

Communities' Contribution to a Protected Area: Willingness to Pay Approach

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ABSTRACT: *This study investigates which factors determine people's willingness to pay for contribution in the conservation of a protected area by employing logit regression analysis. As it is unattainable to reach the whole population in our society as an individual researcher, this research is done by interviewing a total of (180) visitors who come to this area, and (180) non-visitors who have never been to the site from (6) cities. For studying people's willingness to pay, the variables such as distance, bids, age, gender, education, marital status, family income and attitude are employed in this study. Based on logit regression results, the study finds that bid, education level, and family income influences on people's willingness to pay for the conservation of a protected area. Lower bid price enhances people's willingness to pay. The result says that people who have high education level are willing to pay more. Similarly, households with high family income have willingness to contribute more for conservation of a protected area. Average willingness to pay for visitors, non-visitors, and both visitors and non-visitors are 375.1 Ks, 446.83 Ks, 368.6 Ks respectively. It is sure that these are the considerable information to policy makers concerning decision making for the conservation of a protected area.*

KEYWORDS: *protected area, willingness to pay, visitors, non-visitors, bid, education level, family income*

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I. INTRODUCTION

1.1 Background

National parks, wildlife sanctuary, nature reserves and other protected areas play a significant role in the biodiversity conservation and sustainable development¹. Protected areas such as nature reserves, national parks and wildlife sanctuary are established to protect ecosystems and their services such as water provision, food production, carbon sequestration and climate regulation².

Myanmar is rich in forest resource. There are many different forest types in Myanmar due to the great variation of rainfall, temperature, soil and topography. Tropical evergreen forest exists in the southern part of the country, and Hill and moist temperate forests are found in the eastern, northern and western regions where elevation exceeds 900 m. Dry forest is in the middle of the country. Mangrove forests are in the delta and coastal area.

However, according to 2001 report of the Myanmar Ministry of Environmental Conservation and Forestry, there are major threats to forest due to conversion of closed forests to other land uses, shifting cultivation, illegal logging, wildlife and timber trade, lack of environmental impact assessment (EIA) for development projects. These forces have generated a large amount of deforestation area in Myanmar.

Statistically, total forest area of Myanmar has significantly decreased from 57.9 percent in 1990 to 51.1 percent of the total land area in 2000. In 2010, forest covered about 48.6 percent of the total land area of the country. According to the 2012 World Bank data, out of the total area of Myanmar which accounts for 261,228 square miles, forest covers about 47.7 percent which represents the area of 124,605.756 square miles.

Such deforestation problem engenders environmental degradation, and certainly occur natural hazard such as flood, drought, storm, and so on. Therefore, forest conservation becomes important in the society. Accordingly, the government has established protected areas in order to protect the forests.

At present, there are (2) nature reserves, namely Bawditataung nature reserve and Tanintharyi nature reserve in Myanmar. Bawditataung nature reserve is in dry zone of Myanmar, and Tanintharyi nature reserve is situated in Yebyu and Tavoy Townships which are in lower part of Myanmar. Seeing that the weather conditions of dry zone are very hot and dry, it cannot be denied that trees and forests are needed to conserve. As Bawditataung nature reserve is in dry zone, it can be understood that building nature reserve in dry zone is vital for the residents and the country. However, there is no study about measuring people's willingness to pay for the

¹ Myanmar Protected Area

² ibid

conservation of nature reserve in Myanmar. This research, therefore, makes a choice to analyze whether people want to contribute in the conservation of nature reserve.

1.2 Objective of the Study

The objective of the study is to investigate which factors determine people's willingness to pay for contribution in the conservation of a protected area: namely, Bawditataung nature reserve.

1.3 Method of Study

Descriptive analysis and logit regression analysis are employed to investigate which factors influence on people's willingness to contribute to a protected area.

1.4 Scope of the Study

This research intends to interview a total of 180 visitors who come to this area regarding whether they have willingness to contribute in the conservation of Bawditataung Nature Reserve. In addition, there is no doubt that forests and trees could give prevention of irreversible change. Accordingly, another target group will be (180) non-visitors, who have never been to the site, from (6) cities for the analysis of non-use value of the nature reserve. Amongst there are (6) cities, (30) people in each city will be randomly interviewed. Therefore the total sample will be (180) households. The interviewee for each household will be a member who has a job and income.

