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## Article

# Willingness to pay for the preservation of urban green space in Indonesia

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## GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

# Willingness to pay for the preservation of urban green space in Indonesia

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**Abstract:** Padang has just begun to build an urban green space to increase the quality of the urban environment and provide recreational opportunities to residents. In such cases, a well-informed professional management plan needs to be formulated to preserve a better environment. Therefore, this study seeks to determine the visitors' willingness to pay for the preservation of urban green space. This study was carried out at the Urban green space of Imam Bonjol Park Padang using a survey approach, and the respondents were chosen using the purposive technique. The logistic regression shows that the willingness to pay for the urban green space is affected by the visitors' perception of Imam Bonjol Park, the knowledge of functions, and marital status. The empirical results show that income, family dependents, and park-related factors are insignificant in influencing willingness to pay for the urban green space. Using the Contingency Valuation Method, this study discovered that most visitors are willing to pay some amount for environmental preservation, and the estimated amount is IDR. 4,877. The empirical results have a few practical implications. As a result, this study suggests launching awareness-raising programs.

### ABOUT THE AUTHOR



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Idris, Idris is an Associate Professor in the Department of Economics, Faculty of Economics, Universitas Negeri Padang, Indonesia. Now, he is the dean of the Faculty of Economics at Universitas Negeri Padang. His primary research interests are mainly the economics of natural resources and the environment. He has published articles in several disciplines, including economics, the economics of natural resources and the environment, and pollution research. Mohammad Enamul Hoque earned a Doctor of Business Administration in Finance from Universiti Kebangsaan Malaysia. Dr. Hoque's research focuses on financial economics and financial consumer behavior. Perengki Susanto is an Associate Professor at Department of Management, Faculty of Economics, Universitas Negeri Padang. His main areas of interest in research include strategic management and marketing. He has published journal articles in the fields of entrepreneurial orientation, social media capability, market orientation, marketing capabilities, e-money, strategic management challenges, and SME research.

### PUBLIC INTEREST STATEMENT

This study examines the visitors' willingness to pay for the preservation of urban green space. This study was carried out at the Urban green space of Imam Bonjol Park Padang using a survey approach, and the respondents were chosen using the purposive technique. The results show that the willingness to pay for the urban green space is affected by the visitors' perception of Imam Bonjol Park, the knowledge of functions, and marital status. The empirical results show that income, family dependents, and park-related factors are insignificant in influencing willingness to pay for the urban green space. This study has estimated that most visitors are willing to pay some amount for environmental preservation, and the estimated amount is IDR. 4,877.

**Subjects:** Urban Economics; Economics and Development; Environmental Economics

**Keywords:** Urban green space; willingness to pay; contingency valuation method

## 1. Introduction

Open green space is considered as public goods. Citizen want a clean and wide-open space with some public facilities and infrastructures such as parking areas, health equipment, public toilets, children's playgrounds, and other supporting infrastructures (Do et al., 2019; Xiao et al., 2017; Xu et al., 2020). More importantly, the open green space facilitates to having a greener community and healthier social life (Worpole, 2007). It enhances the beauty of the environment and the ecological balance with a better atmosphere (Cole et al., 2019; Du et al., 2019; Safaee & Ghafoori, 2016). Although the quality of open green space is not up to standard, it yet helps people to have a desired quality living life (Nasution & Zahrah, 2012). Additionally, the deployment of open green space has various purposes such as for recreation with family and for improvement of family relations (Song et al., 2015). Therefore, open green space for the community is essential, especially in urban areas which is a densely industrial areas and is having serious air pollution.

As the open green space belongs to public goods category, it possesses some characteristics such as non-exclusive and non-rivalry. Additionally, since there are not fully reflected in the price, public goods can generate market inefficiencies (Abelson, 2019). More critically, the sustainability of public goods in developing countries such as Indonesia is questionable at its best, as public goods have properly not been maintained by the community. In these countries, government involvement in ensuring the sustainability of public resources is strongly recommended and necessary (Anguluri & Narayanan, 2017; Stiglitz & Stiglitz, 2000). In supporting this, UNIDO (2008) suggested that protecting environment is important economic development and preserving green space is better for health and human development.

Furthermore, existing research indicates that the government bears a greater responsibility for protecting and preserving public goods like green space from waste and pollution (Cho et al., 2005). Cho et al. (2005) and Dahal et al. (2018) maintaining public goods such as urban green space is not only the responsibility of the government but also of the residents or community. Therefore, the collaboration among various stakeholders, including the government, private sector, and citizens, is required. For example, they may collaborate for maintaining cleanliness of the urban green space (Jim, 2004). extant studies also report that citizens are willing to pay for maintenance and preservation of public goods (e.g., Dahal et al., 2018; S. R. Einarsdóttir et al., 2018; Schuhmann et al., 2019; Sardana, 2020; Xu et al., 2020).

Padang is the biggest city on the western coast of Sumatera Island, and it is regarded as the capital city of the West Sumatera province. The city has an area of 694.96 Square-Kilo-Meter, which is bordered by the sea and surrounded by the hills. It is situated about 1.85 meters above sea level and is inhabited by nearly 1 million residents. Padang is characterized by an urban area facing the Indian Ocean and surrounded by the mountainous range of Bukit Barisan. The development of the urban area starts from the old town of Muara Batang Arau to the northern and eastern parts of the city. In line with the disaster mitigation-based city development, the eastern region of Padang has been developed into residential areas and an educational centre, while the western part of the city, adjacent to the coast, is situated as commercial areas and a business centre.

In 1995, the government of Padang City developed urban green space with the intention of improving the quality of the urban environment and providing recreational facilities for the people. The space has ecological functions such as to maintain the quality of the environment, filter various pollutants (gases and dust), bond carbon dioxide, and control microclimate. In this case, an urban green space, Imam Bonjol Park is seemingly not well-managed (Iqbal & Jumiaty, 2019).

