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VALUING ORGANIC FRUITS AND VEGETABLES: URBAN CONSUMERS' PREFERENCES FROM A CHOICE EXPERIMENT SURVEY IN PESHAWAR, PAKISTAN

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ABSTRACT

This research study investigated households' preferences for fresh fruits and vegetables consumption and their willingness to pay (WTP) for organic attributes using a Choice Experiment Survey in urban Peshawar (Pakistan). Key findings revealed a strong preference for fresh fruits and vegetables in daily diets and a high level of awareness regarding their health benefits. Moreover, households demonstrated a robust preference for best quality produce, showing willingness to pay a considerable premium for organic attributes, such as being free from pesticides and synthetic fertilizers, local varieties and other features like grading and labeling. These results suggest a promising market for organic produce and encourages farmers for organic agricultural practices. In addition, valuable information are provided for policymakers promoting healthier and environmentally friendly food choices.

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Introduction

The World Health Organization (WHO) strongly recommends a daily consumption of more than 400 grams of fruits and vegetables for better health and the reduction in risk of non-communicable diseases. These natural foods, characterized by their low fat, sugar and sodium content, have the potential to effectively combat obesity by managing and reversing weight gain. Furthermore, they are a rich source of dietary fiber, essential minerals, vitamins and a group of beneficial compounds,

including antioxidants, flavonoids and plant sterols (WHO 2024; Woodside et al. 2023; Yazew and Deba 2021;).

Pakistan's diverse agro-climatic conditions are ideal for the cultivation of high-quality tropical and sub-tropical fruits and vegetables. Notable among these are citrus fruit, mangoes, apples, melons, dates, guavas and apricots in the fruit category, while vegetables like potatoes, onions, tomatoes, carrots, cauliflowers, spinach and peas are in high production. Tomatoes, onions, and carrots, in particular, account for nearly 58% of the total vegetable production. Mangoes and oranges contribute to approximately 45% of the fruit output (GoP, 2020). The domestic production of these fruits and vegetables is sufficient to meet their domestic demand; however, a significant and pressing concern lies in their quality.

Farmers' excessive use of various insecticides and pesticides during production is a serious issue. Researchers have extensively investigated the presence of pesticide residues in local produce Latif et al. 2011; Khan et al. 2018; Khan et al. 2021). Many studies have found an exceeded level of pesticide residues in apples, melons, mangoes, grapes and plums (Latif et al. 2011; Khan et al., 2018). This is a significant challenge not only for our producers but also for the country's export agencies.

Conventional farming practices, relying on synthetic chemical fertilizers, insecticides, fungicides and herbicides, supply to the food needs of a significant portion of the global population. However, these practices, beside posing threats to human health, also causes degradation of soil, water and air quality and loss of biologically beneficial crops and animals from natural ecosystems (Shah, 2013; Shah et al., 2016). In contrast, organic farming, also known as chemicals-free farming, strictly prohibits the use of pesticides, synthetic fertilizers and genetically modified crops. Producers undergo certification by authorized bodies based on strict production standards. Pesticide-free farming emphasizes recycling, maintaining healthy ecosystems and harnessing biodiversity (Uma and Kumar 2025).

In Pakistan, awareness of the valuable effects of organic farming on the environment and human health remains limited. Local farmers have the capability of organic farming; however, most of them are unaware of the local consumers' preferences and their WTP for such fruits and vegetables. On the research side, few studies have investigated consumer preferences for the local organic products (Khan et al. 2018 is notable example). To address this research gap, this study was designed to investing local consumers' willingness to pay for the organic attributes of local fruits and vegetables.

