

Willingness to Pay of Agritourists for Grape Products in Takestan County

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Abstract

Challenges such as perishability, low prices, rising production costs, and market fluctuations reduce producers' ability to set prices effectively. However, demand driven by Agritourists' willingness to pay plays a crucial role in determining equilibrium prices. Agritourism, by enabling tourists to visit orchards and directly harvest products themselves (pick-your-own method), allows farmers to sell products directly and potentially capture higher prices. The present study aims to estimate the willingness to pay of Agritourists for grape products (seedless white and seedless red varieties), as well as to evaluate the added value generated by Agritourism in Takestan County, Iran. Data were collected through a combination of literature review and a field survey with 140 questionnaires completed by tourists attending the Takestan Grape Festival and transit tourists passing through roadside shops in the region during the September 2024 harvest season. A convenience sampling approach was used, and the Contingent Valuation Method with a double-bounded dichotomous choice (DBDC) design was estimated in Stata¹⁷ using the doubleb command. Results revealed mean willingness-to-pay values per kilogram of white seedless grape and red seedless grape as \$1.02 and \$1.19, respectively. There were significant positive correlations between WTP and the variables of age, income, and the intention to stay overnight. Intermediary prices for the same period were \$0.27 and \$0.33 per kilogram, respectively, implying stated gross price premium of approximately 3.8 and 3.6 times the intermediary price. This difference represents a stated gross price premium, not net value added.

Keywords: Agritourism, Contingent Valuation Method, Double-Bound Dichotomous Choice, Grape, Willingness to Pay, Takestan,

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1. Introduction

Farmers have long encountered persistent challenges, including the perishability of agricultural products, low and volatile prices, increasing production costs, environmental degradation, climate change, and unstable markets, all of which undermine their income stability [Hanli et al., 2023; Ranjbarfathi et al., 2015; Thakur & Arora, 2025; Kidane, 2022]. Reliance solely on traditional farming activities no longer provides sufficient income for rural households [Bahmani et al., 2021; Dionizi & Kercini, 2025], forcing some farmers to abandon their farms and orchards in search of alternative livelihoods [Norouzi & Fathi, 2017]. In this context, the rapidly expanding tourism industry offers an opportunity to compensate for the declining profitability of agriculture through the development of Agritourism [Zarei et al., 2018; Wen-Ta et al., 2025]. Agritourism can enhance farmers' income by providing direct marketing opportunities such as farm shops, pick-your-own initiatives, and local purchases—thereby reducing intermediary costs and mitigating the challenge of perishability in a short period [Kedla et al., 2025; Lak & Khairabadi, 2022; Moatar et al., 2018]. Consequently, an increasing number of farmers worldwide are diversifying into tourism-related activities, particularly nature-based tourism [Yavari Far & Hassani, 2015]. Common Agritourism practices include product harvest festivals, tourist participation in farming activities, and knowledge sharing between farmers and visitors [Thakur & Arora, 2025; Moatar et al., 2018], all of which contribute to supplementary income generation and rural livelihood diversification [Walker & Mahmoodi Chenari, 2019].

Qazvin Province in Iran, despite covering less than one percent of Iran's land area, is highly diverse in agricultural production. According to the 2024 statistics of the Horticultural Department of Takestan Agricultural Jihad Organization, Takestan County with 25,000 hectares of vineyards, accounts for 80% of Qazvin Province's total grape production and is recognized as the second-largest grape-producing region in Iran. Due to the lack of a suitable market for fresh grapes in the region, 75% of the grapes produced are processed into raisins, and only 25% are consumed as fresh grapes. With the development of Agritourism in the region and the entry of Agritourists into the vineyards, a broader market can be created for selling grapes as fresh produce. Based on the findings of the authors' prior research on the agricultural tourism development strategy in the Takestan area, the presence of vineyards with a wide

variety of grape cultivars emerged as a key strength. Furthermore, the region's favourable conditions for tourist attraction were identified as a major opportunity.

From the perspective of tourists, Agritourism can be categorized into four main objectives (Figure 1): purchase, entertainment, experience, and recreation [Kenebayeva, 2014; Vazin & Zamani Alavijeh, 2023].

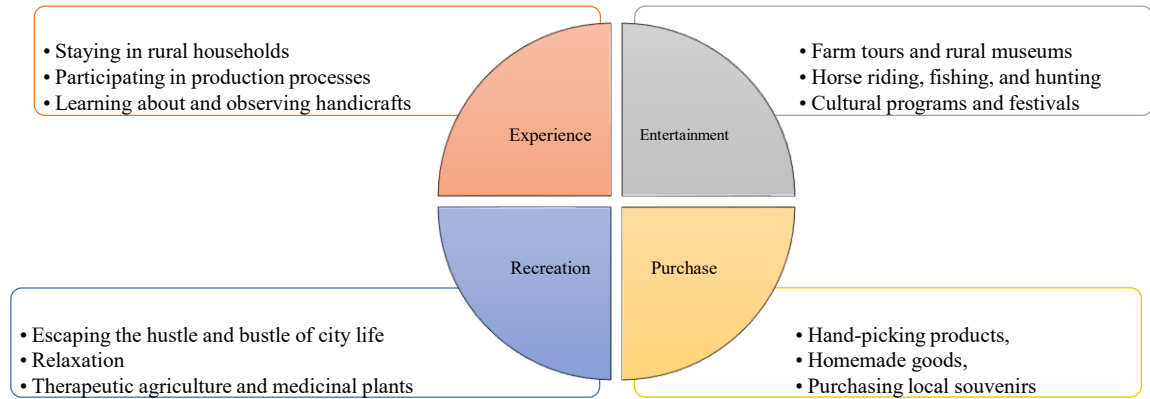


Figure 1. Categorization of Agritourism based on the objectives of tourists.

