



Economy and Environment Program for Southeast Asia



Valuing Environmental Services Using Contingent Valuation Method

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THE CONTINGENT VALUATION METHOD: CASE STUDIES FROM LAO PDR

ABSTRACT

This report presents the results of two studies in Lao PDR that assessed people's willingness to pay (WTP) using the Contingent Valuation Methodology (CVM). The first study investigated the WTP of residents for the sustainable development and maintenance of urban parks in the city using Saysetha Park as the case study. In this study residents expressed that urban parks are very important to them as they are areas for relaxation and areas to conserve urban biodiversity. The WTP survey revealed that the residents' mean WTP is 10,741kip/month/household. With this amount, it was estimated that a monthly water bill surcharge of 3,000/kip/month/household may be recommended to maintain urban parks.

The second study assessed the WTP for biodiversity conservation and sustainability in the Houay Nhang Protected Area. Using CVM, the WTP responses showed that the monthly contribution that would be acceptable to the people is 5,000 kip. The logit regression shows that this WTP value is influenced by bid prices, gender, and educational levels. The respondents recognized the importance of the protected area for environmental and biodiversity protection.

1.0 INTRODUCTION

Researchers from the Environmental Research Institute (ERI) of Lao PDR have conducted two studies using the Contingent Valuation Method (CVM). The first study, conducted by Duangmany Luangmany and Souphandone Voravong, estimated the people's willingness to pay for the improvement of Saysetha Park, one of the sixteen parks located in Vientiane Capital City (VCC). Kaisorn Kaisorn Thanthathep, Daovinh Souphonphacdy and Malabou Baylatry conducted the second study which estimated the economic value of the Houay Nhang Protected Area, also in VCC. Since VCC was the focus of both studies, a map of the city and Vientiane Province is given in Figure 1 for ease of reference.

These researchers had earlier participated in a series of EEPSEA in-country training courses on natural resources and environmental economics. Based on its principle of providing practical research experience in applying the tools of economic analysis, EEPSEA provided these ERI researchers with the technical and financial support to conduct two case studies using the CVM. These are also the first two CVM research studies conducted in Lao PDR by local researchers.



Figure 1. Map of Laos showing Vientiane Capital City and Vientiane Province

Source: Michael, E.; N. Minot; R. Dewina; P. Messerli; and A. Heinemann. 2008. The Geography of Poverty and Inequality in Lao PDR. <http://www.laoatlas.net/links/PDF/The%20Geography%20of%20Poverty%20and%20Inequality%20in%20the%20Lao%20PDR.pdf>

2.0 THE SUSTAINABLE DEVELOPMENT AND MAINTENANCE OF URBAN PARKS: A CASE STUDY ON SAYSETHA PARK

Duangmany Luangmany and Souphandone Voravong

2.1 Introduction

2.1.1 Significance of the Study

One of the emerging forms of outdoor recreation sites are urban parks (or urban green parks). They attract people who seek a natural environment and serve as places where they can exercise, relax or meet other people. Due to their unique attraction, urban parks or recreation areas have become essential to the health of urban communities. Thus, the development of urban parks has become an important component of any urban development plan.

Vientiane Capital City (VCC) (Figure 2.1) is the second largest city of Lao PDR with a total land area of about 3,920 km². It is home to some 123,174 households or 695,473 inhabitants, which represent 12.42 per cent of Lao PDR's total population. Of this, 339,117 people or approximately 49 per cent, live in the built-up areas of the inner districts. The city is divided into nine districts, four of which are municipal or inner districts, namely, Chanthabouly, Saysetha, Sikhottabong and Sisattanak, while the other five are suburban districts (external or vicinity), namely, Saythany, Hadxaiphong, Naxaithong, Pak Ngum and Sangthong.

VCC is the fastest growing city in the country with an annual growth rate of 3.4 per cent. It is projected that its population will increase to 776,604 residents by the year 2010. The average population density ranges from 80 persons/km² in the suburban districts to as many as 500 persons/km² in the inner districts. Vientiane's average population density of about 178 persons/km² is the highest in the country.

This rapid population growth is one of the main challenges to the Capital City Planning Authority since new VCC residents are in urgent need of jobs, housing, and green rest areas, among others. In 2000, VCC formulated and approved its Five-Year City Plans for the years 2000-2005 and 2006-2010 with achieving a "Clean and Green Capital City" as one of the main objectives.

There are 16 parks in VCC, which include Patuxay Park, Salongxay Park, Chao Fa Ngum Park, That Luang Park, and Saysetha Park¹. The total urban green area of 1.58 km² is about 0.04 per cent of the total urban land. No other cities in Lao PDR have urban parks. These green areas have been created and improved over time. In recent years, there have even been projects on urban park maintenance, Patuxay and Chao Fa Ngum Parks being two examples.