Literature Review

Consumers' willingness to pay for organic and pesticide-free food has been widely studied across different regions. Owusu and Anifori (2013) analyzed consumers' WTP for organic lettuce and watermelon in Ghana. Their findings revealed that socioeconomic characteristics, product freshness, and cleanliness positively influenced WTP for organic watermelon, while product size had a negative impact. Similarly, Skreli et al. (2017) examined consumer preferences for organic tomatoes in Albania and identified four distinct consumer classes, with strong preferences influenced by factors such as education and income. In Pakistan, Khan et al. (2018) investigated

households' WTP for pesticide-free fruit and found that consumers were willing to pay a 26 percent premium. Significant determinants included age, income, household size, and awareness of pesticide usage. Senyolo et al. (2018) examined WTP for African leafy vegetables in South Africa, where approximately 80 percent of respondents expressed a preference for these vegetables. Factors such as gender, urbanization, age, distance to the market, taste, and availability played a role in their WTP. More recently, Ho et al. (2024) estimated WTP for organic oranges in Vietnam, concluding that household demographics, food safety concerns, and environmental awareness play a crucial role in determining consumer preferences. Nohara (2024) further explored consumer attitudes toward pesticide-free vegetables in Japan and found that consumers did not prioritize the appearance of vegetables, such as color and shape, as long as they were pesticide-free. Additionally, increasing interest in environmental issues was noted as a factor that could enhance WTP.

The role of food safety labels in shaping consumer preferences has also been widely studied. Wongprawmas et al. (2014) investigated whether Thai consumers value food safety labels for fresh produce and found that the were willing to pay a premium for labeled products. In China, Wang et al. (2018) examined consumers' WTP for certified labels on pork products, revealing that the "Organic Food" label commanded the highest premium, certified labels on pork products, revealing that the "Organic Food" label commanded the highest premium, with region, education, and income significantly influencing their choices. More recently, Liu et al. (2023) explored consumer preferences for eco-labeled eggs in China and found strong preferences for labels indicating "organic," "free-range husbandry," and "nutrition enrichment," with consumers willing to pay 375% more for these attributes.

These studies collectively provide offer insights into consumer preferences and WTP for organic and pesticide-free fruit, vegetables, and other food products. Findings from such research in Pakistan can play a vital role in shaping agricultural practices, marketing strategies, and policy decisions in the food industry. In addition to the high expected prices for organic products, organic farming may have lower production costs than conventional farming in developing countries (Patil et al., 2014; Jouzi et al., 2017). Furthermore, organic farming has been shown to perform better than conventional farming under climate change and extreme weather conditions (Borron, 2006). While increasing organic farming in Pakistan would be a beneficial step forward, the results of this study can serve as valuable evidence for promoting organic agricultural practices and encouraging policy support for sustainable farming initiatives.

Methodology

Study Area

This study was conducted in the urban areas of Peshawar, the capital city of Khyber Pakhtunkhwa Province, Pakistan. Peshawar is the largest and most populous city in the province, with a population of 1.964 million (GoP, 2017). The city is home to 224,099 households (see Figure 1 for more details). Peshawar has a diverse economy, key industries including agriculture, horticulture,

manufacturing, services and healthcare. It is a strategic location near Afghanistan and Central Asia and is an important economic hub in the region.

The northern areas of the Khyber Pakhtunkhwa are well-known for production of fruits, such as peaches, apples, guava, strawberries, citrus fruit, persimmons, apricots and plums. The region also has the substantial capacity for cultivating off-season vegetables, including tomatoes, cucumbers, and squashes. Peshawar acts as a central market for these fruits and vegetables.