This study focuses specifically on agritourism motivated by product purchase. In this form, tourists directly purchase agricultural products through self-harvesting, farm-gate shops, roadside markets, or participation in harvest festivals [Motiei Langroudi & Mahmoodi Chenari, 2019]. The “pick-your-own” approach [Phillip et al., 2010] is particularly popular, offering both recreational benefits and experiential learning for families and children [Thakur & Arora, 2025; Wen-Ta et al., 2025; Motiei Langroudi & Mahmoodi Chenari, 2019]. Direct-to-consumer outlets allow farmers to retain a larger share of the product margin while offering consumers fresh, high-quality, locally grown produce at competitive prices, along with additional experiential values such as authenticity, environmental consciousness, and shopping atmosphere [Arumugam, 2018]. Consequently, Agritourism and direct sales have grown markedly in recent years [Schmidt et al, 2023].

While Agritourism has a long history in developed countries, its expansion in developing regions, particularly across Asia, remains limited [Duc Hai et al., 2023]. Among various models, the “pick-your-own” method offers distinct economic advantages, including eliminating seasonal harvest labor, reducing transportation and packaging costs, and generating direct income by bypassing intermediaries [Motiei Langroudi & Mahmoodi Chenari, 2019].

These advantages have positioned Agritourism as an increasingly important strategy for diversification and supplementary revenue generation [Schmidt et al., 2023]. Pricing remains a critical issue for farmers engaged in Agritourism. Two approaches are commonly employed: cost-benefit pricing, in which farmers set prices based on production costs to secure minimal profits [Carlucci et al., 2018], and value-based pricing, in which prices reflect tourists' willingness to pay (WTP) for perceived quality and authenticity [Motiei Langroudi & Mahmoodi Chenari, 2019; Carlucci et al., 2018]. In Takestan, grape farmers often express dissatisfaction with sales to intermediaries due to low prices and delayed payments [Rahmani, 2020]. Agritourism provides an opportunity to overcome these limitations, as tourists are often willing to pay higher prices for direct purchases [Shirzadi Laskookalayeh & Jalali, 2020]. Value-based pricing thus emerges as a promising demand-oriented approach for improving profitability and capturing market potential [Arumugam, 2018]. Numerous studies conducted in Iran [Aghapour Sabbaghi & Akbarnejad, 2019; Norouzi & Fathi, 2017; Moradi et al., 2020; Pourfaraj & Naghavi, 2023] and other countries such as the United States [Pitas & Chen, 2023], Sri Lanka [Malkhanthi & Routray, 2012], China [Tong et al., 2024], and Indonesia [Suprianti et al., 2025], have examined the behaviour, motivations, and preferences of Agritourists, as well as their willingness to participate in agricultural tourism activities and to purchase agricultural products directly through self-picking. Most of these studies, however, have been descriptive in nature and have rarely provided quantitative estimates of Agritourists' willingness to pay for agricultural products using advanced econometric models. Accordingly, the main objective of this study is to quantitatively estimate Agritourists' willingness to pay for **two** products—white seedless grapes and red seedless grapes—in Takestan County, and to compare these figures with the selling prices offered to intermediaries and brokers, in order to evaluate the added value generated by the development of Agritourism in the region. The main research question is whether Agritourists are willing to pay for grapes that are picked by themselves directly from the vineyards? And the research hypothesis is based on the premise that, if Agritourists do have willingness to pay, then the price they are willing to pay is higher than the price paid by intermediaries. **In the valuation scenario of this study, the willingness to pay of Agritourists is defined as the maximum price per kilogram they would pay for fresh grapes purchased directly at the vineyard, excluding any travel or experiential costs.**

2. Methodology

2.1 Ethical Approval

This study was approved by the Ethics Committee of Tarbiat Modares University (No.: 52D/6185, Date: 2025), in accordance with the ethical standards defined by this committee for conducting a Ph.D. thesis. All respondents provided verbal informed consent before participating.

2.2 Research Area

Takestan County, located in Qazvin Province in the northwest of the Central Iranian Plateau, lies 185 kilometers west of Tehran and 30 kilometers southwest of the city of Qazvin. Geographically, the county is positioned at $49^{\circ}42'$ east longitude and $36^{\circ}4'15''$ north latitude, at an elevation of 1,265 meters above sea level [Rahmani, 2011].