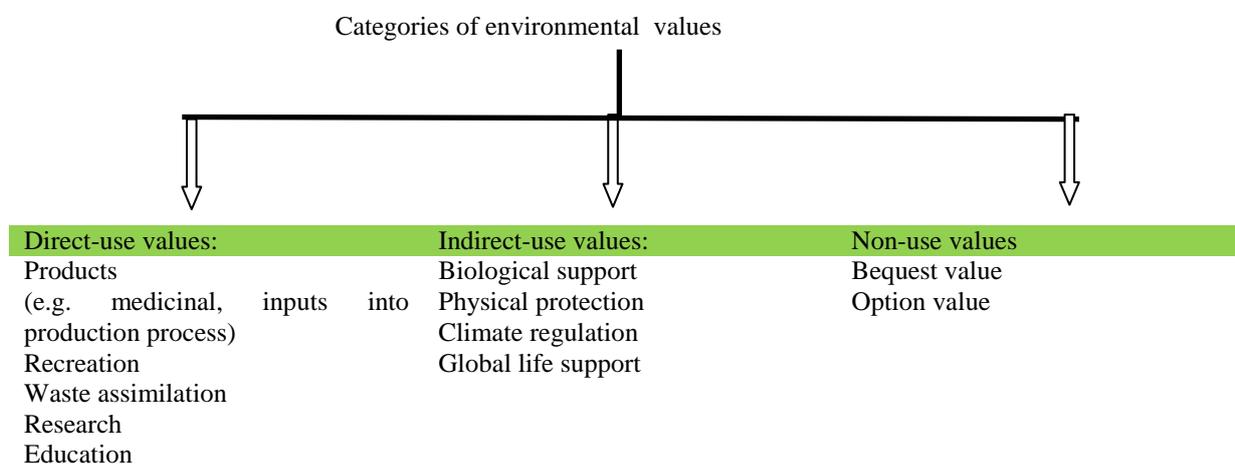
II. LITERATURE REVIEW

Attempts have been made to review literatures on the concept of the most widely used methods for assessing the economic valuation of environmental protection. Starting from categories of environmental values and environmental valuation methods, the concept of willingness to pay and contingent valuation method, and previous studies regarding people's willingness to pay via contingent valuation method will be presented in this section.

2.1 Categories of Environmental Values

There are three categories of environmental values, namely direct-use values, indirect-use values, and non-use values.

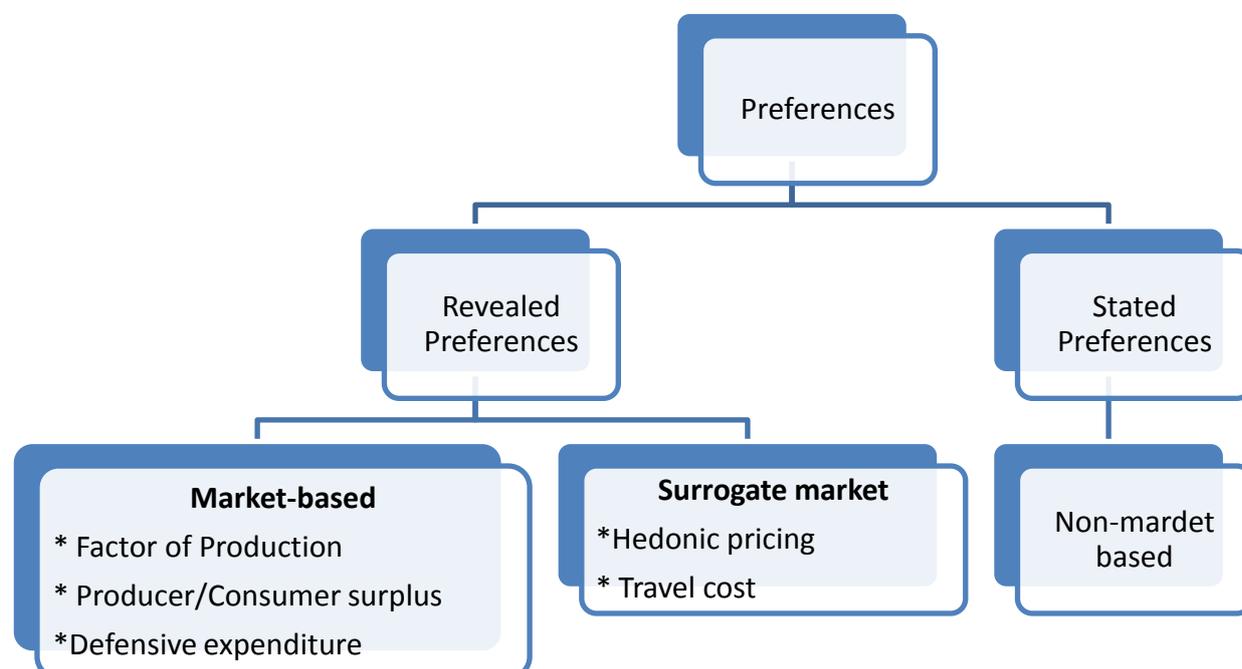
The following chart shows the categories of environmental values.