The budget for the maintenance and development of urban parks in VCC is some 106,000,000 kip/month (USD 11,160/month). These parks have improved the city's environment and may also reduce and partly prevent air pollution. VCC residents also benefit from the emergence of these new parks and the improvement of existing ones by having places for jogging, biking and exercising. For instance, in the last few years, Patuxay Park's visitors have increased from 50-100 visitors/day² to 200-400 visitors/day³.

¹ Vientiane Communication, Transport, Post and Construction Office, 2005

² Vientiane Urban Development Administration Authority, 2003

Currently, urban parks face a range of management problems resulting in the poor condition of their ornamental plants, sprinklers and lamps. Some park property has also been stolen while others have been vandalized. Clearly, there is a need to improve the management of these parks as well as to launch an awareness campaign to emphasize their importance and promote cooperation among VCC residents. However, these improvements have not been carried out because of budget limitations.

Saysetha District is home to 17,021 households⁴. It has a total land area of approximately 147 km², which is about 3.75 per cent of the total land area in VCC. Saysetha Park is about 0.34 km² which is about 21.47 per cent of the total urban green area in VCC. The park is located in front of the National Assembly Hall building in That Luang, a national historic area which the Lao people are very proud of. According to the persons-in-charge of the Vientiane Capital City Master Plan, the park represents the face and power of the Lao population. Residences are located inside the park along with some restaurants, the former Saysetha Hospital and the Ministry of Public Health's drugstore, which will be moved as soon as the construction of the new store is completed. The Lao government has spent a large sum of money in relocating these structures and homes. According to the Construction Plan of Vientiane Communication, Transport, Post and Construction Office (2005), the actual budget allocated was USD 1,303,002, but the actual amount spent was only USD 1,205,707 (USD 774,125 for relocation, USD 324,332 for construction improvement and USD 107,250 for infrastructure).

The Vientiane Governor Decree No. 462/VT dated December 3, 2002 places emphasis on improving the city's landscape beauty and cleanliness by developing and improving green parks/areas in order to improve the urban residents' quality of life. A time frame was also set; by 2010, VCC should be the Clean and Green Capital City of Lao PDR⁵.

The Prime Ministerial Decree No. 14/PM dated February 23, 1999, established the Vientiane Urban Development and Administration Authority (VUDAA). VUDAA's responsibilities include the planning, operation, management and maintenance of local government infrastructure. It also provides financial support for environmental planning and staff training programs in the four urban areas in Vientiane. However, VUDAA, which is in charge of managing the city's green parks/areas including Saysetha Park, is facing financial constraints. Thus, it has not been able to maintain and develop the parks as planned. Moreover, since the local communities consider the management of Saysetha Park as the responsibility of the government, there has been limited cooperation from them in maintaining the park. Some youth even use the park to play soccer. There appears to be low awareness among city residents of the importance of the park. In addition, local communities were not consulted regarding Saysetha Park's proposed improvements.

Until now, no study has been undertaken on the participation of VCC residents in the management of the city's green parks. Similarly, there have been no studies on the public's attitudes and level of understanding on the importance of these green parks, particularly Saysetha Park. This study aimed to assess the VCC residents' level of awareness about, understanding of, and attitude towards green parks, specifically Saysetha Park. It also aimed to identify their expectations regarding the park and estimate their willingness to pay for its sustainable development and maintenance. In other words, it sought to estimate the value of the sustainable development and maintenance of urban parks to VCC residents.

³ Vientiane Urban Development Administration Authority, 2006

⁴ National Statistics Center, 2003

⁵ Vientiane Capital City Environment Strategy up to the year 2020, and the Environment Action Plan 2006 - 2010

This study was the first in Lao PDR to use the contingent valuation method to estimate the economic value of a public utility, in this case, an urban park. Its findings on the general public's willingness to contribute to the sustainable development and maintenance of VCC's urban parks will be useful in proposal formulation for external funding, which will help reduce the financial burden on the local government.

2.1.2 Objectives of the Study

The overall objective of the study was to estimate the value of Saysetha Park and evaluate the Vientiane Capital City residents' willingness to pay (WTP) for the sustainable development and maintenance of Saysetha Park using the Contingent Valuation Method (CVM).

The specific objectives were:

1. To evaluate the level of awareness of Vientiane Capital City (VCC) residents about the importance of urban green parks/areas in ensuring them a more healthy and pleasant environment;
2. To study and identify the factors that affect VCC residents' WTP for the sustainable development and maintenance of Saysetha Park; and
3. To identify a realistic form of funds collection from VCC residents to support a long-term project for the sustainable development and maintenance of Saysetha Park.