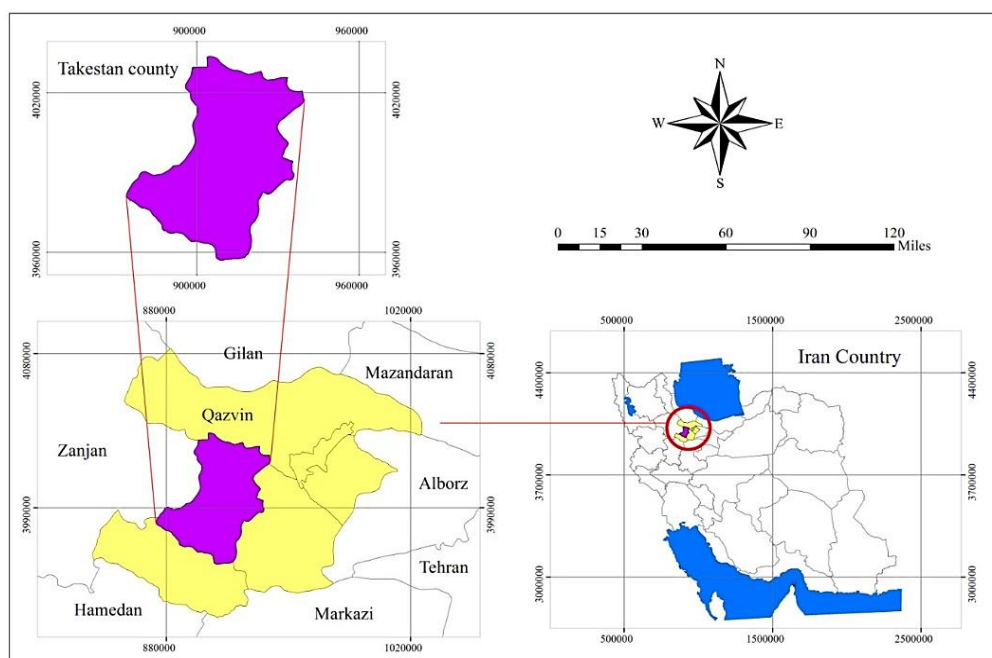


Figure 2. Geographical Location of the Studied Area.

2.3 Model Estimation

Random Utility Theory provides an econometric framework for modeling discrete choice behavior when the available alternatives are qualitative and discrete rather than continuous. The theory posits that every consumer (or decision-maker) behaves rationally by selecting the alternative that maximizes their utility. Nevertheless, the actual utility associated with each alternative remains unobservable to the researcher [McFadden]. The behavioral relationship

approach to valuation can be generally categorized into two main groups: revealed preferences and stated preferences. Revealed preference methods are based on the observation of individuals' behaviors and choices in real markets, whereas stated preference methods rely on individuals' declarations about their choices under hypothetical conditions [Kidane et al., 2022; Callan & Thomas, 2009]. Due to the fact that Agritourism has not yet been developed in the Takestan region, there is no real market for it. Therefore, the stated preference method and a hypothetical market scenario were used to calculate the willingness to pay of Agritourists. Contingent Valuation Method (CVM) is a stated preference approach that elicits a respondent's WTP (Willingness to pay) based on a hypothetical market scenario for valuing the food product under investigation [Khan et al, 2019]. A review of previous studies [Soofi et al., 2023; Ebata et al., 2025; Kim et al., 2025; Kim & Jeon, 2025] regarding the calculation of willingness to pay and the examination of the factors affecting it (studies conducted in different fields other than Agritourism) showed that for model estimation they used the CVM method with Lopez-Feldman model by implementing the double bounded command in Stata software. Revealed preference methods (e.g., the travel cost method, hedonic pricing, etc.) are based on actual market behavior of individuals. Stated preference methods (such as CVM), however, can measure individuals' behavior in a hypothetical market.

This method was first proposed by Ciriacy-Wantrup in 1947, but Davis was the first to implement it in an applied context in 1963 [Hanemann et al., 1991]. The contingent valuation method (CVM) is a survey-based technique, where a hypothetical market situation is created to elicit people's preferences by using different payment vehicles [Hanli et al., 2023]. Contingent valuation implies asking to a sample of the population about their willingness to pay (WTP) for the provision of a given good or service. The name of the method comes from the fact that the elicited values are contingent to the hypothetical scenario that is presented to those being interviewed [Hanemann et al., 1991].

In this study, "willingness to pay" refers specifically to the value of the grape product itself (per kilogram of fresh grapes), not to the broader Agritourism experience (e.g., travel, accommodation, entertainment, or the experiential value of self-harvesting). Respondents were explicitly instructed to state the price they would be willing to pay for one kilogram of freshly harvested grapes, assuming they had already arrived at the vineyard.

The central question of willingness to pay can be posed in questionnaires using various techniques, the most important of which include the Double-Bounded Dichotomous Choice (DBDC) Method. Developed and refined by Hanemann and Carson, this is an extension of the single-bounded approach [Jani et al., 2024; Mahmoodi et al., 2013]. The double-bounded format is statistically more efficient than the single-bounded format, and the confidence interval of the estimated willingness-to-pay is narrower. After the respondent answers the initial bid amount, a subsequent higher or lower bid is presented based on their response. This method collects more information about the distribution of willingness to pay without needing a larger sample size, and significantly improves the precision of the estimated mean willingness to pay [Czajkowski et al.; Zahed Gharavi et al., 2022; Aikoh et al., 2020]. In this method, the first question asks about willingness to pay a proposed amount. If the answer is “yes” a higher bid is proposed; if the answer is “no” a lower bid is proposed. Therefore, the second question is endogenous, depending on the respondent’s answer to the first [Lopez-Feldman, 2013; Aikoh et al., 2020].