Source: Lecture Notes, Piyaluk Buddhawongsa

2.2 Environmental Valuation Method

The following chart supports in analyzing environmental valuation methods.



Source: Lecture Notes, Piyaluk Buddhawongsa

2.3 Willingness to Pay (WTP)

This is a method to estimate the economic value of natural and environmental resources. This method can be usually used to determine preferences straightforwardly from consumers by asking them using structured questionnaires. Based on theory, it is called “stated preference technique”. This method is usually used to measure the individual’s willingness to pay for environmental protection.

2.4 Contingent Valuation Method

According to J. Jochem (2006), contingent valuation method (CVM) is one of the most advanced and the most used technique for environmental valuation. The specific questionnaires are required to construct in order to receive a direct answer from people. He said that the key descriptive statistics variables such as age, sex, level of education, household income, size of household and ownership of dwelling should be included in the questionnaires. In addition, a questionnaire concerning whether the respondent has a willing to support in the conservation of natural environment, and a level of bid values should be embraced in the questionnaire, to receive the meaningful results from surveyed questionnaire

2.5 Reviews on Previous Studies

A number of scholars have been conducted the empirical studies regarding the measure of economic value for nature reserve, national park, and other environmental assets.

B, Zewdu and A, Yemesrach have studied people’s willingness to pay for protecting endangered environment, namely Netchsar National Park via dichotomous choice contingent valuation method by using variables such as household income, educational level of the household, distance from the park, dependency ration, primary activity of the household, offered amount, sex and age. They found that the local community has a willing to protect the park. According to their result, the determinants of willingness to pay are primary economic activity of the households, distance from the park, and dependency ratio. However, it was observed that educational level of the household, sex and age are insignificant. Based on their findings, they suggested that the local community should involve in the conservation of national park.

J. P.S. Francisco (2010) has studied households willing to pay for cleaner public transport in Manila, Philippine by employing a single-bound dichotomous choice contingent valuation approach. In order to estimate which factors influence the willingness to pay of Manila households in metropolitan area, he employed the logistic regression model. According to his result, bid level, income and education of respondents, and the factor whether respondents regularly use public jeepney are the determinants of willingness to pay.

M. Suman, D. Jinyang, Z. Yaoqi, and P. Chad (2011) estimated the willingness to pay for urban forests in Savannah, Georgia by using contingent valuation. This study employed willingness to pay for urban forests as a dependent variable, and demographic characteristics such as age, gender, education, income, dummy variable for respondents from foreign country, and number of people accompanying the respondents during the visit, and destination loyalty of the respondents as independent variables. According to their results, it was found that the willingness to pay of tourists would increase with higher income. Moreover, the results suggested that the loyal tourists are willingness to pay more for environmental conservation. Based on the findings, the relationship between willingness to pay and number of previous visits are positively significant.