Without prior notice, it is often used for activities that could interfere with the pleasantness of visitors and detract from the beauty of the city (Wepriadi & Marjohan, 2020). Therefore, in order to manage the Imam Bonjol park well and assure the preservation and cleanliness of the park, some information regarding the characteristics of the visitors, the visitors' perception about the existence of the park, and the visitors' willingness to pay is needed. Furthermore, it is also important to identify the factors affecting the visitors' willingness to pay.

Therefore, this study aims to examine visitors' perceptions of the existence of the park and the visitors' willingness to pay for green open space in the city of Padang, Indonesia. To best of our knowledge, this is that first initiative to investigate willingness to pay for green open space in Indonesia. Therefore, this study is important for understanding residents' perceptions towards green open space in Indonesia countries and their intention to pay for public goods. This is especially important for policy practices, as the purpose of pricing public goods is not profit-oriented but resource efficiency and equity-oriented. More importantly, improving the quality of the environment through the availability of green open space can increase consumer surplus in the use of environmental goods such as for recreation, leisure, trading, breathing fresh air, and so forth. Additionally, the research findings about the visitors' willingness to pay might become a benchmark in the price decision making. Accordingly, this finding will be valuable for decision makers, such as the Mayor of Padang as well as other city administrators in Indonesia, in managing the urban green space. The revenue from this urban green space will be useful for the operational and environmental costs. Finally, it also has new insight into the relationship between a visitor's perception and their willingness to pay.

## 2. Literature review

Law No. 26, Year 2007, has been set on spatial planning of the city for which the Ministry of Public Works issues Regulation No. 05/PRT/M2008 about urban green space as its implementation guidance. The main (intrinsic) functions of urban green space are ecological functions, while its additional (extrinsic) functions are social and cultural functions, economic functions, and aesthetic functions. To keep the space functioning properly, support and participation from society are necessary, one of which is their willingness to pay (WTP) an amount of money to preserve the area.

Urban green space (UGS), consisting of greenery in open spaces, contributes notably to a healthy living environment. They offer residents without doors recreational opportunities and opportunities to interact with nature in order to foster a harmonious people-environment relationship (C. Y. Jim, 2004; Kaplan & Kaplan, 1989; Miller & Friesen, 1983). Estimating the non-market benefits that stem from urban green spaces (UGS) is not an easy task, given the market failure associated with public goods. Consequently, questions concerning the economic value of public goods have been addressed by economists using different approaches.

The contingent valuation method (CVM) is the most widely used empirical method in experimental economics to measure the demand for non-market goods (Jin et al., 2019; Mitchell et al., 1989; Mjelde et al., 2017). This survey approach relies on asking the respondents in a hypothetical market how much they are willing to pay for a specific public good. The attraction of contingent valuation is that it facilitates the construction of a market in which the researcher can observe an economic decision directly related to the good in question (Hanemann, 1994; Mitchell et al., 1989). The CVM relies on a direct questionnaire approach, asking a sample of individuals to state their hypothetical maximum willingness-to-pay (WTP) for preserving an environmental asset or their minimum willingness-to-accept (WTA) the loss of that asset. The method values environmental benefits or losses directly; therefore, it is usually termed the "stated" or "expressed preference" method (Bateman, 1999).

The previous studies on the CVM in measuring environmental issues are neglected (Breffle, Morey, & Lodder, 1998; Damigos & Kaliampakos, 2003; del Saz Salazar & Menendez, 2007; Chi Yung Jim & Chen, 2006; Lo & Jim, 2010; Tyrväinen & Väänänen, 1998), in predicting the economic

value of an environment, the CVM approach has several benefits, including (1) it could be applied in any conditions and is frequently chosen as the only technique used to estimate benefits, and applicable in every context of environmental policy, (2) it could be used to estimate the value of the environmental goods around the people, (3) compared to other environmental assessment techniques, CVM is potential to estimate the value of non-users from which an individual may be able to measure the utility of environmental goods which are used indirectly, and (4) even though CVM technique requires competent analysis, the research findings are easy to analyse and explain.

Hanley and Spash (1993) state that there are several phases conducted in the application of CVM analysis covering (1) designing hypothetic market, (2) acquiring the offering value of the WTP, (3) estimating the median and average values of the WTP, and (4) estimating the curve of the WTP. The curve of the WTP could be estimated by using WTP value (the dependent variable) and the factors affecting the value (the independent variable). It is used to approximate the changes over WTP value due to the changes over a number of variables related to the quality of the environment. There are several independent variables that could affect the WTP value, some of which are level of income (Y), level of education (E), level of knowledge (K), age (A), and some variables determining the quality of environment (Q). The relationship between independent and dependent variables can be linearly correlated with the general equation form,  $WTP_i = f(Y_i, E_i, K_i, A_i, Q_i)$ .

Buckley et al. (2009) measures the WTP of visitors for public access and the development of treks in public cultural areas used for recreational facilities in high-land and low-land regions in West Ireland by using CVM. Based on the research, it is revealed that 54% of the sample living on the high-land region and 44% of those living on the low-land area give positive WTP toward the “scenario implementation” offered. The research also finds that the scenario implementation offered to the people on the lowland area has better preference than that offered to those living on the highland region which is reflected by the WTP median. The WTP median of the lowland is € 12.22 and that of the highland is € 9.08.

