



Available Online at EScience Press
Journal of Arable Crops and Marketing

Open Access International Journal
<https://esciencepress.net/journals/JACM>

Promoting Organic Production & Consumption: A Case of Punjab, Pakistan

¹Manan Aslam, ²Muhammad Wasim Akhtar

¹ Muhammad Nawaz Shareef University of Agriculture, Multan, Pakistan.

² Pir Mehar Ali Shah Arid Agriculture University, Rawalpindi, Pakistan.

Corresponding Author: Wasim Akhtar, Email: wasimakhtar2110@gmail.com

ARTICLE INFO

Article History

Received: July 21, 2020

Revised: September 29, 2020

Accepted: October 13, 2020

Keywords

Marketing potential

Organic vegetables

Consumer's willingness

ABSTRACT

The study seeks to investigate the impact of major determinants influencing marketing potential and consumer's willingness to pay for organic vegetables in Punjab, Pakistan. In this regard, two districts (Lahore and Toba Tek Singh) were selected purposively. Information was collected for the main organic vegetables. Convenient sampling technique was used to collect data because limited numbers of respondents were available. A sample size of 50 organic farmers (25 from each district) and 50 consumers (25 from each district) was selected. Multivariate regression analysis was employed to identify and evaluate the effects of marketing potential (farmers) and the consumer's willingness to pay for organic vegetables in the study area. According to selected organic vegetable growers' potential existed for the organic vegetables farming in the country and major variables influencing significantly the market potential for organic vegetables as income, price, no pesticide residues whereas hygienic food and more nutrients in the organic vegetables affecting insignificantly the market potential for organic vegetables in the study area. The relationship between the dependent variable (demand for organic vegetables) and independent variables (income, hygienic food, price, pesticide residues and more nutrients in the organic vegetables) was estimated by using a regression model. On the other hand, a consumer survey was conducted in order to delineate the effect of consumer's willingness to pay for organic vegetables in the selected area. The findings of the research depicted that no synthetic pesticide residues, appearance and prices of organic vegetables influencing significantly the consumer's willingness to pay for organic vegetables whereas quality, long shelf life and taste affecting insignificantly the consumer's willingness to pay for organic vegetables in the study area. The price of the organic vegetables should be low that's why every consumer will purchase organic vegetables instead of conventional vegetables. It should be assured by the government that there are no pesticide residues in the organic vegetables. The farming community may be motivated to produce quality seeds of organic vegetables. A pilot farming program should be initiated with joint involvement of public and private sectors.

INTRODUCTION

Agriculture is the solitary largest sector and driving verve of Pakistan's economy. Despite the structural alterations in the economy of Pakistan, which have taken place since its independence, the share of agriculture in GDP is

declining but agriculture still remains the largest sector of the economy accounting for 21 percent to GDP and employing 44 percent of the workforce (GOP, 2015). Production of food crops is one of the most important responsibilities of the agriculture sector. Vegetables are

meeting the dietary requirements of a fair majority of the country's population.

Ensuring food security is one of the core issues on the priority agenda of governments in almost all countries. The emerging trend regarding food is changing in the sense that consumers have now started showing concerns about food safety as well. A similar pattern of consumer behaviour is also observed in Pakistan and other developing countries too. Organic food has been more popular than ever, and its market is growing swiftly (Michaelidou and Hassan, 2010). Organic farming is a sustainable farming system that produces healthy crops and livestock without damaging the environment. It avoids the use of artificial chemical fertilizers and pesticides (Victor and Owusu, 2010).

Nature has blessed Pakistan with fertile land and suitable climate for growing vegetables which are used for food and raw material for the processing industry (Farooqi, 2009). Vegetables grown in Pakistan are unique in taste and aroma. The farmers do not get a reasonable price of their production in normal vegetable season mainly due to abundance/flooded supply (PHDEC, 2008). Consumers have also concerned about residual effects of pesticides and chemical fertilizers used to increase the production of these vegetables. As such, vegetable growers need to adopt innovative practices like more attractive marketing methods and the production of organic vegetables to make their farming experience more profitable.