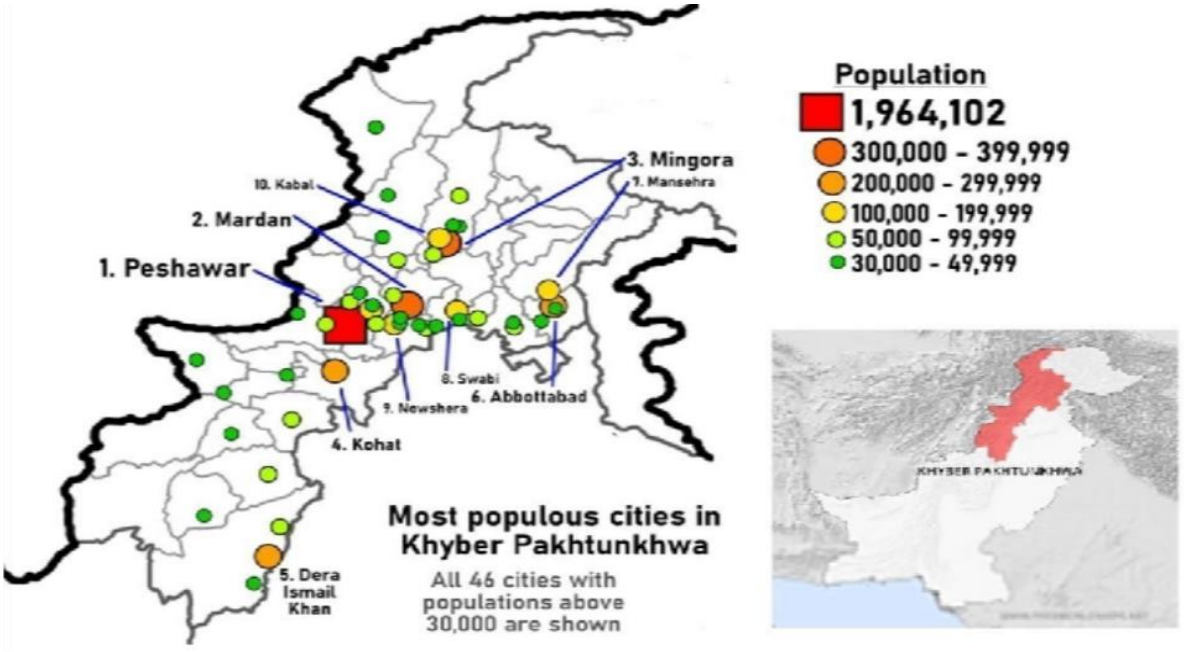


Figure-1. Khyber Pakhtunkhwa most populous cities

Sampling and Data Collection

A two stage sampling procedure was employed for selecting a representative sample of households for the choice experiment survey. In the first stage, based on residential settlements, Peshawar city was divided into 6 zones. In the second stage, 100 households were randomly selected from each settlement. Thus, a sample of 600 households was selected from the entire city. A well-structured and pre-tested questions were included in the final survey, and various aspects, including socio-economic characteristics, awareness and perceptions of pesticides usage, were also included for data collection.

To measure the respondents' WTP for different organic attributes of locally produced fruits and vegetables, this study used Choice Experiment (CE). This method is widely used in valuation of environmental and ecosystem services valuation. Its theoretical foundation is the Lancaster's theory of attributes, stating that the usefulness of goods for a consumer depends on their properties

or characteristics. They select and buy goods based on the attributes they prefer. In CE, one or more hypothetical choice sets are designed. Each choice set consists of different alternatives, described by attributes and prices or costs. These choice sets are presented to each respondent and are asked to choose their preferred alternative (Freeman et al. 2014).

Survey design:

The study investigated the sampled respondents' willingness to pay for the following organic and marketing attributes of fresh fruits and vegetables in Peshawar city:

- Pesticides free (Yes, No)
- Synthetic fertilizers free (Yes, No)
- Local variety (Yes, No)
- Graded (Yes, No)
- Labeled (Yes, No)

For this purpose, 2 levels (No and Yes) were used, generating 32 different alternatives or combinations of these five attributes. These alternatives were then used to construct 12 different choice sets, each consisting of 4 alternatives, having the first one as status quo. The 12 choice sets were subsequently split into 6 blocks, each of 2 choice sets, which were distributed in 6 versions of the questionnaire. Each respondent was presented with 2 different choice sets.

Survey versions were parallel in all parts, except for the combination of alternatives in the choice sets. Equal numbers of copies were printed for the survey questionnaires (100 copies of each version) and were shuffled properly before distributing them among the 600 respondents.

A typical choice set designed for this study is given below:

"Suppose your favorite fresh fruit or vegetable (such as apple, peach, strawberry, melons, tomatoes, cucumbers or eggplants) cost you around Rs. 100 per kilogram in a local market (2023-2024 market price). Farmers are growing their hybrid version and use pesticides, synthetic fertilizers and other chemicals to produce them. If the following improved quality versions of the same fruit or vegetable is available in the local market, which one would you buy at the given prices?"