Baumgärtner et al. (2017) explained that the community must contribute to the management of open green space by wanting to pay for environmental goods. This research found that people’s willingness to pay depends on the income distribution of each household. Hence, it can be explained that if income is not evenly distributed among identical households, there are some consequences, including (i) the social willingness to pay for environmental management (public goods) increases as the increase of average income, (ii) willingness to pay social money for environmental public goods is reduced if environmental public goods are complementary goods, (iii) the effect of income inequality on the desire to pay is stronger if the average income is higher, and (iv) the desire to pay for public environmental goods changes more elastically with the average household income compared to income inequality.

Dahal et al. (2018) have conducted a study by using CVM analysis to estimate the willingness of citizens to pay (WTP) for preserving coastal city open space in Alabama and Mississippi. The results of their study explained that 56.91% of respondents used green open space regularly for various purposes, while 4.42% of respondents never used green open space. There is a difference in the respondents’ willingness to pay for preserving green open space. They found that 53.96% of respondents agreed to pay any amount of money to protect green open space, while 20.05% of respondents did not agree to make payments to protect green open space, and the rest of the respondents believed that green open space must be protected by using public and private initiatives. Respondents who agree to pay, have a willingness to spend \$ 90.72 per household to maintain green open space. They have a concern about the potential improvement in environmental quality. Einarsdóttir et al. (2019) have conducted a similar study which found that most respondents (57.5%) responded positively by being willing to pay for wind farm management, while only 23.1% of the respondents had responded negatively and were not willing to pay. The remaining 19.3% stated that they did not want to respond to the questions.



Schuhmann et al. (2019) explain that some visitors are willing to pay a conservation fee of US \$ 25 and more than 80% of visitors are willing to pay an environmental maintenance fee of US \$ 1 to US \$ 5. The results of this study also explained that the willingness of the community to pay for conservation costs was far more beneficial compared to other public facilities payments such as entrance fees for marine parks. (Sardana, 2020) has found a similar finding in her study of 1029 visitors to traditional agro-forest ecosystems providing biodiversity. She explains that the visitors will get positive benefits from the restoration of native tree species and they are willing to pay an average of INR 187 for the restoration program. Xu et al. (2020) examined WTP for urban green space in the Pinggu District of Beijing, China, using a questionnaire survey and the CVM method. They found that 55.90% of the respondents were willing to pay around 57.56 CNY to conserve green spaces. They also noted socio economic factors like education and income play important roles in determining whether respondents intend to pay for any public goods like green spaces.

Depending on prior research, we can assume that determining the WTP for open green space as a public good in different areas and nations is intriguing since there are differences in findings based on demographics, social-economic variables, and visiting or park-related CVM. For example, Baumgärtner et al. (2017) found that people's willingness to pay depends on the income distribution of each household. Contrary to Dahal et al. (2018) have estimated the willingness of citizens to pay (WTP) in preserving coastal cities open space in Alabama and Mississippi, in which a difference in the respondents' willingness to pay for preserving green open space. Also, Schuhmann et al. (2019) explained that the willingness of the community to pay for conservation costs was far more beneficial compared to other public facilities payments such as entrance fees for marine parks. In a variety of circumstances, people's willingness to pay (WTP) for green projects has been studied (Kang & Nicholls, 2020). Based on Social Identity Theory (Tajfel & Turner, 1986), a positive relationship between environmental concern and WTP to promote green behaviors can be expected.

With the literature survey, we noted that in the Indonesian context, there is limited research on WTP for green space. In that case, our study is the first attempt to investigate the context of Sumatera City, Indonesia. Therefore, the study will add knowledge to the emerging market, given the country's unique social-economic and demographic distribution compared to countries like China and India. Thus, the current study will facilitate a comparative understanding of WTP for green space in the emerging market. Hence, the current study builds on the findings of prior research. Based on these findings, we need to look into more demographic factors (gender, age), social-economic variables (education, income, and family dependents), and visiting or part-related factors (comprehension and knowledge, visiting origin, frequency of visiting, visiting fees, and perceptions of Imam Bonjol Park Padang) to get a better understanding of WTP in developing countries.

### 3. Methods

#### 3.1. Study area

This study was undertaken at Imam Bonjol Park, Padang's urban green space. Padang is the largest city on Sumatera Island's western coast, and it serves as the provincial capital of West Sumatera. Padang is an urbanized city that faces the Indian Ocean and is surrounded by the Bukit Barisan Mountain range. It is the 16th most populated city in Indonesia and the most populous city on the west coast of Sumatra, with a Census population of 909,040 as of 2020. Padang is Sumatera's third-largest urban area, with a population of about 1.4 million people. Padang is famous for its Minangkabau culture, cuisine, and beach sunsets. Padang's urban green space is also designed as an earthquake evacuation camp, so it will provide amenities for those who visit.

#### 3.2. Variable selection

##### 3.2.1. Willingness to pay

The focal variable is willingness to pay, as we want to estimate visitors' willingness to pay for Imam Bonjol Park Padang's Urban green space. We asked open questions about how much the

visitors were willing to pay (maximum). A similar approach has been employed in the studies of Xu et al. (2020) and Schuhmann et al. (2019).

### 3.2.2. Demographic factor

In estimating the WTP of any public or non-public goods, demographic factors play important roles in the decision-making process.

- *Gender*: It plays an important role in decision-making process, especially in financial decisions. The study of Hanley and Spash (1993), Buckley et al. (2009), and Baumgärtner et al. (2017) included gender in their studies. We, therefore, they should be included in the analysis.
- *Age*: It plays a critical factor in WTP decisions because paying capacity varies with age. Age has been included in the studies of Hanley and Spash (1993), Buckley et al. (2009), Baumgärtner et al. (2017), and Li et al. (2018) also showed difference in WTP among different age groups. In study, we hence have different age groups.