2.2 Literature Review

Contingent Valuation (CV) was first used by Davis (1963) to estimate the value of big game hunting in Maine. Hammack and Brown (1974) applied CV to value waterfowl hunting. CV has become an important analytical method in economic welfare analysis by providing a means to estimate values when markets do not exist and revealed-preference methods are not applicable (Boyle, 1990).

Stated preferences methodologies aim to provide an economic assessment of environmental impacts using data on hypothetical choices made by individuals responding to a survey and stating their preferences. These methodologies have been used to estimate direct use, indirect use, and non-use values. The Contingent Valuation Method (CVM) is a stated preference method that is implemented by means of surveys and aims to assess how individuals would hypothetically react to changes in environmental quality. In particular, it finds out how much respondents would be willing to pay for improved environmental quality or to avoid a hypothetical reduction in environmental quality (Laplante 2006).

Urban parks provide people with direct and indirect benefits. They provide places for people to relax, exercise and engage in other recreational and social activities with their family and friends. On the other hand, an indirect benefit derived from urban parks is air purification. Since urban parks are public facilities, the benefits that VCC residents gain from it cannot be traded and, therefore, do not have market prices. Thus, CVM is the appropriate tool to use to estimate the people's WTP for the improvement of Saysetha Park.

Numerous studies have used CVM to estimate WTP for public goods and services. Seenprachawong (2006) estimated the Thai people's WTP to restore and preserve ten historic temples in Central Thailand, using CVM. The results showed that an individual was willing to pay 214 baht in a one-time income tax surcharge or 243 baht as a voluntary donation to finance a preservation program for the temples.

Also using CVM, Willis (1994) assessed the maximum amount that individuals were willing to contribute when they visited a cathedral in England with no entry charge. He adopted an open-ended WTP approach. The respondents were asked what they would contribute voluntarily before being asked to state their maximum WTP. Payment cards were employed to elicit the amount of a voluntary donation for visiting the cathedral and to ascertain the maximum amount an individual would be willing to pay as an entry charge. Overall, the mean stated WTP was 77 pence.

Carson et al. (1997) estimated the value of rehabilitating the Fes Medina in Morocco. The survey covered 600 visitors representing both tourists and those visiting for business or other purposes. Use and non-use values of public goods were quantified in terms of WTP for specified improvements. Respondents were presented with information about the current condition of the Medina and were told that rehabilitation would accomplish three things: (a) the improvement of the Medina's appearance by repainting and cleaning up buildings, streets, infrastructure, public spaces, and monuments; (b) the preservation of its traditional character and cultural heritage for future generations; and (c) it would continue to be a productive and vibrant living city. To help pay for the proposed project, visitors would be charged a special fee when they registered at their hotel. Visitors to Fes Medina were found to be willing to pay USD 70 each for the project. Other visitors to Morocco were willing to pay USD 30 each.

2.3 Research Methodology

The CVM was adopted to estimate VCC residents' WTP for the development and maintenance of Saysetha Park. The survey was conducted in the city's four main districts, namely, Saysetha, Chanthabouly, Sisattanak and Sikhodtabong. Villages were randomly selected from these four districts. Respondent households were randomly selected from these villages⁶. Altogether, 400 face-to-face interviews with household heads were conducted.

2.3.1 Focus group discussions and pretests

The questionnaire was finalized based on the results of two focus group discussions (FGD) and the two pretests⁷. The first FGD was with participants from NongBorn Village in Saysetha District. The second FGD was with representatives from various government agencies. The aim of the FGDs was to set guidelines for the sustainable development and maintenance of urban parks as well as to test the bid prices to be used in the pretests. The FGD materials included photographs of VCC's urban parks and how parts of them had been destroyed or vandalized. The point was to show the present condition of the parks and to

⁶ The field survey was conducted between 26 April and 2 May 2007.

⁷ The pretests were conducted on 22 February, 2007, by 10 interviewers with 40 questionnaires.

contextualize the proposed management plans for their development and maintenance. The materials for the main survey were then modified and finalized.

2.3.2 Questionnaire structure

The questionnaire was divided into three main sections and seven sub-sections (Table 2-1). The first section explored the background information of the respondents and their attitude towards VCC’s urban parks, particularly Saysetha Park. Respondents were also asked about their use of urban park facilities and how they used their free time. For example, they were asked the following questions: *“Have you ever been to any public parks here in Vientiane Capital City? To which particular park have you been? When? How often? How do you get there?”* The respondents were also asked to rank the activities that they liked to do during their free time and asked about their views on the present situation of Saysetha Park.