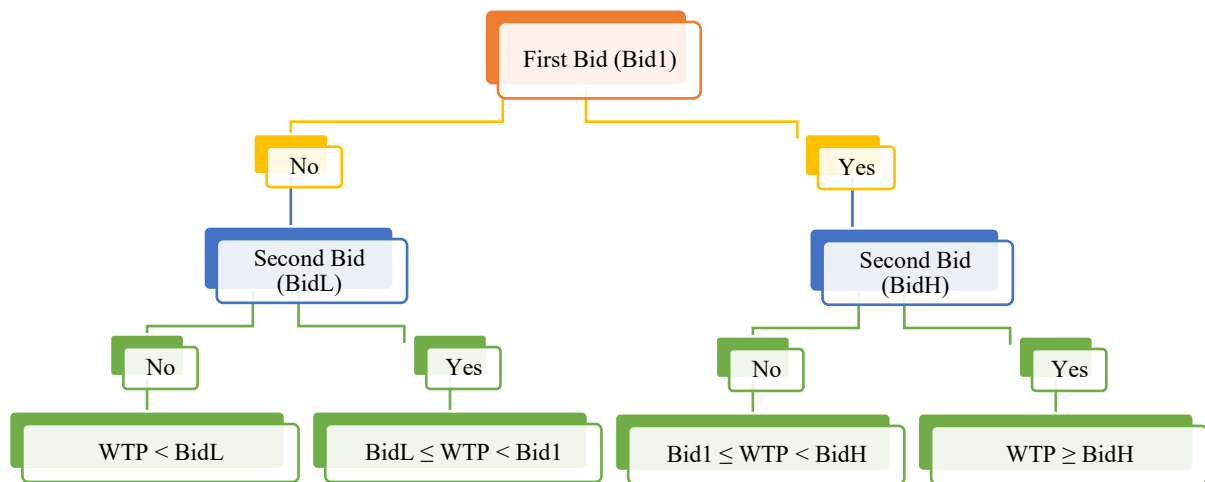


Figure 3. Double-Bounded Dichotomous Choice (DBDC) Model [Hanemann et al., 1991].

Hanemann et al (1991), established that the double-bounded dichotomous choice CV model is asymptotically more efficient than the single-bounded model. Khan et al (2019) recommended the double-bounded dichotomous choice format for eliciting households’ WTP. Based on reviews of existing articles in Iran and worldwide on agritourism, the authors concluded that these articles have mostly examined qualitative evaluations of Agritourists’ willingness to pay

for products (harvested by tourists) and the factors affecting it. This research has used the CVM/DBDC method to calculate and quantitatively examine Agritourists' willingness to pay for grape products and the factors affecting it in Takestan County. In valuation studies, both willingness to accept (WTA) and willingness to pay (WTP) are measured. However, in this research, due to the undeveloped state of Agritourism in the area and the limited statistical population of Agritourists, only willingness to pay (WTP) was examined, primarily because of its greater importance. This approach provides two responses for each individual, thus providing more information; however, it also complicates the econometric estimation of WTP. Let the first offered bid be t^1 and the second offered bid be t^2 , each respondent, upon answering the two dichotomous questions, will fall into one of the following four categories [Lopez-Feldman, 2013]:

1. The individual's answer to the first bid is "no" and the answer to the second, lower bid is also "no": If (no, no) then $(WTP < t^2)$ and $(t^2 < t^1)$

2. The individual's answer to the first bid is "no" but the answer to the second, lower bid is "yes": If (no, yes) then $(t^2 \leq WTP < t^1)$ and $(t^2 < t^1)$

3. The individual's answer to the first bid is "yes" but the answer to the second, higher bid is "no": If (yes, no) then $(t^1 \leq WTP < t^2)$ and $(t^1 < t^2)$

4. The individual's answer to the first bid is "yes" and the answer to the second, higher bid is "yes": If (yes, yes) then $(t^2 \leq WTP)$ and $(t^1 < t^2)$

The algebraic form of the WTP model is as follows [Lopez-Feldman, 2013]:

$$5. WTP_i (Z_i, u_i) = \beta Z_i + u_i$$

$$u_i \sim N(0, \sigma^2)$$

Where Z_i is the vector of explanatory variables, β is the vector of parameters, and u_i is the error term, which is assumed to be normally distributed. In this study, maximum likelihood estimation (MLE) was used to estimate the coefficients of the WTP regression model. In this method, a probability distribution is first specified for the error terms, and using the cumulative distribution function of the error term, the log-likelihood function is formulated. Based on the sample data, coefficients β and σ are maximized. Accordingly, the probability for each of the four respondent categories is calculated as follows [Lopez-Feldman, 2013]:

$$6. P(\text{no, no}) = P(WTP < t^2) = P(\beta Z_i + u_i < t^2) = \Phi\left(t^2 \left(\frac{1}{\sigma}\right) - Z_i \left(\frac{\beta}{\sigma}\right)\right) = 1 - \Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^2 \left(\frac{1}{\sigma}\right)\right)$$

$$7. P(\text{no, yes}) = P(t^2 \leq \text{WTP} < t^1) = P(t^2 \leq \beta Z_i + u_i < t^1) = \Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^1 \left(\frac{1}{\sigma}\right)\right) -$$

$$\Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^2 \left(\frac{1}{\sigma}\right)\right)$$

$$8. P(\text{yes, no}) = P(t^1 \leq \text{WTP} < t^2) = P(t^1 \leq \beta Z_i + u_i < t^2) = \Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^2 \left(\frac{1}{\sigma}\right)\right) -$$

$$\Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^1 \left(\frac{1}{\sigma}\right)\right)$$

$$9. P(\text{yes, yes}) = P(\text{WTP} > t^2) = P(\beta Z_i + u_i > t^2) = \Phi\left(Z_i \left(\frac{\beta}{\sigma}\right) - t^2 \left(\frac{1}{\sigma}\right)\right)$$