### 3.2.3. Socio-Economic variable

- *Education*: It is another important factor which could affect the WTP of any individual. Xu et al. (2020) note education has been promoting WTP for urban green space in the Pinggu District of Beijing, China. Therefore, we also conjecture that education level is important in WTP. We have included several levels of education, from secondary to postgraduate level.
- *Income*: Income level has always been a factor in the expenditure level of any individual. Therefore, several studies have included income as a factor of willingness to pay (Baumgärtner et al., 2017; Buckley et al., 2009; Hanley & Spash, 1993). Hence, following past studies, we consider that income level could influence willingness to pay.
- *Family Dependents*: The numbers of family members or dependents influence the expenses and savings. Therefore, it could influence the amount that is willing to pay for Imam Bonjol Park Padang's urban green space maintenance.

### 3.2.4. Visiting or park related

- *Comprehension and Knowledge*: Knowledge is crucial for making informed decisions. Hanley and Spash (1993) found the knowledge influenced WTP. Thus, in this study, we consider comprehension and knowledge to estimate the willingness to pay for Imam Bonjol Park Padang's urban green space maintenance.
- *Visiting Origin*: It refers to distance of park from the living place. Distance to visiting origin has impact on visitor's WTP
- *Frequency of Visiting*: It is an important factor that motivates visitors to pay for the maintenance of the park. If an individual visits the park very frequently, that individual's willingness to pay for Imam Bonjol Park Padang's Urban green space maintenance will be higher. Therefore, we believe that the frequency of visiting could be a significant explanatory factor of WTP.
- *Visiting Fees*: Sardana [18] has found entrance fees have an influence on traditional agro-forest ecosystem restoration. Hence, we believe that visiting fees will play an explanatory role for WTP for Imam Bonjol Park Padang's Urban green space maintenance.
- *Perceptions toward Imam Bonjol Park Padang*: Understanding visitor perception is critical for management in order to know what visitors think about the park. Therefore, before estimating WTP for Imam Bonjol Park Padang's Urban green space maintenance, we study the perception of visitors towards Imam Bonjol Park Padang's Urban green space. The following measurement items used to observe the perception of visitors towards Imam Bonjol Park Padang's Urban green space as shown in [Table 1](#).



**Table 1. Measurement items perception towards Imam Bonjol Park**

No	Statement	SA	A	U	D	SD
1.	The location of Imam Bonjol Park is easy to reach					
2.	Recreational facilities (places to sit, play, etc.) in the Green Open Space area are fully available					
3.	Public facilities (toilet, prayer room) are available					
4.	At the Imam Bonjol Park location, security is guaranteed					
5.	It is easy to get the required information at Green Open Space					
6.	Green Open Space of Taman Imam Bonjol is well organized					
7.	Green Open Space of Taman Imam Bonjol is clean					
8.	Traders are not selling in Green Open Space area.					
9.	Playground for children in the Green Open Space area is well organized.					

### 3.3. Empirical method

#### 3.3.1. Logistic regression

Past studies have used logistic regression to understand the influence of explanatory variables on WTP (Halkos & Matsiori, 2012; Makwinja et al., 2019; Sardana, 2020; Wang et al., 2018). According to Gujari (2004), the approach is appropriate when examining the relationship between one or more categorical predictors and binary categorical dependent variable. Therefore, we employ a logistic regression approach to examine the relationships of the explanatory variables with WTP for the preservation effort of Imam Bonjol Park Padan. We assume that WTP variables either 1 or 0 thus probability WTP for

the preservation effort of Imam Bonjol Park Padang.  $\pi_i$  = Probability (WTP =1), is related to explanatory variables Z. The logistic model of the WTP is presented in the following equation (1).

$$\text{Log}\left(\frac{\pi_i}{1 - \pi_i}\right) = C + \gamma Z_i \tag{1}$$

Where  $Z_i$  is vector of is a vector of explanatory variables that may influence visitors' willingness to pay for the preservation effort of Imam Bonjol Park Padang, C is intercept,  $\gamma$  is the vector of coefficients, and  $\left(\frac{\pi_i}{1 - \pi_i}\right)$  is the odds ratio in favor willingness to pay for the preservation effort of Imam Bonjol Park Padang, where the odds ratio of the probability of being willingness to pay to the probability of unwillingness to pay. This model assumed the log of the odds is a linear function of the explanatory variables, Z. The further description of the variables showed in Table 2.

### 3.3.2. WTP estimation with contingent valuation method

In experimental economics, the contingent valuation method (CVM) is the most widely used empirical method for calculating value or price for non-market products (Jin et al., 2019; Mitchell et al., 1989; Mjelde et al., 2017). Following the study of Hanley and Spash (1993) and Xu et al. (2020), we set-up the CVM approach with following steps:

- (1) Establishing the hypothetic market,
- (2) Getting an offer of the WTP value,
- (3) Estimating the average value of WTP,
- (4) Estimating the WTP using the function,  $WTP = f(\text{JK, UM, SP, TP, PD, JT, PM, FK, PsP, DM, BK})$ .

**Table 2. Description of variables used in logistic regression**

Coding	Definition of variables	Description of Variables
JK	Gender	Dummy variable where male = 1 and female =0
UM	Age	Continuous
SP	Marital Status	Dummy variable where married status = 1 and single = 0
TP	Level of Education	Dummy variable where elementary school level = 1, junior high school level = 2, senior high school level = 3, diploma level = 4, and university level = 5.
PD	Income (converted \$ where \$1 = Rp 14.000)	Continuous
JT	Total Number of Dependents	Continuous
PM	Knowledge about the Functions of Imam Bonjol Park Padang	Dummy variable where 0 = has knowledge on functions of Iman Bonjol Park Padang and 1 = otherwise.
FK	Visiting Frequency	Continuous
DM	Visit Origin	Dummy variable where local resident =0 and outside resident = 1
BK	Visiting Fee (converted \$ where \$1 = Rp 14.000)	Continuous
PsP	Perceptions toward Imam Bonjol Park Padang	Five-point scale
WTP	Willingness to Pay	Yes =1 and No =0