Worldwide specifically in developing countries, urban and peri-urban vegetable production and marketing play important roles in the socio-economic development as they ensure employment generation, wealth creation and poverty alleviation through provision of raw materials for local food industries and fast growing restaurants in most cities in the country (Nouhoheflin *et al.*, 2004; Norman, 2007). In Pakistan, vegetables are mostly grown in peri-urban areas which are near to vegetable markets (mandis). Conventional vegetables are produced unhygienically by using pesticides and harmful chemicals for the purpose of increasing the production of vegetables and protect them from pests. These pesticides and harmful chemicals are very dangerous for human health. People in Pakistan regularly are using these vegetables without identifying that whether these conventional vegetables are safe or harmful for their health.

The trend is changing, and sophisticated technology is available now to analyze the vegetable stuff. As such consumers are now in a position to evaluate their food in

terms of safer and harmful implications. Hence any harmful effects in vegetables are considered threat to human health. There are several reports about chemical residues in vegetables showing serious side effects on human health and the environment. Many farmers in developing countries traditionally use organic production practices, but organic cultivation is not in accordance with international regulations. Consumer's interest in organically grown foods is opening new market opportunities for producers and in recent years' consumer demand for organically grown vegetables is also increasing (Datamonitor, 2008; Briz and Ward, 2009). In spite of the numerous advantages of consuming organic food products, information on market demand and prospects appear to be limited (Wang and Sun, 2003). As such, the future of organic agriculture to a large extent depends on consumer demand. Thus, a consumer-oriented approach to understanding organic vegetable demand is important (Mahmoudi *et al.*, 2008).

Organic farming is environmental friendly ecosystem management in which, use of all kinds of synthetic inputs is eliminated (FAO, 2009). Food safety and environmental concerns are motivating factors for consumers to purchase organic products. Nouhoheflin *et al.* (2004) argue that the consumption of fresh organic food products is seen as one of the best remedies toward the prevention of numerous health hazards associated with consumption of conventional foods. As such, there exist a niche market for organic vegetables and consumers are ready to pay premium prices.

Mostly food is produced and handled in a traditional way in Pakistan, however, with advancement in technology and changes in consumer preferences, the trend for production and consumption of safe and nutritious food is increasing. Major organic vegetables sown in Pakistan are potato, tomato, carrot, garlic, ginger, capsicum etc. Although organic vegetables in Pakistan are grown on a small scale now the scenario is changing in response to the increasing importance of organic vegetables because they are considered superior in quality compared to conventionally produced vegetables as they are safe, nutritious and good for health (Razzaq, 2011).

PROBLEM STATEMENT

In Pakistan, the production of organic vegetables is in its initial stages, but the trend is changing. Consumers have the willingness to pay and consume organic vegetables, but they have limited knowledge and opportunities to

purchase. A fair proportion of the farming community in Pakistan also intends to produce organic vegetables due to profit attraction in this venture which exists due to increasing demand (Razzaq, 2011). So more aware the consumer will be of the health benefits associated with organic produce, the more likely they are to make the purchase of organic products (Hassan *et al.*, 2007, Nouhoheflin *et al.* 2004). So, at this stage, it is necessary to explore attitude, perceptions and willingness of consumers to pay for organic vegetables. Furthermore, it is also imperative to estimate market potential so that appropriate policy measures may be taken for their further expansion and adoption. The market potential which is the maximum reasonable sales attainable under a given set of conditions within a specified period of time is critical in determining the economic feasibility of the product and maximum total sales potential for a given market (Lehmann and Winer, 2005). Wolfe (2006) rightly points out that the market potential for a new product determines whether the market is large enough to support the viability of the product.

In this regard, it thus seems rational to investigate current perceptions of farmers about the marketing potential and willingness to adopt this venture as their commercial farming system. Consumer's willingness to consume and pay for these organic vegetables needs to be estimated.