Choice Card-1

Traditional version	Improved version-1	Improved version-2	Improved version-3
Non-Graded	Non-graded	Graded	Graded
Pesticides applied	Pesticides free	Pesticides free	Pesticides free
Fertilizers applied	Fertilizers applied	Fertilizers applied	Fertilizers free
Hybrid	Local	Hybrid	Local
Non-Labeled	Non-Labeled	Non-Labeled	Labeled
100 rupees per KG	150 PKR per KG	200 PKR per KG	250 PKR per KG

Econometric Model:

The econometric analysis of CE data set is centered on the McFadden 1973's Random Utility Theory. The Random Utility Model describes an i^{th} individual utility (U_{ij}) from choosing alternative 'j' as the sum of a deterministic utility component (V_{ij}) and a non-deterministic component ϵ_{ij}.

$$U_{ij} = V_{ij} + \epsilon_{ij} \quad (1)$$

The deterministic utility component (V_{ij}) is a linear function of the j^{th} alternative attributes 'X', (such as pesticides free, fertilizers free, local variety, graded and labeled in this case) and its price (p_j).

$$V_{ij} = BX_j + \lambda p_j + e_{ij} \quad (2)$$

In equation 2, 'B' is a set of parameters $(\beta_1, \beta_2, \beta_3, \beta_4, \beta_5)$ for the given five attributes of alternative 'j', λ is the marginal utility of income and e_{ij} is a random error. The probability that individual 'i' chooses alternative 'j' over alternative 'h' in the same choice set is written as:

$$P_{ij} = Pr(U_{ij} > U_{ih} \; \forall \; j \neq h) \quad (3)$$

Revelt and Train (1998) suggested Mixlogit regression model for analyzing CE data to estimate probabilities of choosing different alternatives, preferences for different attributes and Marginal willingness to Pay (MWTP) for their improved versions. The Mixlogit model assumes heterogeneity in preferences for alternatives' attributes which result random parameters estimates. It captures heterogeneity by estimating the mean values and standard deviations of the parameters. Thus for Mixlogit model, the probability of choosing alternative 'j' over others is given as follows.

$$P_{ij} = \int \left(\frac{e^{\beta x_{ij} + \lambda p_j}}{\sum_{h=1}^{N} e^{\beta x_{ih} + \lambda p_h}} \right) f(\beta|\theta)\, d\beta \quad (5)$$

Where θ refers collectively to the parameters of this distribution (such as the mean and covariance). For this study, the linear deterministic utility function is given in equation 6.

$$V_{ij} = \bar{\beta}_1 x_{j1} + \tilde{\beta}_{i1} x_{j1} + \ldots\ldots + \bar{\beta}_5 x_{j5} + \tilde{\beta}_{i5} x_{j5} + \lambda p_j + e_{ij} \quad (6)$$

Where, $\bar{\beta}_1$ is the coefficient mean for the attribute '1' and $\tilde{\beta}_{i1}$ is the individual i's deviation from the estimated mean value of the same attribute. The estimated coefficients, at individual levels, can be used to derive MWTP for each attribute using the following formula.

$$MWTP_{i1} = - \frac{\partial V_{ij} / \partial x_{j1}}{\partial V_{ij} / \partial p_j} \quad (7)$$

Results and Discussion

Socioeconomic Characteristics of Households

Table 1 presents the socioeconomic characteristics of the surveyed households in Peshawar city and its six residential zones. The average age of the household head was 52 years, with relatively small differences across the zones. The average level of education of household heads was about 10 years. However, clear differences were observed across zones. These differences in education may be relevant to consumers' awareness and preferences regarding organic food products.

The average household size was six members, although some variation was observed across the zones. Considerable variation was also observed in annual household income. The average annual income for the surveyed households was PKR 1,236,970. It was highest in Hayatabad (PKR 1,513,819) and University Town (PKR 1,479,163), while Zaryab Colony had the lowest average income (PKR 938,853). These differences indicate variation in the purchasing capacity of households across residential zones and may be relevant when examining their demand for relatively higher-priced organic food products. Average annual food consumption expenditure was PKR 621,686, equivalent to approximately PKR 51,807 per month.

Overall, the table shows noticeable differences in income and education across the residential zones, while household size, age and food expenditure vary relatively less. These socioeconomic differences provide an important background for examining consumers' preferences and willingness to pay for organic fruits and vegetables.