Table 2-1. Questionnaire sections

Sections	Sub-sections
I. Background Information	Attitude towards urban parks
	Awareness of Saysetha Park
II. WTP	Description of the role of Saysetha Park
	Presentation of Saysetha Park’s situation
	Proposed sustainable management plan
	Decision rule (a bid will only “pass” if 50% or more of the respondents vote for it)
III. Socio-Economic Information	Profile of the respondents’ socio-economic characteristics

The second section of the questionnaire contained the CV scenario, which informed the respondents that the Lao government had developed a 5-year master plan up to 2010 to promote the concept of a “clean and green city” with sustainable urban park management. Among the measures to be undertaken were: (a) stopping any further degradation of the remaining parks as well as avoiding any further loss, and (b) ensuring that the green parks will continue to be well-maintained for park users or city residents in the future. These measures would result in the improvement of park conditions from its current status (Picture A) to the more attractive environment shown in Picture B. However, given its budget constraints, the government would not be able to undertake these measures without the support of the people.



Picture A. Current state of Saysetha Park



Picture B. The park after improvement

The questionnaire went on to explain to the respondents the proposed plan to set up a trust fund for the sustainable development and maintenance of urban parks in VCC. The trust fund would be managed by the VUDAA. The proposal was that VCC households would contribute to this trust fund by paying a surcharge on their monthly water bill.

The respondents were then asked if they would support a legislation that would create the said trust fund if this would mean that they and other VCC households had to pay a specified monthly surcharge for a period of 10 years. The respondents were also asked to cite their reasons for their answer as well as their perceptions about the authority that would take responsibility for implementing the program.

The last section of the questionnaire contained questions that obtained information on the respondents' socio-economic characteristics such as gender, age, monthly income, water bill payments, and use of water resources, all of which were factors that were expected to determine their WTP responses.

2.3.3 Payment vehicles and elicitation method

Respondents were asked to vote 'for' or 'against' a referendum/bid that would impose a monthly surcharge through their water bill for a 10-year period. This surcharge would be used to finance the improvement of Saysetha Park. This mandatory payment scheme was chosen as the payment vehicle because most of the residents in the areas had access to piped water. The decision rule given to the respondents was that if more than 50 per cent of them voted in favor of the referendum, the proposed improvement plan would be implemented and every VCC household would have to pay regardless of how they voted.

The WTP question was posed in single-bounded dichotomous form. The respondents were asked whether they would be willing to vote in favor of a policy that would impose a monthly surcharge on their water bill for 10 years. Five bid prices were used: (a) 1,000 kip, (b) 3,000 kip, (c) 5,000 kip, (d) 10,000 kip and (e) 15,000 kip. Negative responses to the bid were followed by an open-ended question on the amount that they would be willing to pay

2.3.4 Estimation of mean willingness to pay and factors influencing it

The mean willingness to pay (MWTP) was calculated using the following formula:

$$\text{Mean}_{(\text{Bids})} = \frac{\alpha}{\beta}$$

where α is a constant value and acts as a coefficient of the dependent variable (WTP) and β is an independent variable coefficient (bid price level). This function considered the bid variable as the only determinant factor.

Apart from bid price, other variables may influence the respondents' WTP. Therefore, the following function included all other factors that were expected to affect the VCC residents' WTP:

$$\text{WTP}_2 = F(X_1, X_2, X_3, X_4, D_1, D_2, D_3)$$

Factors assumed to influence WTP were: X_1 (bid prices), X_2 (respondent's income), X_3 (respondent's age) and X_4 (monthly water bill). Dummy variables existed in this formula as well; 1 and 0 were the representative values of the dummy variables:

- D₁: gender (1 = female; 0 = male respondents)
- D₂: respondents' educational attainment (1 = had at least a Bachelor's Degree; 0 = a lower educational level)
- D₃: current park usage (1 = respondent visits the parks; 0 = respondent does not visit the parks).

2.4 Findings and Results

2.4.1 Socio-economic profile of the respondents

The socio-economic profiles of the respondents are shown in Table 2-2. The majority of the respondents were female (59.8 per cent). The respondents' overall educational attainment was very low. Around 24.3 per cent had only primary school education while another 27 per cent had completed high school. Only 8.5 per cent of the respondents had university-level education. Regarding their occupational profiles, the largest group of respondents (36 per cent) was composed of merchants. Twenty-two per cent (22 per cent) were housewives and the smallest group was farmers (1.5 per cent) (Table 2-2).