In addition, we employ OLS regression to estimate the WTP amount and determine the factors that affect the value of visitors' WTP at Imam Bonjol Park Padang. The following equation (2) show the OLS presentation.

$$\begin{aligned} WTP_i = & \beta_0 + \beta_1JK_i + \beta_2UM_i + \beta_3SP_i + \beta_4TP_i + \beta_5PD_i + \beta_6JT_i + \beta_7PM_i + \beta_8FK_i + \beta_9PsP_i \\ & + \beta_{10}DM_i + \beta_{11}BK_i + \epsilon_i \end{aligned} \quad (2)$$

### 3.4. Data collection

This research was conducted at the urban green space of Imam Bonjol Park in Padang using a survey technique. The data covers the responses given by the respondents on their willingness to pay for preserving the urban green space of Imam Bonjol Park Padang. The sample of the research was taken by making use of Non-Probability Sampling. This method was chosen as the number of the population was uncertain. The respondents were chosen using a purposive technique from those over the age of 17. We have collected data from 200 respondents (80% response rate), and those were employed in the estimations. This data has fulfilled the minimum sample statistically to achieve research power of 0.8 as suggested by Hair et al. (2014).

By establishing a situation, the data collection for the willingness to pay was completed. The conditions of Imam Bonjol Park Padang at this time were defined in the constructed scenario. We have included the condition of the environmental quality, the tourist attributes, as well as the issue of funds which were the constraints of the development and preservation of the environment. Imam Bonjol Park was explained in the scenario as an urban green space that exists to enhance the quality of the urban living environment. It is comfortable and beautiful, particularly for the people of the city, and it also functions as a means of recreation. Furthermore, it was also explained that the management team plans to make an effort to improve and preserve Imam Bonjol Park Padang, which requires the active participation of the visitors by withdrawing the visiting fee. Later, the fee will be allocated as operational funds which will be used to improve the recreational and public facilities, pay for the salaries of janitors in order to monitor the cleanliness of the urban green space as well as pay for the procurement of the infrastructure and facilities to support recreational activities at the location.

## 4. Results and discussion

### 4.1. Result

#### 4.1.1. Preliminary analysis

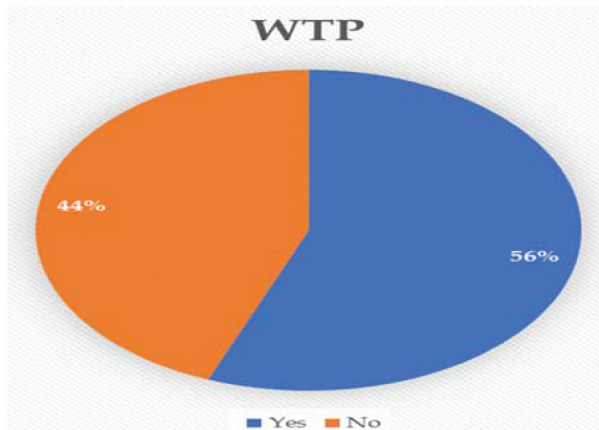
Data was collected directly from 200 respondents visiting the urban green space of Imam Bonjol Park Padang. 60 percent are female and 40 are male respondents. In terms of age group, 49 percent are between the ages of 29 and 55. Additionally, 65 percent are married, 62 percent have a high school diploma, the majority are housewives (31 percent), and the remainder pursue entrepreneurship (19 percent) and other occupations, with the majority of respondents earning less than the provincial minimum wage. Most of the respondents who visited the urban green space of Imam Bonjol Park in Padang were people who lived in Padang city (81 percent), and just 19 percent came from outside of Padang city. More details can be seen in [Table 3](#).

According to the descriptive findings, more than half of those who took part in the study intend to pay for green space preservice in Imam Bonjol Park Padang. [Figure 1](#) shows that 56% of the visitors were willing to pay, while the remaining 44% were not willing to pay for the environmental conservation efforts of Imam Bonjol Padang. In the context of willingness to pay by visitors, the study of Schuhmann et al. (2019) found that some visitors are willing to pay a conservation fee of US \$25 and more than 80% of visitors are willing to pay an environmental maintenance fee of US \$1 to \$5. As a result, the WTP descriptive statistics indicate that visitors to green space like Imam Bonjol Park Padang are likely to pay for it. Furthermore, [Figure 2](#) shows the frequency distribution of those who were willing to pay. [Figure 2](#) shows that 58% of them were willing to pay for about