These four cases are then incorporated into the log-likelihood function as follows, since the total log-likelihood is the sum of the probabilities of each type of response across the sample [Lopez-Feldman, 2013]:

$$10. \ln L = \sum_{i=1}^N \left(d_i^{nn} \ln \left(1 - \Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - t^2 \left(\frac{1}{\sigma} \right) \right) \right) + d_i^{ny} \ln \left(\Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - t^1 \left(\frac{1}{\sigma} \right) \right) - \right. \right. \\ \left. \left. \Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - t^2 \left(\frac{1}{\sigma} \right) \right) \right) + d_i^{yn} \ln \left(\Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - t^2 \left(\frac{1}{\sigma} \right) \right) - \Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - \right. \right. \\ \left. \left. t^1 \left(\frac{1}{\sigma} \right) \right) \right) + d_i^{yy} \ln \left(\Phi \left(Z_i \left(\frac{\beta}{\sigma} \right) - t^2 \left(\frac{1}{\sigma} \right) \right) \right) \right)$$

(d_i^{nn} , d_i^{ny} , d_i^{yn} and d_i^{yy}), These variables respectively represent one of the four possible response states (Answer1: No and Answer2: No; Answer1: No and Answer2: Yes; Answer1: Yes, and Answer2: No; Answer1: Yes, and Answer2: Yes) for each individual. Depending on respondent's answers, they fall into exactly one of these states. The variable corresponding to that specific state takes a numerical value of 1, while the remaining variables take a value of 0.

All estimations were performed in Stata¹⁷ using the doubleb command (Lopez-Feldman, 2013). The log-likelihood function was maximized using the Newton–Raphson algorithm. Mean WTP and its standard error were computed using the delta method. Sensitivity analysis was conducted assuming lognormal and Weibull distributions for WTP. Protest responses ($n = 11$) were distinguished from genuine zero WTP and excluded from the main estimation. Income and education were re-entered as dummy sets for robustness. A respondent-level bootstrap (500 replications) was used to account for within-respondent dependence.

2.4 Data Collection Tools

The face validity of the questionnaire was confirmed by five faculty members of the university. Data were collected through a structured questionnaire administered to Agritourists, as outlined in Table 1. The questionnaire comprised two main sections:

Section 1: Demographic and Social Characteristics; This section gathered information on age, gender, marital status, education level, monthly income and distance from place of residence to Takestan, car ownership, and intention to stay overnight.

Section 2: Valuation Scenario and Willingness to Pay for Products; to identify the lower and upper bounds of respondents' willingness to pay, a pretest was conducted utilizing an open-ended questionnaire distributed among a cohort of 30 Agritourists. Following the exclusion of amounts perceived by the majority of respondents as either excessively low or excessively high, the mean value was computed to establish the initial bid amount, the secondary higher bid, and the maximum bid. In this context, the minimum bid was calibrated to a level at which virtually all respondents would respond affirmatively, whereas the maximum bid was calibrated to a level at which virtually all respondents would respond negatively. Subsequently, as shown in Figure 3, three price levels—initial bid (Bid1), lower bid (BidL), and higher bid (BidH)—were set to facilitate econometric calculations in Stata₁₇, based on prices per kilogram during the peak grape harvest in Takestan County (September 2024).

Imagine you are visiting a vineyard in Takestan County during the grape harvest season. You may pick grapes yourself (pick-your-own) and purchase them directly from the farmer. What is the maximum price per kilogram you would be willing to pay for fresh [white seedless / red seedless] grapes, given that the quality is high, the grapes are fresh, and payment is made in cash at the time of purchase?

The payment vehicle was a one-time cash payment at the point of sale. No travel, accommodation, or entertainment costs were included in the stated amount. The valuation was performed separately for each product, and respondents provided independent WTP values for each. The target population consisted of non-local visitors present at the Takestan Grape Festival and at roadside grape-product shops during the harvest season (September 2024). According to estimates from the Takestan County Agricultural Jihad Office and the Department of Cultural Heritage and Tourism, approximately 225 non-local individuals visited the region for Agritourism purposes during this period; this figure is an official estimate based

on festival attendance records and shop transaction logs. Using Morgan's table, a target sample of 140 was set. However, because no complete sampling frame was available, a convenience sampling approach was employed: all eligible visitors present at the two sites during the survey period were approached and invited to participate. Of the 168 individuals approached, 140 completed the questionnaire (response rate 83.3%); 28 declined. Inclusion criteria were: (i) being a non-local visitor, (ii) being at least 18 years old, and (iii) being present at the vineyard, festival, or roadside shop at the time of the survey. The unit of analysis was the individual respondent, not the household. Allocation between the festival site (n = 92) and roadside shops (n = 48) reflected availability. We acknowledge that this convenience sampling strategy may introduce selection bias, as visitors at the festival and roadside shops are likely to have a stronger prior interest in grapes than the general tourist population, potentially overestimating WTP. Owing to the confidentiality of the personal information provided by the Agritourists who completed the questionnaire, these data are not publicly accessible and are retained by the authors.