TECHNICAL METHODOLOGY

Two districts (Lahore and Toba Tek Singh) were selected purposively. A sample size of 50 organic farmers (25 from each district) and 50 consumers (25 from each district) was selected. Primary data was collected through personal interview method using pre-tested comprehensive questionnaires. Information was collected for major organic vegetables (potato, tomato, carrot, garlic, ginger, and capsicum) grown in main areas of Pakistan. Convenient sampling technique was used to select the sample because it is preferred in cases having limited and diverse respondents (Malhotra, 2007). Several characteristics such as nutritive value, taste, freshness, appearance, colour and other sensory characteristics influence consumer preference for organic vegetables (Wied, 2008). The market potential for organic vegetables was assessed using information such as the number of potential buyers, an average selling price, and an estimate of the purchasing rate for a specific period of time. Multivariate analysis (regression models)

was used to delineate the effects of major variables affecting willingness to produce (market potential) and consume organic vegetables.

A detailed description of models was given as;

Market Potential or Demand of Organic Vegetables (Farmer's Perception)

The relationship between dependent and independent variables is given as:

$$Y = f(X_i)$$

Where; Y = Quantity consumed of organic vegetables (kg / month)

X_i = Vector of qualitative variables i = 5

In a more specific form, equation 1 can be written as:

$$Y = \beta_0 X_i^{\beta_i} e^{\mu}$$

Equation 2 can be further explained as:

$$Y = \beta_0 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} e^{\mu}$$

By taking natural log on both sides, equation 3 can be written as:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \mu$$

X₁ = Income of the Respondent

X₂ = Hygienic food

X₃ = Price of the organic vegetables

X₄ = Pesticide Residues in organic vegetables

X₅ = More nutrients in the organic vegetables

Here the demand is dependent variables while income, hygienic food, price, pesticide residues and more nutrients in the organic vegetables are independent variables.

β_0 is the intercept, β_s are the elasticities and μ is the random error

ln = Natural log

3.2 Willingness to Pay for Organic Vegetables (Consumer's Perception)

The relationship between dependent and independent variables is given as:

$$W = f(Z_i)$$

Where; W = Willingness to pay for organic vegetables (Rs. / kg)

Z_i = Vector of qualitative variables i = 6

In a more specific form, equation 1 can be written as:

$$W = \beta_0 Z_i^{\beta_i} e^{\mu}$$

Equation 2 can be further explained as:

$$W = \beta_0 Z_1^{\beta_1} Z_2^{\beta_2} Z_3^{\beta_3} Z_4^{\beta_4} Z_5^{\beta_5} Z_6^{\beta_6} e^{\mu}$$

By taking natural log on both sides, equation 3 can be written as:

$$\ln W = \beta_0 + \beta_1 \ln Z_1 + \beta_2 \ln Z_2 + \beta_3 \ln Z_3 + \beta_4 \ln Z_4 + \beta_5 \ln Z_5 + \beta_6 \ln Z_6 + \mu$$

Where;

W is the dependent variable used to check the effect of major variables affecting the willingness to pay for organic vegetables. Categorical data of given independent variables were collected by using 5 points Likert scale (Very high=5, high=4, medium=3, low=2, and very low=1)

Zs are the independent variables in which,

Z₁ = quality of organic vegetables

Z₂ = long shelf life of organic vegetables

Z₃ = taste of organic vegetables

Z₄ = price of organic vegetables

Z₅ = appearance of organic vegetables

Z₆ = no synthetic pesticide residue of organic vegetables

β₀ is the intercept, β_s are the elasticities and μ is the random error

ln = Natural log

RESEARCH FINDINGS

The research findings have been discussed as below;

Factors affecting demand or market potential for organic vegetables: The relationship between the dependent variable (demand for organic vegetables) and independent variables (income, hygienic food, price,

pesticide residues and more nutrients in the organic vegetables) was estimated by using a regression model.