Table 1. Socio-economic Characteristics of the Households

Zones	Head's Age (Years)	Head's Education (Years)	Household Size (Individuals)	Annual Income (PKR)	Consumption Expenditure (PKR)
Peshawar city (Overall)	52	10	6	1236970	621686
Gulbahar (zone-1)	54	10	6	1092048	631289
Zaryab Colony (zone-2)	53	9	6	938853	600716
Nasir Bagh (zone-3)	50	10	5	1202547	611201
Tehkal (zone-4)	50	9	5	1195391	619360

University Town (zone-5)	52	12	6	1479163	650013
Hayatabad (zone-6)	51	12	7	1513819	617535

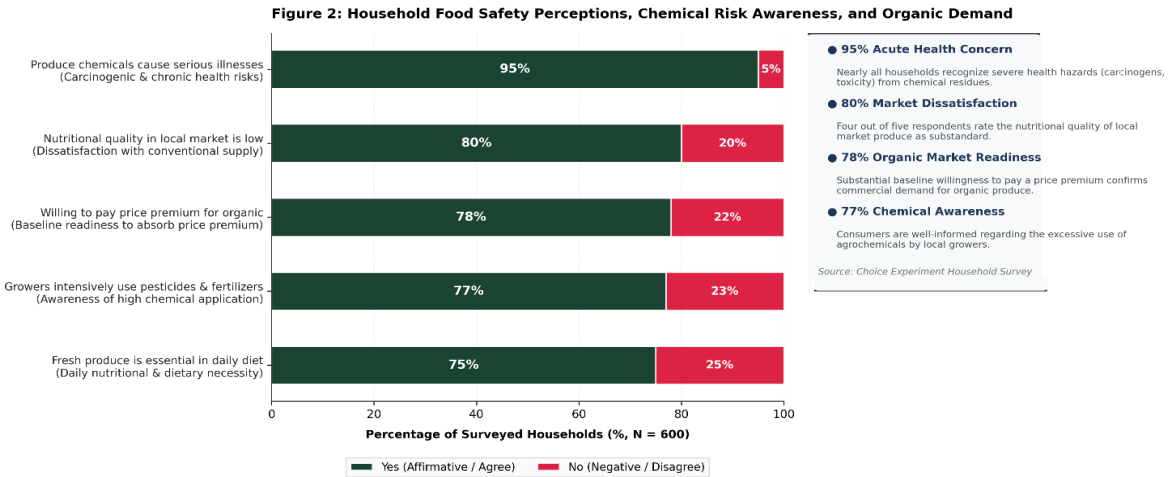
Source: Survey data

Households' Preferences for Fresh Fruits and vegetables

Figure 2 presents consumers' perceptions and attitudes toward fresh fruits and vegetables, their quality and safety and their possible effects on human health. The results show that fresh fruits and vegetables are an important part of the respondents' diets, with 75 percent considering them an essential component of their daily food consumption. This indicates a strong preference for fresh produce among the surveyed households.

At the same time, respondents expressed considerable concerns about the quality and safety of fruits and vegetables available in the local market. About 80 percent of respondents perceived the nutritional quality of locally available fresh fruits and vegetables to be low. Similarly, 77 percent believed that pesticides and chemical fertilizers are intensively used in their production. The concern about chemical use is particularly evident from the finding that 95 percent of respondents believed that consumption of chemically treated fruits and vegetables could cause serious health problems. This high level of concern suggests that health and food-safety considerations may be important factors in consumers' decisions regarding the purchase of organic or chemical-free produce.

The results further show that 78 percent of respondents were willing to pay a higher price for organic version of fruits and vegetables as compared to conventional products. This finding indicates a considerable potential demand for safer food products in Peshawar.



Estimated Regression Model

Results for the Mixed Logit regression model values are given in Table 3. The significant and positive coefficients for pesticide-free, no synthetic fertilizers and local variety attributes in the model indicate strong consumer preferences for these features. These estimated mean coefficient for each attribute was used to derive consumer's MWTP for it. The derived MWTP for each attribute is given in Figure-3. The estimated MWTP premiums of PKR 143.72 per kg for pesticide-free produce and PKR 134.26 per kg for fruits and vegetables grown without synthetic fertilizers demonstrate a substantial demand for chemical-free products. This is in line with Khan et al. (2018), who reported that Pakistani consumers were willing to pay a 26% premium for pesticide-free fruit, reflecting growing health consciousness.