The mean monthly household income was 2,127,146 kip/month (Table 15), 49.5 per cent earned between 1-5 million kip per month. Households that earned 500,000 kip and below per month accounted for 16.5 per cent while around 3 per cent had monthly incomes of more than 5 million kip. About 46.25 per cent paid between 100,000 and 500,000 kip/month/household for electricity, and around 80.25 per cent paid between 10,000 to 50,000 kip/month/household for water.

Table 2-2. Respondents' socio-economic characteristics

Socio-economic Characteristics	Frequency	Percentage
Gender		
Female	239	59.8
Male	161	40.2
<i>Total</i>	<i>400</i>	<i>100</i>
Education		
Primary & lower	97	24.3
Secondary	103	25.8
High school	108	27
Technical education	52	13
Bachelor degree & higher	34	8.5
No answer	6	1.5
<i>Total</i>	<i>400</i>	<i>100</i>
Occupation		
Unemployed	20	5
Business	5	1.25
Private official	17	4.25
State official	42	10.5
Worker	21	5.25
Farmer	6	1.5
Housewife	88	22
Merchant	144	36
Retired	19	4.75
Technical staff	21	5.25
Other	13	3.25
No answer	4	1
<i>Total</i>	<i>400</i>	<i>100</i>
Monthly Income (kip)		
500,000 & below	66	16.5
500,001 to 1,000,000	120	30
1,000,000 to 5,000,000	198	49.5
5,000,001 & above	12	3
No answer	4	1
<i>Total</i>	<i>400</i>	<i>100</i>
Electricity Bill Payment		
50,000 & lower	92	23
50,001 to 100,000	106	26.5
100,000 to 500,000	185	46.25
500,001 & above	12	3
No answer	5	1.25
<i>Total</i>	<i>395</i>	<i>100</i>
Monthly Water Bill Payment		
Use underground water	18	4.5
10,000 & below	22	5.5

Socio-economic Characteristics	Frequency	Percentage
10,001 to 50,000	321	80.25
50,001 to 100,000	26	6.5
100,001 & above	9	2.25
No answer	4	1
<i>Total</i>	<i>400</i>	<i>100</i>

Source: Field survey from 26 April to 2 May 2007. N = 400.

Note: 1 USD = 9,500 kip (Sept. 2007)

The majority of the respondents (86.3 per cent) owned the residence they were occupying. Others were either renting (4.6 per cent) or staying with relatives (3 per cent) (Table 2-3). Household sizes were notably large with 68 per cent of the respondents saying that there were between five to ten people living in a single household (Table 2-4).

Table 2-3. Respondents' housing profile

Home Ownership	Frequency	Percentage
Home owner	341	86.3
Renting	18	4.6
Staying with a relative	12	3.0
Son or/and daughter in law	8	2.0
Other	16	4.1
<i>Total</i>	<i>400</i>	<i>100</i>

Source: Field survey from 26 April to 2 May 2007. N= 400.

Table 2-4. Number and size of households

Household Size (Person)	Frequency	Percentage
Fewer than 5	119	30
5 to 10	268	68
More than 10	9	2
<i>Total</i>	<i>396</i>	<i>100</i>

Source: Field survey from 26 April to 2 May 2007. N= 396.

2.4.2 Use of urban parks and perceptions of their management

2.4.2.1 Park visitation

To assess the popularity of the 16 parks in Vientiane Capital City, the respondents were asked about their visits to these parks. The results (Table 2-5) showed that 87 per cent of the respondents had visited one park at least while 2 per cent had visited all the parks. Around 12 per cent had never visited any of the parks. Among the 16 parks, Patuxay Park and That Luang were the favorites, having been visited by 79.35 per cent and 43.32 per cent of the interviewed respondents, respectively (Table 2-5). These parks were located in the center of town and were very easy to access. They also had attractive flower gardens, foot-

paths for jogging and walking, and benches, were well-maintained and had attractive fountains. That Luang Park is located in That Luang field where the That Luang Stupa, the symbol of Vientiane Capital City, is situated—this is a popular attraction for the locals. Only 13.6 per cent of the respondents said that they had visited Saysetha Park. Generally, Saysetha Park was perceived to be in relatively poor condition because it had insufficient jogging areas, no beautiful garden and nothing interesting to motivate people to visit it.

Table 2-5. Park visitation profile

Park visits	Frequency	Percentage
Have never visited any park	46	12
Have visited at least one park	344	87
Have visited all the parks	7	2
<i>Total</i>	<i>397</i>	<i>100</i>
Patuxay Park	315	79.35
Jao Fagum Park	115	28.97
Saysetha Park	54	13.60
That Luang Park	172	43.32
Slongsay Park	109	27.46
Singha Park	19	4.79
Sisavangvong Park	18	4.53

Source: Field survey from 26 April to 2 May 2007. N = 397.