Income is a major determinant which increases the demand for organic vegetables. With the increase in income of the respondents the demand for organic vegetables increase in the market, there are chances that consumers will purchase more organic vegetables. The coefficient of price 0.15 (p<0.1) showed a positive sign and was significant. The coefficient of variable explained that for every one percent increase in income of the respondent might be an increase of 0.15 percent in demand for organic vegetables, keeping all other factors constant. Price is also an important determinant which decreases the demand for organic vegetables. With the decrease in prices of organic vegetables in the market, there are chances that consumers will purchase more organic vegetables. The coefficient of price ---0.17 (p<0.1) showed a negative sign and was significant. The coefficient of variable explained that for every one percent increase in the price of organic vegetables there might be a decrease of 0.17 percent in demand for organic vegetables, keeping all other factors constant.

Table 1. Demand / Market Potential of the Organic Vegetables (Farmer's Perception).

Independent Variables	Coefficient	Standard Error	T-Value	Significance (P-value)
(Constant)	11.5	0.68	56.30	.085
Income	0.15	0.073	4.59	0.064**
Hygienic food	0.11	0.053	1.68	0.56 ^{NS}
Price	-0.17	0.055	-1.582	0.055**
Nutrient (organic vegetables)	0.12	0.062	1.780	0.43 ^{NS}
No Pesticide residues	0.15	0.058	1.725	0.004*
R ²		0.59		
Adjusted R ²		0.54		
F- Value		9.57		

* = Significant at 95% level of confidence

**= Significant at 90% level of confidence

^{NS} = Non Significant

No synthetic pesticide residues may increase the probability of demand for organic vegetables by the consumers. The coefficient of no synthetic pesticide residues 0.15 (p<0.1) showed a positive sign and was significant. The coefficient of variable explained that for every one percent increase there might be an increase of 0.15 percent in demand for organic vegetables, keeping all other factors constant. Hygienic food and more

nutrients in the organic vegetables were showing positive sign but influencing insignificantly on the demand or market potential for the organic vegetables in the study area.

Factors affecting willingness to pay for organic vegetables: The relationship between the dependent variable (willingness to pay) and independent variables (quality, long shelf life, taste, price, appearance and no

synthetic pesticide residues etc.) was estimated by employing double log form of the regression model because scattered plot between dependent and independent variables suggested such a relationship. So, the estimated is given below.

Collinearity (or multicollinearity) is the undesirable situation where the correlations among the independent variables are strong. Tolerance is a statistic used to determine how much the independent variables are linearly related to one another (multicollinear). VIF or the Variance Inflation Factor is the reciprocal of the tolerance. As the VIF increases, so does the variance of the regression coefficient, making it an unstable estimate. Large VIF values are an indicator of multicollinearity. If the value of VIF is greater than 10 then there exists a problem of multicollinearity. In our analysis, all values of VIF are less than 10 which showed no multicollinearity existed in the data set.

The value of R^2 in our analysis was 0.68 which stated that

all independent variables jointly explained 68% change in dependent variable i.e. willingness to pay for organic vegetables. This value also explained that the rest of the 32 % change in the dependent variable was caused by some other variables, the effect of which could not be explained by the given model. The value of adjusted R^2 in our analysis was 0.63 which is significant. The value of adjusted R square means that all independent variables explained 63% variation in the dependent variable, keeping all other factors constant. F-ratio implies that all independent variables are significant or non-significant factors for causing variation in the dependent variable. The F-value in our analysis 9.57 ($p < 0.05$) which was highly significant and explained the overall appropriateness of the model. Considering the results, it may be concluded that willingness to pay for organic vegetables might be rupees 7.25 hundred (725) permonds in absence of an effect from independent variables.

Table 2. Collinearity Statistics of Variables.

Variables	Collinearity Statistics	
	Tolerance	Variance Inflation factor (VIF)
Quality	0.407	2.460
Long shelf life	0.452	2.214
Taste	0.408	2.449
Price	0.532	1.881
Appearance	0.440	2.275
No synthetic pesticide residues	0.624	1.922

Table 3. Major Variables affecting Willingness to Pay for Organic Vegetables (Consumer's Perception).