S. Zhaoyi, C. Yue, Y. Kai, and J. Yu (2012) assessed local communities' willingness to pay for river network protection in Shanghai, China by using contingent valuation method. The study has been conducted with local residents in urban and suburban areas using structured questionnaire in order to examine local people's awareness and attitudes regarding the river network, and to find out which factors determine the residents' willingness to pay for river network protection. According to the results, they found that the local people in Shanghai have significantly recognized the value of river network. In addition, the results suggested that most of respondents have willingness to pay for the protection of river network. Based on the findings, it is examined that the factors that determined the respondents' willingness to pay are the number of years lived in Shanghai, the distance from the home to the nearest river, and the bid amount.

B.S. Andrea, and F.H.IV. Lucius (2013) have studied attitudes and perceptions of local residents and tourists toward the protected area of Retezat national park from Romania. In order to extract attitudes and perceptions of local people and travelers on protected area, namely Retezat national park and their willingness to pay for the protection of environment, he conducted a survey in and near the national park. According to their results, individual's willingness to pay for the conservation of Retezat national park is very different between local people and tourists. It was found that the willingness to pay of tourists is greater than that of local people. However, their results suggested that the fact that both tourists and local people could contribute in the nature conservation is obvious, and both of them could facilitate in the future conservation policies.

R. G. Bradecina (2014) asserted tourists' willingness to pay for the conservation of Caramoan beachscape in Camarines Sur, Philippines, by using contingent valuation method. This study employed willingness to pay as a dependent variable, and the variables such as bid amount, gender, age, civil status, education, income and attitude toward conservation as independent variables in order to meet the objectives of this study. According to his study, the tourists' willingness to pay is decided by the bid amount, age, income, and attitude toward conservation. However, it is found that gender, civil status and education have no influences on tourists' willingness to pay.

Mya Lwin Lwin Aung (2015) has assessed how public in Yangon, Myanmar have willingness to pay for solid waste management, by utilizing contingent valuation method (CVM). She used willingness to pay as a dependent variable, and bid amount, age, gender, education, and household income, length of stay, solid waste bags, and distance variables as independent variables in order to estimate which factors determine households' willingness to pay for solid waste management in Yangon in her study. Based on the result, bid amount, household income and length of stay significantly influence on the households' willingness to pay for solid waste management in Yangon.

III. SOCIO-ECONOMIC CONDITION OF RESPONDENTS

Socio-demographic and economic conditions of the respondents – visitors and non-visitors - are presented in this section. Age, household size, gender, marital status, level of education, occupation and monthly income of the respondents are presented in detail.

Table (1) Characteristics of Respondents

Charac- teristics	Particular	Visitors			Non-Visitors		
		Mean	Frequency	Relative Frequency	Mean	Frequency	Relative Frequency
Age	Age	36.24			36.19		
Household Size	Household Size	4.49			4.66		
Gender	Male		92	51.1		87	48.3
	Female		88	48.9		93	51.7
Marital Status	Married		101	56.1		118	65.6
	Single		79	43.9		62	34.4

Source: Calculation from Survey Data

As shown in the above table, it is found that the mean value of age of respondents – visitors and non-visitors is nearly the same. Also, the mean value of household size is almost the same. Most of visitors are male,

accounts for 51.1 percent. Most of non-visitors are female, accounts for 51.7 percent. The marital status of most visitors and non-visitors is married, accounts for 56.1 percent and 65.6 percent respectively. The education level of respondents is shown in Table (2).

Table (2) Education Level of Respondents

Charac-teristics	Particular	Visitors		Non-Visitors	
		Frequency	Relative Frequency	Frequency	Relative Frequency
Level of Education	less than high school level	41	22.8	36	20
	High school level	36	20	59	32.8
	University student level	2	1.1	7	3.9
	Graduate	94	52.2	69	38.3
	Master	7	3.9	9	5

Source: Calculation from Survey Data

Based on the above table, it can be said that the most respondents in visitors and non-visitors groups are in graduate level, accounts for 52.2 percent and 38.3 percent respectively. For visitors group, the visitors whose education level is less than high school level take the second place, accounts for 22.8 percent. For non-visitors group, the non-visitors whose education level is in high school level takes the second place, accounts for 32.8 percent. The occupation concerning respondents is shown in the following table.