Table 1. Describe the Variables in the Questionnaire.

Variable	Variable Describe	
	White Seedless Grape	Red Seedless Grape
Bid1 (Initial Bid) (in Dollar \$)	0.77 \$	0.99 \$
BidH (High Secondary Bid) (in Dollar \$)	0.99 \$	1.22 \$
BidL (Low Secondary Bid) (in Dollar \$)	0.55 \$	0.77 \$
Y (Response States to Initial and Secondary Bid Amounts)	Y= 1 if (no, no), Y= 2 if (no, yes) Y= 3 if (yes, no), Y= 4 if (yes, yes)	
Age	Continuous variable	
Gender	Male= 1 Female= 0	
Marital	Married= 1 Single= 0	
Education	Illiterate= 1, Diploma= 2, Bachelor= 3, Master of sciences= 4, PhD= 5	
Income (in Dollar \$ per Month)	<265= 1, 266-332= 2, 333-398= 3, 399-553= 4, > 553= 5	
Distance (km)	Continuous variable	
Vehicle	Yes= 1 No= 0	
Stay	Yes= 1 No= 0	

Source: Research findings.

It should be noted that, after data collection through the questionnaire and prior to estimating the econometric model for willingness to pay, the data related to BidH, BidL, and Y must be redefined as new variables, as shown in Table 2. Based on this, the variables Answer1 and Answer2 were constructed to enable the implementation of the dichotomous choice model.

Additionally, the variable Bid2 was defined such that, depending on the respondent's acceptance or rejection of the initial bid, it takes the value of either BidL or BidH.

Table 2. Describe the New Variables in the Model.

Variable	Describe
Answer1	Answer 1= 0 Answer 1= 1 if Y= 3 or Y= 4
Answer2	Answer 2= 0 Answer 2= 1 if Y= 2 or Y= 4
Bid2	Bid2= BidH if Answer 1= 1 Bid2= BidL if Answer 1= 0

Source: Lopez-Feldman, 2013

3. Results

Table 3 shows that the average age of the respondents is approximately 44 years. Males constitute 77% of the participants, and 73% are married. Most of the respondents have completed high school or hold a bachelor's degree. The frequency of sampled individuals across income strata indicates that the frequency in each income group is approximately equal to that of the other groups. The average distance from the participants' place of residence to Takestan County is 172 kilometers, and 84% own a personal vehicle. Additionally, 32% of the visitors expressed willingness to stay overnight in the region. These data reflect a diverse range of visitors participating in Agritourism activities.

Table 3. Characteristics of Agricultural Tourists in the Sample.

Variable	Describe	Frequency	Percentage	Mean
Age	year	-	-	44.4
Gender	Male	108	77.14	-
	Female	32	22.86	-
Marital	Married	102	72.86	-
	Single	38	27.14	-
Education	Illiterate	8	5.71	-
	Diploma	42	30.00	-
	Bachelor	56	40.00	-
	Master of sciences	26	18.58	-
	PhD	8	5.71	-
Income (in Dollar \$ per Month)	< 265= 1	20	14.29	-
	266-332= 2	38	27.14	-
	333-398= 3	24	17.14	-
	399-553= 4	30	21.43	-
	> 553= 5	28	20.00	-
Distance	km	-	-	171.9429
Vehicle	Yes	118	84.29	-
	No	22	15.71	-
Stay	Yes	44	31.43	-
	No	96	68.57	-

Source: Research findings

The Cronbach's alpha coefficients for assessing the reliability of the questionnaire regarding the Answer1 and Answer2 by Agritourists for white seedless grapes and red seedless grapes were found to be 0.84 and 0.87, respectively. A reliability coefficient above 0.7 indicates acceptable reliability of the questionnaire. To examine the dependence (independence) of the Answer2 on the Answer1, the Chi-square test (χ^2) was used. The test results for white seedless grapes is $\chi^2=1.625$ with p-value= 0.202 and for red seedless grapes is $\chi^2=0.568$ with p-value= 0.451. Since the p-value > 0.05, there is no significant dependence between Answer1 and Answer2 for either of the products. Additionally, the normality of the residuals was confirmed using the Kolmogorov–Smirnov test. According to the results presented in Table 4, 84% and 80% of Agritourism tourists were willing to pay for white seedless grape and red seedless grape, respectively. These findings indicate a considerable interest among tourists in participating in Agritourism activities related to grape harvesting.

Table 4. Frequency Distribution of Willingness to Pay.

Crop	Answer 1= Yes		Answer 1= No	
	Answer 2		Answer 2	
	Yes	No	Yes	No
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
White Seedless Grape	44 (31.43%)	48 (34.28%)	26 (18.57%)	22 (15.71%)
Red Seedless Grape	42 (30.00%)	38 (27.14%)	32 (22.86%)	28 (20.00%)

Source: Research findings.

Prior to the estimation of the model, it is essential to carry out standard diagnostic procedures, including testing for multicollinearity and conducting the Breusch–Pagan test to examine the presence of heteroscedasticity. According to the results, the lowest VIF value is 1.18 and the highest is 1.85. These figures are considerably low, confirming that there is no multicollinearity issue in the data, and that all variables can be simultaneously included in the model. The Breusch–Pagan test was employed to examine heteroscedasticity. The test statistic was found to be 12.85, with a corresponding p-value of 0.4602. Consequently, there is insufficient evidence to suggest the presence of heteroscedasticity in the linear model. The error variances are acceptably homoscedastic.