Variables	Coefficient	Standard Error	T-Value	Significance (P-value)
(Constant)	7.25	0.61	65.20	.096
Quality	0.05	0.083	3.459	0.68 ^{NS}
Long shelf life	0.02	0.065	2.589	0.82 ^{NS}
Taste	0.13	0.063	1.786	0.66 ^{NS}
Price	-0.17	0.055	-1.582	0.055 ^{**}
Appearance	0.12	0.062	1.780	0.053 ^{**}
No synthetic pesticide residues	0.15	0.058	1.725	0.004 [*]
R^2			0.68	
Adjusted R^2			0.63	
F- Value			9.57	

* = Significant at 95% level of confidence

**= Significant at 90% level of confidence

^{NS} = Non Significant

Quality is an important determinant which increases willingness to pay for organic vegetables. The coefficient of quality 0.05 ($p>0.1$) showed a positive sign but was insignificant. The coefficient of variable explained that for every one percent increase or improvement in the category of quality there might be an increase of 0.05 percent in willingness to pay for organic vegetables, keeping all other factors constant. Long shelf life plays an important role in the determination of willingness to pay for organic vegetables. The longer shelf life of organic vegetables, greater will be the willingness to pay for organic vegetables. The coefficient of long shelf life 0.02 ($p>0.1$) showed a positive sign but was insignificant. The coefficient of long shelf life explained that for every one percent increase or improvement in category of long shelf life there might be an increase of 0.02 percent in willingness to pay for organic vegetables, keeping all other factors constant. The taste may increase the probability of willingness to pay for organic vegetables by the consumers. The coefficient of taste 0.13 ($p>0.1$) showed a positive sign but was insignificant. The coefficient of variable explained that for every one percent increase or improvement in taste there might be an increase of 0.13 percent in willingness to pay for organic vegetables, keeping all other factors constant. Price is major determinant which increases the willingness to pay for organic vegetables. With the decrease in prices of organic vegetables in the market, there are chances that consumers will purchase more organic vegetables. The coefficient of price 0.17 ($p<0.1$) showed a positive sign and was significant. The coefficient of variable explained that for every one percent increase in the price of organic vegetables there might be a decrease of 0.17 percent in willingness to pay for organic vegetables, keeping all other factors constant. The appearance of organic vegetables affects the willingness to pay for organic vegetables. The coefficient of appearance 0.12 ($p<0.1$) showed a positive sign and was significant. The coefficient of variable explained that for every one percent increase in appearance (Rs. / kg) there might be an increase of 0.12 percent in willingness to pay for organic vegetables, keeping all other factors constant. No synthetic pesticide residues may increase the probability of willingness to pay for organic vegetables by the consumers. The coefficient of synthetic pesticide residues 0.15 ($p<0.1$) showed a positive sign and was significant. The coefficient of variable explained that for every one percent increase or taste there might

be an increase of 0.15 percent in willingness to pay for organic vegetables, keeping all other factors constant.

CONCLUDING REMARKS

In Pakistan, organic vegetables are growing at a limited level but there exists a niche market and consumers prefer and ready to pay high prices for organic vegetables. The study seeks to investigate the impact of major determinants influencing marketing potential and consumer's willingness to pay for organic vegetables in Punjab, Pakistan. In this regard, two districts (Lahore and Toba Tek Singh) were selected purposively. Information was collected for the main organic vegetables. Convenient sampling technique was used to collect data because limited numbers of respondents were available. A sample size of 50 organic farmers (25 from each district) and 50 consumers (25 from each district) was selected. Multivariate regression analysis was employed to identify and evaluate the effects of marketing potential (farmers) and the consumer's willingness to pay for organic vegetables in the study area. According to selected organic vegetable growers, potential existed for the organic vegetables farming in the country and major variables influencing significantly the market potential for organic vegetables as income, price, no pesticide residues whereas hygienic food and more nutrients in the organic vegetables affecting insignificantly the market potential for organic vegetables in the study area. The relationship between the dependent variable (demand for organic vegetables) and independent variables (income, hygienic food, price, pesticide residues and more nutrients in the organic vegetables) was estimated by using a regression model. On the other hand, a consumer survey was conducted in order to delineate the effect of consumer's willingness to pay for organic vegetables in the selected area. The findings of the research depicted that no synthetic pesticide residues, appearance and prices of organic vegetables influencing significantly the consumer's willingness to pay for organic vegetables whereas quality, long shelf life and taste affecting insignificantly the consumer's willingness to pay for organic vegetables in the study area. The price of the organic vegetables should be low that's why every consumer will purchase organic vegetables instead of conventional vegetables. It should be assured by the government that there are no pesticide residues in the organic vegetables. A farming community may be motivated to produce quality seeds of organic vegetables.