Note: Multiple response table. Percentages are based on total respondents (N = 400).

Table 2-6. How visitors go to the parks

Mode of transportation	Frequency	Percentage
<i>Do not go to the park</i>	<i>48</i>	<i>12.2</i>
On foot	40	10.2
By bicycle	20	5.1
By motorbike	189	48.0
By car	90	22.8
By public transport	7	1.8
<i>Total</i>	<i>394</i>	<i>100.0</i>

Source: Field survey from 26 April to 2 May 2007. N= 394.

The majority of the respondents preferred to visit the parks in their free time, but the frequency of such visits was quite low. Only 32.7 per cent visited a park between 1-3 times a month, followed by 21.1 per cent who visited a park less than once a month. Only 3.8 per cent, who loved relaxing and exercising, visited a park every day. About 48 per cent of the respondents traveled to the parks by motorbike, and 22.8 per cent went by car. Public transportation accounted for only 1.8 per cent.

Table 2-7. Frequency of visits to the parks

Frequency of visits	Frequency	Percentage
<i>Do not visit the park</i>	46	11.7
Every day	15	3.8
Less than once per month	83	21.1
1-3 times per month	129	32.7
4-6 times per month	40	10.2
6-10 times per month	28	7.1
10-20 times per month	8	2.0
Over twenty times per month	4	1.0
Other	41	10.4
<i>Total</i>	394	100.0

One section of the questionnaire asked respondents which elements of a park they were most concerned about. It was surprising to learn that most of them considered the cleanliness and facilities of a park more important than its beauty. The quality of toilet and waste disposal facilities ranked at number one and two respectively. The presence of green trees and beautiful flowers ranked only as the third most important consideration. Fourth and fifth in importance were the provision of fountains and seats as well as footpaths. The least important was the availability of picnic areas.

2.4.2.2 Saysetha Park visitation

Among those who visited Saysetha Park, about 52 per cent were female. Around 50 per cent were between 31 and 50 years old and another 21 per cent were older than 50 years old. Their educational profile was similar to the total sample group; most had completed only secondary school at best (Table 2-8).

Table 2-8. Profile of the respondents who visited Saysetha Park

Respondents' Characteristics	Frequency	Percentage
Age (Years)		
Less than 20	9	2.25
21 to 30	56	14
31 to 50	201	50.25
More than 50	84	21
Gender		
Female	208	52
Male	135	33.75
Occupation		
Unemployed	20	5
Private official	17	4.25
State official	36	9
Labor	20	5

Respondents' Characteristics	Frequency	Percentage
Housewife	75	18.75
Merchant	131	32.75
Retired	15	3.75
Education		
Secondary & lower	170	42.5
Technical school & lower	149	37.25
Bachelor degree & higher	29	7.25

Source: Field survey from 26 April to 2 May 2007. N = 400

Most of respondents (87.5 per cent) reported that they were aware of the importance of Saysetha Park, particularly its role in strengthening the Lao national spirit and in commemorating important historical events. Saysetha Park also had the advantage of being located in front of the National Assembly Hall in That Luang field as well as being near That Luang Stupa, which are both heritage sites for the Lao people. Therefore, it attracted foreign dignitaries and visitors as well as Lao nationals. However, the survey data revealed that Saysetha Park was not a favorite destination. Of the few who visited it (13.5 per cent), many believed that few people came to the park because of its limited facilities. Some said that Saysetha Park's condition had deteriorated and it had no interesting features. Since the park was not well maintained, it was being used as a football field.

2.4.2.3 Responsibility over park maintenance

When asked for their opinion regarding Saysetha Park management, 64 per cent of the respondents felt that urban parks should be the sole responsibility of the government. Of these respondents, 51.4 per cent said that this project should be the responsibility of the VUDAA. Fewer people thought that agencies such as the Saysetha District Authority, the Science Technology and Environment Agency (STEA), and the National Tourism Organization should have the key management role (Table 2-9).

Table 2-9. Respondents' opinions about who should manage Saysetha Park

Authorities which should manage Saysetha Park	Frequency	Percentage
VCC residents	86	22.1
Non-government organizations	20	5.1
Government and VCC residents	34	8.7
Government of Laos	249	64.0
Vientiane Urban Development Administration Authority	128	51.4
Science Technology and Environment Agency	27	10.8
Saysetha District Authority	57	22.9
National Tourism Organization	13	5.2
Don't know	24	9.6
<i>Total</i>	<i>389</i>	<i>99.9</i>

Source: Field survey from 26 April to 2 May 2007. N= 389

Note: Percentages in smaller font size were calculated using N= 249, the number of respondents who answered that the Government of Lao should be responsible for the management of Saysetha Park.