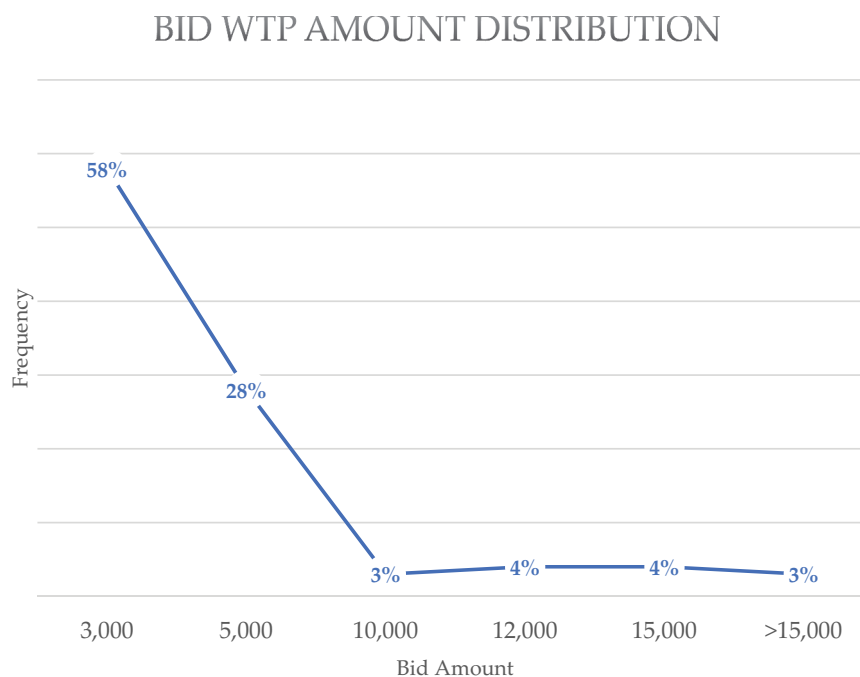
**Table 3. Descriptive statistics**

Definition of variables	Information Category	Value	Percent	Mean ± STD Error	Min-Max
Gender	Female	119	59.5	0.41 ± 0.03	0
	Male	81	40.5		1
Age (years)	Continuous	200	-	32.58 ± 0.78	16-83
Marital Status	Single	71	35.5	0.65 ± 0.03	0
	Married	129	64.5		1
Level of Education	Junior High School	22	12	3.43 ± 0.08	1-5
	Senior High School	124	62		
	Diploma	7	3.5		
	University	47	24		
Income (\$)	Continuous	200	-	189.72 ± 110,082.80	14-714
Total Number of Dependents	Continuous	200	-	2.14 ± 0.12	0-10
Knowledge about the Functions of Imam Bonjol Park Padang	No	31	15.5	0.85 ± 0.03	0
	Yes	169	84.5		1
Visiting Frequency (times)	1 time	13	6.5	4.62 ± 0.12	1-4
	2 times	18	9		
	3 times	30	15		
	More than 3 times	139	70		
Visit Origin	Local residents	37	18.5	0.82 ± 0.03	0
	Others	163	81.5		1
Visiting Fee (\$)	Continuous	200	-	4.29 ± 4798.36	0.25-50

**Figure 1. WTP (Yes/No).Source: Authors' Calculation**



**Figure 2. WTP amount distribution.Source: Authors' Calculation**



IDR. 3,000, 28% of them were willing to pay for about IDR. 5,000, 3% of them were willing to pay for about IDR. 10,000, 4% of them were willing to pay for about IDR. 12,000, 4% of them were willing to pay for more than IDR. The curve is showing a downward trend in response to the higher amount. Such behaviour of visitors is consistent with the theory of consumer choice and preference. The Figure 2 suggests that visitors are willing to pay lower amounts.

To have some preliminary understanding of the perception of respondents about the existence of green space in Imam Bonjol Park Padang, we have included some questions related to residents' perception of green space in Imam Bonjol Padang. From the survey results, we observed that 97% of them stated that the location is easily accessible. 45% of them stated that the recreational facilities are equipped. Moreover, 40% of the respondents said that public facilities like toilets and mushala are not available. 28% of them stated that the condition of the park is insecure. 27% of them said that it was easy to access information in the park. 51% of them also said that it is not clean. Meanwhile, 58% of the respondents mentioned that the children's playground is laid out

well and 85% of them stated they already know and understand the functions of Imam Bonjol Park Padang as an urban green space. These findings suggest a few important implications for the management of the park. Firstly, visitors have been using the park for recreational and children's amusement. Therefore, the management may increase the facilities to attract more visitors to the park. Secondly, visitors feel insecure, and some basic facilities are not available, which could be the main cause for disagreeing to pay for park maintenance. Accordingly, the management has to improve the basic service, which develops a positive attitude towards the Imam Bonjol Park. Thus, their WTP is likely to increase.

#### 4.1.2. *Willingness to pay without scenario*

We have estimated the logit regression of equation (1) for estimating WTP for green space Imam Bonjol Padang, and the estimated results are presented in [Table 4](#). Before interpreting the main finding of the estimation, we look at model information.

The equation (1) with logit regression has produced the values of Log-Likelihood of 178.582, Cox & Snell R Square of 0.187, and Nagelkerke R Square of 0.250, indicating that it has captured reasonable information. The model also exhibited the Hosmer and Lemeshow Test of .649 Sig in which the value is greater than  $\alpha = 0.05$  and an overall percentage of 65.00, suggesting better Goodness-of-Fit.

Focusing on the variables that significantly influence the willingness to pay for visitors (WTP) in the preservation of Imam Bonjol Padang, we find that marital status, knowledge about the functions of Imam Bonjol Park as an urban green space, and visitors' perceptions about the existence of the park itself. Referring to the coefficient related to marital status, we find that marital status significantly influences respondents' willingness to pay for the preservation of Imam Bonjol Park Padang and the Exp ( $\beta$ ) or odds ratio is—0.185. It means that visitors who are married have the chance of paying 0.185% less than visitors who are unmarried. This seems to be indicative of the fact that unmarried visitors are more interested and conscious of the recreation areas, including Imam Bonjol Park Padang's conservation effort. The difference in willingness to pay in this group is found in the study of Li et al. (2018). A possible explanation could be that unmarried visitors have fewer family responsibilities, and they spend more on their personal items.