A pilot farming program should be initiated with joint involvement of public and private sectors. Mostly less educated people are involved in this profession, so there is a need to improve the abilities of these people. Training programs should be offered to organic vegetable farmers to improve their existing abilities.

REFERENCES

- Ahmad, Z., N. Ali., M, Ahmad, S, Haq and S, Ahmad. 2005. Yield and Economics of Carrot Production in Organic Farming. *Sarhad J. Agric.* Vol.21, No.3. Pakistan.
- Anderson, J.C., Hughner, R.S. and C, Wachenheim. 2006. Perceptions of Genetically Modified and Organic Food and Processes. *Ag Bio Forum*, 9(3), (p. 180-194).
- Asafu-Adjaye, J. 2000. *Environmental Economics for Non-Economists*. World Scientific Publishing Company Ltd., New Jersey, USA, pp 101-130.
- Boccaletti, S. and Nardella, M. 2000. Consumer willingness to pay for pesticide-free fresh fruit and vegetables in Italy. *International Food and Agribusiness Management Review* 3:297-310.
- Briz, T. and Ward, R.W. 2009. Consumer awareness of organic products in Spain: an application of multinomial logit models. *Food Policy* 34 (3):295-304.
- Carson, R. 2002. *Contingent valuation: A comprehensive bibliography and history*. Williston, VT., Edward Elgar.
- Datamonitor. 2008. *Organic food: Global Industry Guide*. Datamonitor Ltd., NY.
- FAO. 2009. *Food and Agricultural Organization of the United Nations. Adoption to Climate Change with Improved Agricultural Water Management*. www.fao.org.un.
- Farooqi, A. 2009. *Potential of Organic Farming to Alleviate Poverty in Pakistan*. Pakistan Institute of Development Economics (PIDE). Pakistan.
- Gil, J.M., A. Gracia, A. and M. Sanchez. 2000. Market segmentation and willingness to pay for organic products in Spain. *International Food and Agribusiness Management Review* 3:207-226.
- Government of Pakistan (GOP). 2011. *Economic Survey of Pakistan 2010-11*, Economic Advisor's Wing, Finance Division, Islamabad.
- Holcomb R. B., W, Chuck. E, Erin and K, Reed. 2004. *Market Research Study, Organic Fruit, Vegetable and Herb Production. Adding Value to Oklahoma* 405-744- 6071.
- Kimenju, S. C. & De Groote, H. 2008. Consumer willingness to pay for genetically modified food in Kenya. *Agricultural Economics* 38: 35-46.
- Kotler, 2001. *Identify the Consumer's Willingness to Pay Additional Price for Hygienic Food*. Paperback Publications. India. Volume 4. Part 1. (p.109).
- Krissoff. 1998. *Consumer's Willingness to Pay for Organic Products. A Case from Katmandu Valley*. The Journal of Agriculture and Environment, Volume 10. Nepal.
- Kwan, Y. L. 2009. *Consumer Behavior towards Organic Food Consumption in Hong Kong*. Hong Kong Baptist University. Hong Kong.
- Lehmann, D.R., & Winer, R.S. 2005. *Analysis for marketing planning*. Sixth Edition, McGraw-Hill Companies, Inc, New York, pp 170-179.
- Lodorfos, G.N., and J, Dennis. 2008. *Consumer's Intent in Organic Food Market*. *Journal of Food Products Marketing*, 14(2), 17-38. United Kingdom.
- Lusk, J. L. & Hudson, D. 2004. Willingness-to-pay estimates and their relevance to agribusiness decision making. *Review of Agricultural Economics* 26 (2):152- 169.
- Mahmoudi, A., J. Javanmardi, N. Abdollahzadeh and Z. Liaghat. 2008. *Consumer's Awareness, Demands and Preferences for Organic Vegetables: A Survey Study in Shiraz, Iran*.
- Malhotra, N. K. 2007. *A Book of Marketing Research. An Applied Orientation*. 5th Addition. Pearson Publications Copy Right. India.
- Micheaelidou, N., and M, Hassan. 2007. *The Role of Health Consciousness, Food Safety Concern on Attitude towards Organic Food*. *International Journal of Consumer Studies*, 32(2) p.163. California.
- Michaelidou, N. and Hassan, L. M. (2010). *Modeling the factors affecting rural consumers' purchase of organic and free-range produce: A case study of consumers' from the Island of Arran in Scotland, UK*. *Food Policy* 35:130-139.
- Misra, S. K., Huang, C. L. & Ott, S. L. 1991. *Consumer willingness to pay pesticide- free fresh produce*. *Western Journal of Agricultural Economics* 16:218-227.
- Norman, J. C. 2007. *Ghana at 50: Horticulture and national development*. *Ghana Journal of Horticulture* 6: 1-7.
- Nouhoheflin, T., Coulibaly, O., Andy, J., Cherry, Al-Hassan