Table (3) Occupation of Respondents

Charac-teristics	Particular	Visitors		Non-Visitors	
		Frequency	Relative Frequency	Frequency	Relative Frequency
Occupation	Government Employee	43	23.9	27	15
	Private Enterprise Staff	23	12.8	26	14.4
	Craftsman	6	3.3	17	9.4
	Self-employed	45	25	52	28.9
	Retired	1	0.6	6	3.3
	Seller in market	34	18.9	21	11.7
	Others	28	15.6	31	17.2

Source: Calculation from Survey Data

As shown in the above table, most of visitors and non-visitors are self-employed, accounts for 25 percent and 28.9 percent respectively. Among visitors, 23.9 percent are government employee. Therefore, it may be said that government employee usually go to pagoda around the place where they live currently. Regarding income level of respondents, Table (4) shows in detail.

Table (4) Income Level of Respondents

Charac-teristics	Particular	Visitors		Non-Visitors	
		Frequency	Relative Frequency	Frequency	Relative Frequency
Monthly Income of respondent	<100,000 MMK	6	3.3	43	23.9
	between 100,000 & 200,000MMK	49	27.2	66	36.7
	between 200,000 & 300,000MMK	66	36.7	39	21.7
	between 300,000 & 400,000MMK	14	7.8	10	5.6
	between 400,000 & 500,000MMK	12	6.7	7	3.9
	between 500,000 & 600,000MMK	2	1.1	1	0.6
	between 600,000 & 700,000MMK	-	-	3	1.7
	between 800,000 & 900,000MMK	-	-	1	0.6
	between 900,000 & 1000,000MMK	-	-	1	0.6
> 1000,000 MMK	1	0.6	9	5	

Source: Calculation from Survey Data

Regarding income level of respondents, the income level of most visitors is between 200,000 and 300,000 MMK, accounts for 36.7 percent. For non-visitors, the income level is between 100,000 and 200,000 MMK, accounts for 36.7 percent.

IV. EMPIRICAL ANALYSIS

In order to satisfy the objective of the study, logit regression analysis is used for visitors, non-visitors, and both visitors and non-visitors as follow:

Model for visitors,

$$\text{Pr(Yes)} = \beta_0 + \beta_1 \text{Distance} + \beta_2 \text{Bid} + \beta_3 \text{Age} + \beta_4 \text{Gender} + \beta_5 \text{Edu} + \beta_6 \text{Marital} + \beta_7 \text{F Income} + \beta_8 \text{Attitude}$$

Model for non-visitors,

$$\text{Pr(Yes)} = \beta_0 + \beta_1 \text{Bid} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Edu} + \beta_5 \text{Marital} + \beta_6 \text{F Income} + \beta_7 \text{Attitude}$$

Model for both visitors and non-visitors

$$\text{Pr(Yes)} = \beta_0 + \beta_1 \text{Bid} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Edu} + \beta_5 \text{Marital} + \beta_6 \text{F Income} + \beta_7 \text{Attitude}$$

where

Bid = the amount of bid which people want to pay (Ks) (100 Ks, 300 Ks, 600 Ks, 900 Ks, 1000 Ks, 1200 Ks)

Distance = the distance between the site and the place which people live (miles)

Gender = dummy (1 = male, 0 = female)

Edu = level of education (1 = less than high school, 2 = high school, 3 = university student level, 4 = graduate, 5 = Master, 6 = Ph.D)

Marital = dummy (1 = married, 0 = single)

F income = level of money income (1 = < 100000, 2 = bet 100000 & 200000, 3 = bet 200000 & 300000, 4 = bet 300000 & 400000, 5 = bet 400000 & 500000, 6 = bet 500000 & 600000, 7 = bet 600000 & 700000, 8 = bet 700000 & 800000, 9 = bet 800000 & 900000, 10 = bet 900000 & 1000000, 11 = > 1000000)

Attitude = taking average the answer from respondents

Table (5) Logit Regression Result

Variable	For Visitors Coefficient	For Non-visitors Coefficient	For Visitors and Non-visitors Coefficient
Constant	3.751 (0.317)	10.724 (0.139)	3.686 (0.157)
Distance	0.002 (0.396)		
Bid	-0.010*** (0.000)	-0.024*** (0.000)	-0.010*** (0.000)
Age	0.017 (0.634)	0.088 (0.081)	0.021 (0.410)
Gender	-0.405 (0.508)	-1.954 (0.143)	-0.344 (0.421)
Edu	0.696** (0.010)	-0.210 (0.645)	0.700*** (0.000)
Marital	-0.647 (0.380)	0.940 (0.513)	-0.648 (0.213)
F income	0.410** (0.030)	0.749*** (0.003)	0.427*** (0.001)
Attitude	-0.201 (0.796)	-0.358 (0.807)	-0.232 (0.669)

Source: Calculation from Survey data

Note: Values in parenthesis are p-value.