A smaller group of people (8.7 per cent) thought that both the government and all VCC residents should share park management responsibilities. They explained that this was because urban parks were good places to relax in during their free time and that the parks benefited everyone who visited them. Only five per cent thought that this project should be the responsibility of non-government organizations (NGOs).

2.4.3 VCC's WTP for the sustainable development and maintenance of Saysetha Park

2.4.3.1 Willingness to pay at different bid levels

Following the questions about the respondents' park usage and their opinion about who should be responsible for park management, the respondents were informed of the proposed plan to improve Saysetha Park. After listening to the CV scenario, they were asked if they would support the creation of a trust fund that would require VCC households to make a monthly contribution as a surcharge on their monthly water bill. The 400 respondents were split into five sample groups at random based on the five bid prices used, which were 1,000 kip, 3,000 kip, 5,000 kip, 10,000 kip and 15,000 kip. Among the 400 respondents, 271 (67.8 per cent) were willing to pay for the Saysetha Park improvement program while 125 respondents (31 per cent) were not willing to pay and 4 (1 per cent) did not vote. Table 2-10 shows that the percentage of respondents who voted in favor of the referendum declined as the bid price increased. These results are consistent with theoretical expectations.

All the respondents in the split sample for a monthly surcharge of 1,000 kip/month voted in favor of it. However, the percentage of respondents who supported the referendums in the split samples reduced to 85 per cent and 75 per cent as the monthly surcharge increased to 3,000 kip/month and 5,000 kip/month, respectively. Only 49 per cent said that they would support the referendum if each household had to pay a surcharge of 10,000 kip/month for a period of ten years. An even smaller percentage of the respondents (30 per cent) voted in favor of a referendum that would collect 15,000 kip/month.

The respondents were informed of the provision rule that the surcharge would only be collected if more than 50 per cent of the respondents voted in favor of the referendum. Based on the results, the referendum would pass only for the three lower bids, (i.e., 1,000, 3,000 and 5,000 kip/month/household).

Table 2-10. Distribution of responses by bid amount

Bid Prices	No. of respondents willing to pay	Percentage	No. of respondents unwilling to pay	Percentage
1,000	80	100	0	0
3,000	68	85	11	13.75
5,000	60	75	19	23.75
10,000	39	48.75	40	50
15,000	24	30	55	68.75
<i>Total</i>	<i>271</i>		<i>125</i>	

Source: Field survey from 26 April to 2 May 2007.

Note: 4 of the 400 respondents did not vote.

2.4.3.2 Respondents' reasons for their WTP

Of the 271 respondents who were willing to contribute to the project, 46.49 per cent said they did so because they agreed to the concept of sustainable development and maintenance of the park. About 23 per cent of them perceived that parks were very good places for recreational activities during their free time, such as jogging, walking, relaxing with family members, meeting friends, and breathing in fresh air. Another 15.87 per cent believed that contributions from VCC residents would be the best way to fund the project since the government's budget was constrained.

Since the contribution would be collected via a water bill surcharge, the respondents' perception of the Water Supply Company was investigated. The results in the Table 2-11 show that, among the respondents who were willing to pay, about 92.36 percent of them trusted the company, while 7.64 per cent did not. The latter's reasons included perceptions that the company would ask for collection fees to cover for personnel or administration costs and that there was no relationship between the project and water supply.

Table 2-11. Respondents' responses to the WTP question and proposed payment vehicle

	Frequency	Percentage
Reasons for willingness to pay		
Agree to the concept of park improvement	126	46.49
Contribution from VCC residents will be the best solution	43	15.87
Parks are good places to spend time during one's free time	63	23.25
Other	39	14.39
<i>Total</i>	<i>271</i>	<i>100</i>
Respondents' perception of the water company		
Trust the water company	266	92.36
Do not trust the water company	22	7.64
<i>Total</i>	<i>288</i>	<i>100</i>
<i>Reasons for not trusting the water company</i>		
<i>The company will ask for collection fees</i>	<i>7</i>	<i>33.33</i>
<i>The company will not collect money for the project</i>	<i>6</i>	<i>28.57</i>
<i>No relationship between the project and water supply</i>	<i>7</i>	<i>33.33</i>
<i>Others</i>	<i>1</i>	<i>4.76</i>
<i>Total</i>	<i>21</i>	<i>100</i>
Contributing via a water bill surcharge		
Agree	264	92.31
Do not agree	22	7.69
<i>Total</i>	<i>286</i>	<i>100</i>
<i>Reasons for unwillingness to pay via a water bill surcharge</i>		
<i>Water bill will increase yearly</i>	<i>5</i>	<i>25</i>
<i>Some households do not have access to the water supply</i>	<i>5</i>	<i>25</i>
<i>A monthly payment is more expensive than a yearly one</i>	<i>1</i>	<i>5</i>
<i>Others</i>	<i>9</i>	<i>45</i>
<i>Total</i>	<i>20</i>	<i>100</i>

