_i) - \Phi(\mu_{j-1} - \beta' X_i). (5)$$
$$j = 0,1,2.$$

Φ When it is the normal cumulative density function (cdf), μj and μj + 1 represent upper and lower threshold values for category j, respectively. Considering that μ-1 = -∞ and μ0 = 0, this probability is specifically as follows.

$$Prob[y_i = 0] = \Phi(\mu_j - \beta' X_i)$$
$$Prob[y_i = 1] = \Phi(\mu_1 - \beta' X_i) - \Phi(-\beta' X_i)$$
$$Prob[y_i = 2] = \Phi(\mu_2 - \beta' X_i) - \Phi(\mu_1 - \beta' X_i) \text{---- (6)}$$

$$\log L = \sum_{i=1}^{N}\sum_{j=0}^{2} y_{ij} \log\left(\Phi(\mu_j - \beta' X_i) - \Phi(\mu_{j-1} - \beta' X_i)\right)$$

$$= \sum^{N}{}_{y_{i=0}} \log(\Phi(-\beta' X_i)) +$$
$$\sum^{N}{}_{y_{i=1}} \log(\Phi(\mu_1 - \beta' X_i) -$$
$$\Phi(-\beta' X_i)) + \sum^{N}{}_{y_{i=1}} \log(\Phi(\mu_1 - \beta' X_i) -$$
$$\Phi(-\beta' X_i)) + \sum^{N}{}_{y_{i=2}} \log(\Phi(\mu_2 - \beta' X_i) -$$
$$\Phi(-\beta' X_i)) \text{ .... (7)}$$

Results and Discussion

In the research, interviews were made with 230 consumers in Punjab province and the statistical summary and explanations of the variables examined are given in Table 1.

The average age of consumers participating in the study was determined to be 38. 66% married and 65% male. (Zeeshan et al., 2017) stated that the average age of 272 individuals interviewed in Punjab for 2017 was 35.04 years, 76% of them were married and 54% of them were male, as a marital status. According to (Khan et al., 2019), they found that the average age of 600 people in the same region is 42.01 years, 53% in terms of marital status are married and 50% are male in terms of gender. It was determined that the education levels of the participants were generally secondary.

(Khan and Jan, 2018) determined that the number of individuals living in the households is 3.25 while 23.4% attended higher secondary school and 42% of the surveyed individuals have a business profession, 30% are students, 8% are unemployed and 20% are housewives. It was determined that the households have an average monthly income of 291 $ and sometimes pay attention to a balanced and healthy diet. In addition, whether the consumers participating in the study are conscious consumers were examined in 4 categories according to the 5-point Likert scale (none: 1, sometimes: 2, half: 3, generally: 4 and always: 5).

The degree of sensitivity of the consumer to items such as making a list before shopping, looking at the label while shopping, examining the use of environmentally friendly products or packaging, paying attention to the expiration date and purchasing receipts after shopping. 2. To what extent the consumers pay attention to the warranty or the brand. 3. The questions about the importance of the consumer when purchasing the product, 4.

Table-1. Statistical summary and explanation of variable.

Variables	Descriptions	Average	Sd. Error
Age	Age of the surveyed individual	38.008	12.730
Gender	Male: 1, Female: 0	0.652	0.031
marital status	Married: 1, Single: 0	0.660	0.031
Education status	Literate: 1, Primary: 2, Secondary: 3, University: 4, Graduate: 5	3.304	0.931
Working status	Yes: 1, No: 0	0.613	0.488
Family size	The number of individuals in the family	4.257	1.845
Revenue	Household income (Months / $)	3309.348	1927.442
Balanced and healthy nutritional status	No: 0, Sometimes: 1, Yes: 2,	1.074	0.787
Conscious consumer status	No: 0, Sometimes: 1, Yes: 2,	1.465	0.658
Price research status	Yes: 1, No: 0	0.778	0.416
Quality research status	Yes: 1, No: 0	0.857	0.351
Being knowledgeable about organic product	No: 0, Sometimes: 1, Yes: 2,	1.352	0.713
Checking the organic certificate of the product	No: 0, Sometimes: 1, Yes: 2,	0.935	0.825

The extent to which they know the consumer rights as a consumer were asked. Here, 1 and 2 answers are analyzed considering zero, 3 answers as one and 4 and 5 answers as two coefficients. As a result, it was determined that consumers generally have shopping consciousness. 77.8% of consumers do price research and 85.7% do quality research. In order to determine the level of knowledge of consumers about the product, 4 questions were asked on the 5-point Likert scale (none: 1, sometimes: 2, half: 3, generally: 4 and always: 5).

1. At what stage organic products should not be used from production to consumption, chemical substance and pesticide hormone should not be used,
2. At which stage of organic production, certification process,
3. Level of knowledge about organic product label in organic products and
4. To what extent traditional or village type products it is organic. (None: 5 and always: 1) These four questions were analyzed by evaluating them as 1,2,3 (0), 4 (1) and 5 (2). In addition, while it is seen that the consumers are partially informed about the organic product, the rate of checking the organic certificate of the product is low. (Bhatti, 2018) list the sources of information consumers use about organic products as internet, television, magazine-newspaper and salespeople. Results In the study by using Ordered Probit Analysis, the organic product consumption status of consumers in Punjab was divided into three categories according to low, medium and high rank, and they were analyzed in the Ordered Probit Model and the results are given in Table 2.