Furthermore, with an odds ratio of 3.773, residents' willingness to pay for the environmental conservation effort of Imam Bonjol Park Padang is significantly influenced by their knowledge of the functions of Taman Imam Bonjol as an urban green space. It means that visitors who know the functions of Imam Bonjol Park Padang as an urban green space have a chance of paying 3.773 times more than visitors who do not know about the functions of the park. Theoretically, it is true that an informed individual with a good park function is willing to pay more than uninformed individuals. Visitors are having difficulty accessing information about Taman Imam Bonjol park, as mentioned earlier in the perception analysis. Our findings are in line with the study of Hanley and Spash (1993) as they found the knowledge influenced the WTP. Lee and Heo (2016) have found similar results where they found that the respondents who have information and knowledge about the importance of the environment are willing to pay. These findings are contradictory to Makwinja et al. (2019) as they found the knowledge factor is not significantly related to WTP of water quality improvement. These empirical findings will now be used to promote the park by advertising the features and functions that exist within it. Hence, it is the duty of the government to create social awareness about the importance of green space. In the case of Imam Bonjol Park Padang, the local government should create an awareness program for the residents of the area.

The visitors' perceptions about the existence of Imam Bonjol Park Padang significantly effect on the chances of the respondents who are willing to pay for the preservation of the urban green space with a value odds ratio of 1.118. It means that the better the perceptions of the visitors, the greater the chance there will be of visitors who are willing to pay. Such findings are closely related to Sardana's (2020), who empirically discusses how attitudinal variables influence WTP significantly. The assessment of perception in earlier studies shows the authorities' need to improve



**Table 4. The results of the logit regression**

Variable	B	S.E.	Wald	df	P-Value	Exp(B)	Cox & Snell R Square	Nagelkerke R square	Log-Likelihood	Hosmer and Lemeshow
Gender	0.127	0.199	0.406	1	0.524	1.135				
Age	-0.012	0.019	0.394	1	0.53	0.988	0.187	0.25	178.58	0.649
Marital Status	-1.688	0.655	6.635	1	0.01	0.185				
Total Number of Dependents	0.002	0.168	0.000	1	0.99	1.002				
Income	0.000	0.000	1.049	1	0.306	1.000				
Visiting Origin	-0.063	0.572	0.012	1	0.912	0.939				
Visiting Fee	0.000	0.000	0.685	1	0.408	1.000				
Visiting Frequency	0.087	0.109	0.629	1	0.428	1.091				
Perceptions toward Imam Bonjol Park Padang	0.111	0.044	6.467	1	0.011	1.118				
Knowledge about the Functions of Urban green spaces	1.328	0.546	5.915	1	0.015	3.773				
D_Junior High	0.432	0.56	0.595	1	0.44	1.54				
D_Senior High	-20.699	15743.69	0.000	1	0.999	0.000				
D_Diploma	21.375	15743.69	0.000	1	0.999	1.92E+09				
D_Bachelor with Honours	-0.649	0.923	0.493	1	0.482	0.523				
Constant	-3.455	1.858	3.458	1	0.063	0.032				

Note. B is coefficient, S.E. is the standard error, Wald is Wald chi-square test, df is the degrees of freedom, Exp (B) is odd ratio

several areas in order to build a better perception and attitude. Hence, the willingness to pay for maintenance of the park is likely to develop.

This study finds that income level has an insignificant relationship with residents' willingness to pay. This finding is not in line with the extant related studies. For example, Wang et al. (2018) argue that high-income people are more likely to want green open space and are willing to pay for the facilities that they receive. They also discussed that low-income people prefer public green space but that should be free of cost. Furthermore, the middle class and above want green space, which is provided by the private sector, while the lower middle class wants green space which is provided by the government. One possible reason could be that, as we have included the knowledge and perception factor, these factors might have captured the maximum variations. Another reason could be that the respondent's income level is not promoting them to think about it.

This study found that gender has no significant effect on WTP. This is in line with studies carried out by Iranah et al. (2018). They found that gender and ability to pay do not have an important relationship. The results of this study also indicate that age has no significant effect on WTP. Furthermore, Lo and Jim (2010a) assert that health, age and income have a significant impact on WTP. This study also shows that the younger generation are more concerned about the environment compared to the older generation.

Focusing on park-related factors, we found that visitors' origin, visiting fee, and visiting frequency are not influential factors of WTP for the park's maintenance. This is consistent with the findings of Einarsdóttir et al. (2019), who found no significant relationship between visitors' experience and WTP, regardless of whether they visited urban green space or not.

#### 4.1.3. *Willingness to pay (WTP) with contingent valuation method*

In this instance, the WTP value is estimated by using the Contingent Valuation Method (CVM) approach. The first step is to build a hypothetical market. In constructing the hypothetical market, all respondents were given information about the declined environmental conditions of Imam Bonjol Park Padang such as the dirty environment, garbage, the neglected garden, the dying trees, as well as street sellers and singers roaming around the park. If these conditions remain, they will threaten the sustainability of the park in the future. Respondents were also given information about the park's management team plan of implementing an effort to improve and preserve the environment. The effort requires funds which will be collected from the visiting fee. Once the funds are collected, they will then be used for the environmental preservation of the park. Based on this information, the respondents figured out the description of the hypothetical situation regarding the environmental conservation effort of Imam Bonjol Park Padang.

Following information about the conditions and future environmental preservation efforts, respondents were asked to indicate their willingness or unwillingness to pay a sum of money. For estimating the WTP value, we considered the multiple regression approach for equation (2) and the results are shown in Table 5. Based on the estimated results, the average WTP value is Rp. 4877. This figure could be used as a guideline when determining the fee rate in Taman Imam Bonjol Padang. The estimated model shows a 0.286 value of R-Square. That means 28.6% of the respondents' behavior is captured in the model. The value of F-Statistic was 2.654 with a p value of 0.006. It shows that the explanatory variables in the model significantly affect the WTP value of the respondents at a level of ( $\alpha = 5\%$ ). The model had been tested for its multicollinearity, heteroscedasticity and normality. Therefore, the model fulfils the OLS assumptions.