Table 5 presents an examination of the effect of explanatory variables (including the demographic characteristics of agricultural tourists) on the level of willingness to pay within the sample under study. According to the results, the Wald chi-square statistic is statistically significant at the 1% level ($p < 0.01$), indicating that the model as a whole explains a significant portion of the variation in WTP relative to a null model. However, this does not by itself

demonstrate goodness-of-fit. McFadden's Pseudo R^2 was employed to assess the goodness-of-fit of the model. The method of calculating this criterion is presented in Equation (11):

$$11. R^2_{\text{McFadden's Pseudo}} = 1 - \frac{\ln(L_{\text{null}})}{\ln(L_{\text{model}})}$$

Lmodel: The maximum value of the likelihood function of the estimated model (with explanatory variables)

Lnull: The maximum value of the likelihood function of the null model or the model with only an intercept (without explanatory variables)

ln: Natural logarithm

The computed McFadden's Pseudo R^2 falling within the range of 0.1 to 0.2 indicates that the model exhibits an acceptable level of fit. As shown in Table 5, the McFadden's Pseudo R^2 values for white seedless grape and red seedless grape are 0.129 and 0.172, respectively, which indicates that the model provides an acceptable fit. The variables age, income, and intention to stay overnight have a significant and positive relationship with the willingness to pay for white and red seedless grapes.

Table 5. The Effect of Explanatory Variables on Agricultural Tourists' Willingness to Pay in the Sample.

	White Seedless Grape	Red Seedless Grape
Interval regression		
Number of observations	140	140
Log-likelihood	-81.952652	-79.626803
Wald chi2(8)	22.54	30.57
Prob > chi2 (p-value)	0.0040	0.0002
$R^2_{\text{McFadden's Pseudo}}$	0.129	0.172
Coefficient		
Age	0.0067**	0.0078**
Gender	-0.0183	0.0171
Marital	0.0492	-0.0389
Education	-0.0403	-0.0168
Income	0.0817*	0.1114*
Vehicle	-0.0404	-0.5056
Distance	-0.00001	-0.0112
Stay	0.1714**	0.1683**
Constant	0.4185*	0.4562*
Sigma constant	0.2367*	0.2377*

** ~ $p < 0.01$ and * ~ $p < 0.05$

Source: Research findings.

According to Table 6, the average willingness to pay (WTP) among Agritourism visitors for each kilogram of white seedless grape and red seedless grape was estimated at 1.02 \$ and 1.19 \$, respectively. According to the 2024 statistics of the Horticultural Department of Takestan

Agricultural Jihad Organization, intermediary prices for white and red seedless grapes were \$0.27 and \$0.33 per kilogram, respectively. The difference between stated WTP and the intermediary price represents a gross price premium and should not be interpreted as net added value or profit. It merely indicates how much more a tourist is willing to pay compared with the intermediary price.

Table 6. The Agritourists' Mean WTP for White Seedless Grape and Red Seedless Grape.

Crop	Mean WTP	Standard. Error	z	p> z	[95% Conf. Interval]	
White Seedless Grape	1.02 \$	0.1664	6.13	0.001	0.6937	1.3459
Red Seedless Grape	1.19 \$	0.1674	7.11	0.001	0.8661	1.5222

Source: Research findings.

4. Discussion

Although several studies have examined Agritourists' preferences and motivations (e.g., Arumugam, 2018; Khan et al., 2019; Pitas & Chen, 2023; Tong et al., 2024; Suprianti et al., 2025; Rahmani et al., 2025), few have provided quantitative, product-specific WTP estimates using a DBDC-CVM design. Our study contributes by providing WTP estimates for two specific grape products in Takestan County. Compared with Arumugam (2018), who found that consumers at direct marketing outlets in Sri Lanka were willing to pay a premium of about 20–30% over supermarket prices, our estimated premia are considerably larger, which may reflect differences in product type, cultural context, and the hypothetical nature of our scenario. Our findings also complement Rahmani et al. (2025), who identified vineyards with diverse cultivars and favorable tourism conditions as key strengths of the Takestan region. The results of the study showed that the willingness to pay of Agritourists exceeds the price paid by intermediaries, aligning with the study's hypothesis. Additionally, addressing the primary research question, the results revealed a willingness to pay among Agritourists for pick-your-own grape purchases directly from the vineyard. This study has successfully established a clear and positive link between the importance of the value-based pricing framework for agricultural products and its empirical and practical analysis within the real-world context. However, two main critical perspectives can be raised concerning the obtained results: First, it is not possible to market the entire grape yield from the vineyards exclusively through Agritourism channels. Nevertheless, it can be interpreted that if a part of the producer's output is sold to Agritourists and the remaining part through brokers and intermediaries, the vineyard owners can still expect higher income compared to selling all products solely to intermediaries. **Second, readers might**

find the estimated values of willingness to pay higher than expected. This can be explained by the possibility of hypothetical bias in the contingent valuation method used to estimate WTP. In other words, this bias occurs when there is a discrepancy between a respondent's stated preference and their actual behavior or real-world valuation [Hensher et al, 2015]. Although hypothetical bias can potentially arise in any stated preference study, its identification is difficult and is often ignored due to the lack of real-world data required for its detection or correction [Lancsar & Burge, 2014]. According to the researchers, the hypothetical bias in this study may have resulted from the influence of excitement and enthusiasm created by the Grape Festival, as well as the tourists' supportive motivations toward the farmers. Despite these critical considerations, the promising results of this study can be regarded as an initial step toward understanding the effects of agritourism on farmers' income in the Takestan region. Nevertheless, the findings should be interpreted with caution in policymaking and support programs, and further comprehensive research is recommended if necessary.