- and Patrice Y. 2004. Consumers' perception and willingness to pay for organic vegetable in Benin and Ghana. *Shaping the Future of African Agriculture for Development: The Role of Social Scientists. Proceedings of the Inaugural Symposium, 6–8 December 2004, Grand Regency Hotel, Nairobi, Kenya.*
- Organic Trade Association. 2009. Fruit and Vegetable Category Accounted for the Largest Portion of Organic Food Sales. That One Category Represented 37% of Total Organic Food Sold. <http://www.ota.org>.
- Vitor, O. and Owusu M. A. 2010. Measuring Market Potential for Fresh Organic Fruits and Vegetables in Ghana. Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.
- Pakistan Horticulture Development and Export Company (PHDEC). 2008. Pre- Feasibility Study, Off-Season Vegetables. <http://www.phdeb.org.pk> Lahore, Pakistan.
- Partap, T. 2010. Emerging Organic Farming Sector in Asia: A Synthesis of Challenges and Opportunities & Organic Farming Potentials for Green Productivity, Ecological services & Sustainable Rural Development, Asian Productivity Organization.
- Parveen S. Wahid M. and W, Nazif. 2010. Fertility Status of Vegetables Growing Areas of Peshawar Pakistan, *Pak. J. Bot.*, 42(3).
- Piyasiri, A. G. S. A. and A, Ariyawardana. 2002. Market Potentials and Willingness to Pay for Selected Organic Vegetables in Kandy. *Sri Lankan Journal of Agricultural Economics*. Volume 4. Part 1. Pp.107-119.
- Qingbin, W. & Sun, J. 2003. Consumer preference and demand for organic food: Evidence from a Vermont survey. Paper Prepared for Presentation at the American Agricultural Economics Association's Annual Meeting, Montreal, Canada, July 27–30, 2003.
- Quagraine, K. 2006. IQF Catfish retail pack: A study of consumers' willingness to pay. *International Food and Agribusiness Management Review* 9 (6):75–87.
- Razzaq, M. 2011. Market Potential and Consumer's Willingness to Pay for Selected Organic Vegetables. Thesis MBA (Marketing and Agribusiness) submitted to Institute of Business Management Sciences, University of Agriculture, Faisalabad.
- Wang, Q. & Sun, J. 2003. Consumer preferences and demand for organic food: Evidence from a Vermont survey. Paper Prepared for American Agricultural Economics Association Annual Meeting July (2003): pp.1–12.
- Wied, L. 2008. Marketing to Organic Consumers, AGCJ 404: Communicating Agricultural Information to the Public Research. Nutrition Organization Switzerland.
- Wolfe, K. 2006. Estimating market potential check-list. Center for Agribusiness and Economic Development, College of Agricultural and Environmental Sciences. Center Report 06-08 September, 2006. The University of Georgia.

Publisher's note: EScience Press remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2020.