Based on the estimated results, the average WTP value is Rp. 4,877. In the Indian context, Sardana (2020) estimated that visitors to traditional agro-forest ecosystems providing biodiversity were willing to pay INR 187 for the restoration program. Using the CVM approach, Xu et al. (2020) noted that visitors in China were willing to pay around 57.56 CNY to conserve green spaces. Dahal et al. (2018) explain that residents of Alabama and Mississippi are willing to pay USD 90.72 (per

Table 5. CVM analysis results

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	R-Square	F-Statistic	P-value
	B	S.E.	Beta						
(Constant)	-9005.864	3929.539	-		-2.292	.025			
Gender	-91.911	93.301	-.106		-.985	.328	0.286	2.654	0.006
Age	-19.057	38.227	-.061		-.499	.620			
Marital Status	593.225	1090.483	.072		.544	.588			
Total Number of Dependents	-103.994	379.278	-.036		-.274	.785			
Income	.000	.000	.083		.617	.539			
Visiting Origin	-1308.567	1188.567	-.122		-1.101	.275			
Visiting Fee	.011	.012	.113		.909	.366			
Perceptions toward TIP	235.044	79.527	.311		2.956	.004			
Functions' Knowledge	1324.861	1283.082	.114		1.033	.305			
Visiting Frequency	169.772	227.912	.080		.745	.459			
Education	476.274	183.713	.302		2.592	.012			

household) to preserve coastal cities' open space. This amount seems reasonable as it matches to some extent with the visitor's general WTP and is lower than Chinese and Indian residents' WTP for perseverance of green space.

Focusing on the coefficient of variables, the constant value of  $-9005.864$  means that regardless of all the variables included in the model, the value of the visitors' willingness to pay (WTP) was  $-9005.864$ . The negative constant of the value (-) also has the sense that in the beginning, all visitors were not willing to pay. However, due to the positive and negative influence of a number of variables, there are finally some of them who are willing to pay and some who are not. There are two variables that have significant effects. They are perception and education. Meanwhile, the other eight variables contribute to insignificant effects. They are gender, age, marital status, total number of dependents, avenue, visiting origin, knowledge of the TIP functions, and the visiting frequency.

The perception variable about the environmental quality of Imam Bonjol Padang has a regression coefficient of 235.044 at Sig. 0,004. It means that the diversity of perceptions about the quality of the park has significantly influenced the WTP value of the visitors at the level of ( $\alpha = 0.05$ ). The value of the coefficient is positive (+) with a value of 235.0441. It means that any improvement in the perception of the environmental quality of about one unit will be followed by an increase in the WTP value of the visitors. The variable of education level has a regression coefficient of 476.274 at Sig. 0,012. It means that the diversity of the education level has significantly influenced the WTP value of the visitors at the level of ( $\alpha = 0.05$ ). The value of the coefficient is positive (+) to the value of 476.274. It means that any improvement in the education level for about one unit will be followed by an increase in the WTP value of the visitors. The results support the findings of previous research which found that the factors which affect the willingness to pay are the level of avenue and education (see Xu et al., 2020). Theoretically, people with higher levels of education are expected to understand better than those who are not well educated (Schuhmann et al., 2019).

## 5. Conclusions

We have examined the factors that influence WTP for Imam Bonjol Park Padang and have estimated the WTP amount for preservice of Imam Bonjol Park Padang. The perception assessment revealed that visitors perceived the urban green space Imam Bonjol Park Padang to be accessible, to have recreation facilities, and to have a well-managed environment. However, public facilities are limited, and they also have a lower safety standard. Moreover, access to information is difficult, the area is not clean, and some parts have been used by the SMEs for selling products. Using logit regression, we found that the marital status, the visitors' perception, and the knowledge of the park influenced WTP for Imam Bonjol Park Padang. In contrast, this study found that socio-economic factors, such as gender, age, income, and number of family members, have not significantly influenced the willingness to pay. Using CVM, we discovered that the majority of visitors pay for the management and environmental protection of the green urban space Imam Bonjol Park Padang, and we estimated Rp.4.877. The estimated value of Rp.4,877 highlights that this is a reasonable amount that visitors may pay. This is useful information for the management of Imam Bonjol Park, and they could use it as a guideline in determining the fee or rate in Taman Imam Bonjol Padang. These findings could be useful for Indonesia and some ASEAN countries like the Philippines, Thailand, Vietnam, and Lagos. Visitors viewed the urban green space Imam Bonjol Park Padang to be accessible, to have leisure amenities, and to have a well-managed environment, which led to policy action. They are also prepared to pay for the space. The assessed value of Rp.4.877 indicates that this is a fair price for tourists to pay. Now, the government must establish payment policies and procedures for those who are low-income or impoverished, so that everyone may use this place. Low-income families, for example, do not have to pay to access the area if they display the card "Kartu Indonesia Sejahtera", which is a low-income family card in Indonesia.

Since visitors' perception and their knowledge tend to be influential factors in willingness to pay for environmental perseverance and park maintenance, the state level authorities should do some local marketing with the public awareness developing programme and inclusive public

engagement. This marketing strategy is effective and efficient for reaching the people in the target area. With these types of policies, several green space authorities, including Hello Graden (Japan) and PubliCity (Singapore), have been successful in achieving sustainability for green space. Moreover, in the age of technological advancement, social media-based awareness-building programs could be effective and cost-efficient. Those programmes also allow you to reach a wider area of people. Additionally, as a matter of knowledge dissemination, the authorities may have a programme with the help of local college and university students.

This study is a cross-section study and quantitative study. The future study should focus on longitudinal and mixed approaches. We have only focused on perception of the park. Hence, the future study involves perception of the environment and perception of the quality of life.

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#### Data availability statement

Data supporting reported results can be obtained by contacting the authors.

#### Disclosure statement

First and second authors have contributed equally. The authors reported no other potential conflicts of interest.

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