The strong preference for local varieties, with an MWTP of PKR 138.81 per kg, suggests a preference for traditional, non-modified produce. The presence of a significant standard deviation for this attribute further suggests heterogeneous preferences. Grading and labeling were also found to influence consumer choices, as evidenced by their MWTP of PKR 83.96/kg and PKR 67.90/kg for graded and labeled produce, respectively. These findings are comparable to those of Wongprawmas et al. (2014) and Liu et al. (2023), who found that consumers in Thailand and China, respectively, valued food safety labels and product grading as indicators of quality and reliability.

Table 3. Estimated Mixed Logit Model for Preferences about Organic Attributes

Choice	Coefficient	Z statistic	P value
Mean			
Price	-0.015	-6.560	0.000
Chemicals free	2.173	8.050	0.000
Local variety	2.099	4.570	0.000
No fertilizers	2.030	12.300	0.000
Graded	1.270	4.330	0.000
Labeled	1.027	5.840	0.000
SD			
Chemicals free	0.463	1.110	0.268
Local variety	6.001	3.050	0.002
No fertilizers	1.438	2.820	0.005
Graded	-0.098	-0.270	0.786
Labeled	-1.156	-2.230	0.026
LR chi2 (5) = 55.24, Prob > chi2 = 0.0000			

In a nutshell, the results reveal that for a one kilogram of local, pesticides and synthetic fertilizers free, graded and labeled fruit or vegetable, a consumer in urban Peshawar would expectedly pay around Rs.570. It means the consumer's WTP for organic fruit or vegetable is predicted to be 5.7 times higher than the existing version.



Figure 3. MWTP for Organic Attributes

Conclusion and Recommendations

The respondents' perceptions indicate that concerns about production practices and the possible presence of chemical residues are common among consumers. More than two-third of the total respondents were aware of the extensive use of pesticides and fertilizers in fruits and vegetables production. This awareness is a positive sign, indicating that consumers are conscious of the potential negative effects of chemical residues on both human health and the environment. The study reveals strong consumer preference for organic attributes of local varieties of fresh fruits and vegetables, and their preferences were even stronger for their graded and labeled versions. Respondents expressed willingness to pay a substantial premium, suggesting a huge demand for safer and more environmentally friendly agricultural practices.

Given the strong preference for quality attributes, there is an opportunity for farmers to switch to more profitable and sustainable organic farming practices. This can be done through sharing knowledge and skills related to organic cultivation. Government agencies, agricultural organizations and NGOs can play a pivotal role in facilitating these educational initiatives. Institutional support for organic growers in obtaining necessary certifications, accessing markets that value organic produce and connecting farmers to those markets, domestically and internationally, can enhance their economic returns and incentivize further adoption of organic farming practices.



References

Borron S (2006) Building resilience for an unpredictable future: how organic agriculture can help farmers adapt to climate change. Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/3/a-ah617e.pdf

Freeman III, A. M., Herriges, J. A., & Kling, C. L. (2014). The measurement of environmental and resource values: theory and methods. Routledge.

Government of Pakistan (GoP). (2020). Pakistan economic survey 2019–2020. Ministry of Finance, Islamabad.

Heinrichs, P. A. (2015). Consumer preferences and willingness to pay for fresh and frozen vegetables (Doctoral dissertation, University of Illinois at Urbana-Champaign).

Ho, N. B., Vo, D. V., & Rowley, C. (2024). Contingent valuation versus choice experiment: estimating the willingness to pay for organic oranges in Vietnam. Journal of Trade Science, 12(4), 268-283.

Jouzi Z, Azadi H, Taheri F, Zarafshani K, Gebrehiwot K, Van Passel S, Lebailly P (2017) Organic farming and small-scale farmers: Main opportunities and challenges. Ecol Econ 132:144–154. https://doi.org/10.1016/j.ecolecon.2016.10.016

Khan, J., Khanal, A. R., Lim, K. H., Jan, A. U., & Shah, S. A. (2018). Willingness to pay for pesticide free fruits: Evidence from Pakistan. Journal of International Food & Agribusiness Marketing, 30(4), 392-408.