Looking at the results of the analysis, it is seen that the signs of the parameters are generally in the expected direction. Considering the variables that are statistically significant, the fact that consumers are willing to increases the consumption of organic products and this variable is shown at 1% significance level. Working status decreases the low organic product consumption rate by about 20% and the moderate consumption rate by about 11% while increasing the high level of consumption by about 31%. It can be stated that the fact that people take part in the work life has led to the emergence of such a result, as it enables them to be conscious and knowledgeable about related problems. It has been determined that the increase in the number of individuals in households increases the level of organic product consumption and this variable is statistically significant (5%). It has been determined that those who consume low and medium level organic products reduce their households by about 2% and increase the rate of those who consume high levels by about 4%.

In this case, the increase in the number of individuals in the household have more earning capacity and they can afford organic product willing to pay more for healthier foods.

Table-2. Results of ordered probit analysis by organic product consumption status

Ordered probability model parameters			Marginal Effect		
			Y=0	Y=1	Y=2
Variables	Coefficient	SE	Coefficient	Coefficient	Coefficient
Age	-0.0017	0.007	0.0004	0.0003	-0.0007
Gender	0.0533	0.299	-0.0124	-0.0088	0.0212
marital status	-0.1424	0.196	0.0321	0.0246	-0.0567
Working status	0.8085***	0.182	-0.2039***	-0.1057***	0.3097***
Household size	0.1005**	0.046	-0.0232**	-0.0168**	0.0399**
Revenue	0.0001*	1E-04	-0.0001*	0.0001*	0.0001*
Consideration to a balanced and healthy diet	0.2824***	0.106	-0.0652***	-0.0471**	0.1123***
Conscious consumer status	0.3944***	0.135	-0.0911***	-0.0658**	0.1569***
PRICE research status	-0.1082	0.29	0.0242	0.0189	-0.0431
Quality research	0.1975	0.288	-0.0489	-0.0288	0.0778
Having knowledge about organic product	-0.1266	0.114	0.0292	0.0211	-0.0504
The status of checking the certificate of the organic product	0.0487	0.101	-0.0113	-0.0081	0.0194
Threshold Value (μ_1)	-0.7384	0.63			
Threshold Value (μ_2)	1.1242***	0.108			

* 10% significance level, ** 5% significance level, *** 1% significance level

Monthly income is highly and positively significant for consumption of organic product which is shown 10%. Looking at the marginal effects for income, it is seen that the impact rate is quite low. It is an expected result that income will positively affect consumption and be an increasing factor especially for organic product consumption. In the case of low income, the organic product consumption rate decreased by 0.01% in the group consuming low organic products, while it increased by 0.01% in the groups consuming medium and high organic products. (Hong, 2018) stated that the increase in the income and education level of the household head has a positive effect on organic vegetable consumption (Moser, 2016) the prices of organic products are 3-5 times higher than that of conventional products, causing higher demand for organic products for families with high income. In addition (Omar et al., 2017) found that an increase in the income of the family in the household by one unit increased the amount of organic product consumption of the household 1.2 times. (Jouzi et al., 2017) have determined that the rate of those who think that organic production should increase in shape of price premium of organic products is 40%, the reduction in cost rate as 10%. The issue of the negative effects of non-organic products on health is an issue raised in many platforms and created awareness in the society. It is expected that the importance of organic product consumption is clearly seen in a balanced and healthy diet, (de-Magistris and Gracia, 2016) who carried out a study that supports this result, found that consumers, who desire a protective, healthy and balanced diet, turn to organic products by paying more prices when the consumers' payment demands are taken into consideration. Despite the increase in organic foods in markets in recent years, consumers' perceptions of trust have become more skeptical for the labeling system and similar factors such as the quality of organic foods. It was determined that individuals expressing that they are a conscious consumers increased their level of organic product consumption positively and statistically significance at a level of 1%. It has been found that while the rate of those who consume low organic products by 9% and those who consume medium level organic products by 7%, they increase the rate of those who consume high level organic products by about 16%. (Yin et al., 2016) evaluated consumer information and food labeling schemes have an important role in increasing organic food consumption. (Asif et al., 2018) stated that the increase in the objective and subjective knowledge levels of consumers regarding organic food and more experience and awareness, reflects a more positive attitude towards organic foods. (Rahman and Noor, 2016) explored ways to promote organic production to the producer, which has difficulty in keeping up with

growing consumer demand in Bangladesh. (Aschemann-Witzel and Zielke, 2017) showed that advertisements aimed at highlighting the environmental awareness of a product within the scope of promotion activities did not affect the conscious consumers, but more to the consumers who did not know about it.

Conclusion

In the study, ordered Probit model was applied to determine the factors affecting organic product consumption according to consumer. The results of the study showed that, 5 of the 13 factors were statistically significant and these factors were the household head, household size, household income, awareness to nutritional health and consumer vision. The studied model analyzed that as the income in the households increase, the organic product consumption amount of the group consuming low organic products decreases, and the organic product consumption amount of the households consuming medium and high-level organic products increases. As a result, factors such as household income and the number of households that are indirectly influential on this income and the individual's dealing with an income generating activity were found effective in increasing the tendency of consumers towards organic products.

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Contribution of Authors

Aslam W: Data collection, data analysis, investigation and manuscript writing

Noor RS: Conceived idea, design & development of the experiment, data collection, data analysis and manuscript writing

Ullah S: Contributed to perform formal analysis of data of this manuscript

Chen H: Investigated, reviewed and supervised the whole research experimental study and the manuscript writing