*** and ** significant at 1 % and 5 % level.

According to the logit regression result, it is found that bid, education level, and family income of visitors influence their willingness to pay. For non-visitors, bid and family income are determinant factors for willingness to pay. For both visitors and non-visitors, bid, education level, and family income determine their willingness to pay. Accordingly, it can be said that high bid price lowers willingness to pay. Respondents who

have high education level are likely to pay more. Likewise, high family income strongly supports respondents' willingness to pay.

In order to estimate the mean willingness to pay, this study uses the following formula:

$$\text{Mean WTP} = -\beta_0 / \beta_2$$

where β_0 = constant,

β_2 = coefficient of the bid

For visitors,

According to the result, $\beta_0 = 3.751$ and $\beta_2 = -0.010$

$$\text{Mean WTP} = -3.751 / (-0.010) = 375.1 \text{ Ks}$$

$$\begin{aligned} \text{Average WTP} &= \text{Mean WTP} * \text{Number of Visitors per year} \\ &= 375.1 \text{ Ks} * 7000 \end{aligned}$$

Total use value = 2.6257 million Ks

For non-visitors,

$$\beta_0 = 10.724$$

$$\beta_2 \text{ is } -0.024$$

$$\text{Mean WTP} = -10.724 / (-0.024) = 446.83 \text{ Ks}$$

$$\text{Average WTP} = \text{Mean WTP} * \text{Number of Household}$$

$$\begin{aligned} \text{Average WTP for Shwebo} &= 446.83 \text{ Ks} * 50247 \\ &= 22.45 \text{ million Ks} \end{aligned}$$

$$\begin{aligned} \text{Average WTP for Butalin} &= 446.83 \text{ Ks} * 28616 \\ &= 12.79 \text{ million Ks} \end{aligned}$$

$$\begin{aligned} \text{Average WTP for Ye U} &= 446.83 \text{ Ks} * 26373 \\ &= 11.78 \text{ million Ks} \end{aligned}$$

$$\begin{aligned} \text{Average WTP for Taze} &= 446.83 \text{ Ks} * 35937 \\ &= 16.06 \text{ million Ks} \end{aligned}$$

$$\begin{aligned} \text{Average WTP for Pokokku} &= 446.83 \text{ Ks} * 66340 \\ &= 29.64 \text{ million Ks} \end{aligned}$$

$$\begin{aligned} \text{Average WTP for Pyinoolwin} &= 446.83 \text{ Ks} * 53382 \\ &= 23.85 \text{ million Ks} \end{aligned}$$

Total non-use value = 116.58 million Ks

For both visitors and non-visitors,

$$\beta_0 = 3.686$$

$$\beta_2 = -0.010$$

$$\text{Mean WTP} = -3.686 / (-0.010) = 368.6 \text{ Ks}$$

V. CONCLUSION

This study analyzes people's willingness to pay by employing logit regression analysis. Based on logit regression results, it is found that bid, education level, and family income supports people's willingness to pay for the conservation of a protected area. Lower bid price enhances people's willingness to pay. People's education level supports the willingness to pay. People who have high education level are likely to pay more. Similarly, households with high family income would like to contribute more for conservation of a protected area. Average willingness to pay for visitors, non-visitors, and both visitors and non-visitors are 375.1 Ks, 446.83 Ks, 368.6 Ks respectively. It is convinced that these are the considerable information to policy makers concerning decision making for the conservation of a protected area.

For that reason, it would be better if there are programs which can increase income of the entire people. In addition, promoting education level of the entire people could be encouraged with the intention of people's contribution in the environmental conservation program by reasonable bid price.

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