Khan, J., Shah, S. A., Saddozai, K. N., & Khanal, A. R. (2021). Investigating the effect of contingent valuation question formats on households' willingness to pay for pesticides free fruits in Khyber Pakhtunkhwa. Journal of Applied Economics and Business Studies, 5(4), 1-12.

Khan, M. J., Zia, M. S., & Qasim, M. (2010). Use of pesticides and their role in environmental pollution. World Acad Sci Eng Technol, 72, 122-128.

Latif, Y., Sherazi, S. T. H., & Bhanger, M. I. (2011). Assessment of pesticide residues in commonly used vegetables in Hyderabad, Pakistan. Ecotoxicology and Environmental Safety, 74(8), 2299-2303.

Liu, C., Liu, X., Yao, L., & Liu, J. (2023). Consumer preferences and willingness to pay for eco-labelled eggs: a discrete choice experiment from Chongqing in China. British Food Journal, 125(5), 1683-1697.

McFadden, D. (1973). Conditional logit analysis of qualitative choice behavior.

Zarembka Paul (Ed.), Frontiers in Econometrics, Academic Press

Nohara, K. (2024). Willingness to pay for pesticide-free vegetables in Hokkaido, Japan: the relationship between appearance and pesticide use. Humanities and Social Sciences Communications, 11(1), 1-12.

Owusu, V., & Owusu Anifori, M. (2013). Consumer willingness to pay a premium for organic fruits and vegetables in Ghana. International Food and Agribusiness Management Review, 16(1), 67-86.

Patil S, Reidsma P, Shah P, Purushothaman S, Wolf J (2014) Comparing conventional and organic agriculture in Karnataka, India: where and when can organic farming be sustainable?

Land Use Policy 37:40–51. https://doi.org/10.1016/j.landusepol.2012.01.006

Senyolo, G. M., Wale, E., & Ortmann, G. F. (2019). A double hurdle analysis of consumers' decisions to purchase African leafy vegetables in Limpopo province. Journal of Consumer Sciences.

Shah, S. A., Hoag, D. L., & Davies, S. (2016). Household preferences and willingness to pay (WTP) for freshwater quality improvement in Pakistan's Swat River Valley. Environment, development and sustainability, 18, 1081-1093.

Shah, S.A. 2013. Valuation of freshwater resources and sustainable management in poverty dominated areas (Doctoral dissertation, Colorado State University).

Skreli, E., Imami, D., Chan, C., Canavari, M., Zhllima, E., & Pire, E. (2017). Assessing consumer preferences and willingness to pay for organic tomatoes in Albania: A conjoint choice experiment study. Spanish journal of agricultural research, 15(3), e0114-e0114.

Uma, S., & Kumar, P. S. (2025). Organic Production of Fruits: Issues, Challenges, and Opportunities. Advances in Agri-Food Systems: Volume I, 141-177.

Uma, S., & Kumar, P. S. (2025). Organic Production of Fruits: Issues, Challenges, and Opportunities. Advances in Agri-Food Systems: Volume I, 141-177.

Wang, J., Ge, J., & Ma, Y. (2018). Urban Chinese consumers' willingness to pay for pork with certified labels: A discrete choice experiment. Sustainability, 10(3), 603.

Wongprawmas, R., Canavari, M., & Waisarayutt, C. (2014). Are Thai consumers willing to pay for food safety labels? Choice experiment on fresh produce.

Woodside, J. V., Nugent, A. P., Moore, R. E., & McKinley, M. C. (2023). Fruit and vegetable consumption as a preventative strategy for non-communicable diseases. Proceedings of the Nutrition Society, 82(2), 186-199.

World Health Organization. (2024). Tackling NCDs: best buys and other recommended interventions for the prevention and control of noncommunicable diseases. World Health Organization.

Yazew, T., & Daba, A. (2021). Review on Health Benefits of Fruits and vegetables Consumption: Preventive Implications for Non-communicable Diseases in Ethiopia. changes, 70.