5. Conclusions

Since Agritourism has not yet been implemented on a large scale in the study region, it was not possible to compare the stated WTP values with observed farm-gate or retail prices for direct sales. Accordingly, the reported ratios should be interpreted as stated gross price premiums relative to intermediary prices, rather than as value added or realized profit. The estimated WTP values demonstrate variation across products, suggesting that Agritourists are willing to pay premium prices when purchasing directly from farms. The results indicate a positive association between overnight-stay intention and stated WTP. However, because the data are cross-sectional and overnight-stay intention is plausibly endogenous, this relationship should not be interpreted as causal. Similarly, the associations with distance and gender may reflect site-selection effects and household purchasing roles rather than genuine preferences. Accordingly, we refrain from drawing causal or global policy conclusions. Instead, we suggest that if agritourism were to be developed in the region, complementary investments in rural accommodation and infrastructure could potentially enhance visitor experience and farm revenues—a hypothesis that requires further testing with longitudinal or experimental data. Policies promoting direct sales and "pick-your-own" experiences could be considered, but their scalability and profitability require rigorous evaluation. Support for value-based pricing, in

which products are priced according to visitors' WTP, could be examined alongside direct marketing initiatives. This study has several limitations. First, the use of convenience sampling from festival and roadside sites likely introduces selection bias and may overestimate WTP. Second, the hypothetical nature of CVM may generate hypothetical bias, anchoring, and repeated-task effects. Third, income and education were treated as linear scores; although robustness checks with dummy variables are reported, residual measurement error may remain. Fourth, the geographical scope is limited to Takestan County, and only two grape varieties were examined. Fifth, cross-sectional data cannot support causal inference. Sixth, the seasonality of the study, the short duration of the grape harvest festival, and the lack of extensive advertising were additional limitations. Seventh, because agritourism has not yet been implemented at scale in the region, it was not possible to compare stated WTP with observed farm-gate or retail prices for direct sales.

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تمایل به پرداخت گردشگران کشاورزی برای محصولات انگور در شهرستان تاکستان

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چکیده

چالش‌هایی نظیر فسادپذیری، قیمت‌های پایین، افزایش هزینه‌های تولید و نوسانات بازار، توانایی تولیدکنندگان را در تعیین مؤثر قیمت‌ها کاهش می‌دهند. با این حال، تقاضای ناشی از تمایل گردشگران کشاورزی (Agritourists) به پرداخت، نقشی حیاتی در تعیین قیمت‌های تعادلی ایفا می‌کند. گردشگری کشاورزی با فراهم کردن امکان بازدید گردشگران از باغ‌ها و برداشت مستقیم محصول توسط خودشان روش «خود-برداشت» یا (pick-your-own)، به کشاورزان اجازه می‌دهد تا محصولات را مستقیماً به فروش رسانده و احتمالاً به قیمت‌های بالاتری دست یابند. مطالعه حاضر با هدف برآورد تمایل به پرداخت گردشگران کشاورزی برای محصولات انگور (ارقام سفید بی‌دانه و قرمز بی‌دانه) و همچنین ارزیابی ارزش افزوده ایجاد شده توسط گردشگری کشاورزی در شهرستان تاکستان ایران انجام شده است. داده‌ها از طریق ترکیبی از مرور پیشینه پژوهش و یک پیمایش میدانی (شامل تکمیل ۱۴۰ پرسشنامه توسط گردشگران حاضر در جشنواره انگور تاکستان و گردشگران عبوری از فروشگاه‌های حاشیه جاده در منطقه طی فصل برداشت در سپتامبر ۲۰۲۴) گردآوری شدند. در این پژوهش از روش نمونه‌گیری در دسترس استفاده شد و مدل «ارزش‌گذاری مشروط (CVM)» با طرح «انتخاب دوگانه با کران دوگانه (DBDC)» در نرم‌افزار Stata17 و با استفاده از دستور doubleb برآورد گردید. نتایج نشان داد که میانگین تمایل به پرداخت برای هر کیلوگرم انگور سفید بی‌دانه و قرمز بی‌دانه به ترتیب ۱.۰۲ و ۱.۱۹ دلار بوده است. همبستگی‌های مثبت و معناداری میان تمایل به پرداخت (WTP) و متغیرهای سن، درآمد و قصد اقامت شبانه مشاهده شد. قیمت‌های واسطه‌گری (قیمت فروش به دلالتان) برای همان دوره به ترتیب ۰.۲۷ و ۰.۳۳ دلار به ازای هر کیلوگرم بود که حاکی از صرف قیمت (price premium) ناخالص اظهارشده‌ای معادل تقریباً ۳.۸ و ۳.۶ برابر قیمت واسطه‌گری است. این تفاوت نشان‌دهنده صرف قیمت ناخالص اظهارشده نه ارزش افزوده خالص است.