The 271 respondents were asked whether they agreed to make the payments through a water bill surcharge. About 92.31 per cent agreed while the rest did not. Reasons for not agreeing included the fact that the water bill tended to increase yearly, so the fear was that the payments would also increase. Also, as some household had no water supply and therefore, no water bill, it did not seem fair that not all VCC residents would be contributing to the project.

The main reason of the 125 respondents who voted against the referendum was that they could not afford paying the surcharge. Others thought that the project would not be implemented because they did not trust the fund’s management authorities. Some thought that their payment would not contribute to solving the problem and that it should be the responsibility of the government since it already collected monthly income taxes (Table 2-12).

Table 2-12. Reasons for respondents’ unwillingness to pay

Reasons for unwillingness to pay	Frequency	Percentage
Cannot afford the amount of money	101	80.80
The project will not be realized	2	1.60
The authorities which will take responsibility for this project cannot be relied upon	1	0.80
This payment will not be able to solve the problem	2	1.60
It should be responsibility of the government because it has tax revenues	4	3.20
No answer	15	12
<i>Total</i>	<i>125</i>	<i>100</i>

Source: Field survey from 26 April to 2 May, 2007 N=125.

2.4.3.3 Respondents’ suggestions on how to increase support for the improvement of the park

Regardless of how the respondents voted, they were asked for suggestions on how to motivate the general public to support this program. Table 2-13 shows that 64 per cent of the respondents indicated that the people would be more willing to contribute to the project if the government increased public awareness of the importance of urban parks. About 16 per cent said that more transparency and accountability by the authorities concerned about the utilization of the funds collected would convince people to pay.

Table 2-13. Factors that will motivate VCC residents to contribute to park improvement

Incentives	Frequency	Percentage
Provide information on the body that will collect the money from the public	33	9.07
Ensure transparency and accountability on how the funds are utilized for the project	60	16.48
Publish and disseminate information on the activities of the public authorities responsible for the project	28	7.69

Incentives	Frequency	Percentage
Build awareness on the importance of urban parks	233	64.01
Other	10	2.75
<i>Total</i>	<i>364</i>	<i>100</i>

2.4.3.4 Mean willingness to pay

The logit model was used to estimate the Mean Willingness to Pay (MWTP). Table 2-14 shows the results of the regression where the probability of voting ‘yes’ (yes = 1) or ‘no’ (no = 0) was regressed with the bid prices only. The bid variable was found to be significant at the 99 per cent confidence and the negative coefficient was consistent with economic expectations that the higher the bid price, the lower the probability that the respondents would be willing to pay (Table 2-14).

Table 2-14. Regression results when only bids are considered

Variable	Model 1 (Bids only)		
	Coefficient	t-ratio	P-value
Constant	2.75621949	10.49	0.0000
Bids*	-0.0002566***	-9.435	0.0000

Source: Field survey from 26 April to 2 May, 2007. N= 271.

The MWTP was computed using the equation: $\text{Mean}_{(\text{Bids})} = \frac{\alpha}{\beta}$. Using the parametric method, the MWTP was therefore $\frac{2.75621949}{0.0002566}$ which equaled 10,741. This meant that VCC residents were willing to pay 10,741 kip/month/household for a period of 10 years.

To assess whether it was realistic to expect VCC households to pay this sum on a monthly basis, the value was compared with the respondents’ mean monthly household income of 2,127,146 kip/month (Table 2-15).

Table 2-15. Respondents who vote “Yes” by monthly income level

Monthly income (kip)	Frequency	Percentage	No. WTP	Percentage
500,000 & below	66	16.7	41	62.1
500,001 to 1,000,000	120	30.3	74	61.7
1,000,001 to 5,000,000	198	50	147	74.2
5,000,001& above	12	3	9	75
Total	396	100	271	68.4
Min	150,000			
Mean	2,127,146			
Max	50,000,000			

Source of data: Field survey from 26 April to 2 May, 2007

Table 2-16. Respondents who voted “Yes” by monthly water bill

Monthly Water Bill (kip)	Frequency	Percentage	No. WTP	Percentage
10,000 & below	22	5.8	12	54.5
10,001 to 50,000	321	84.9	220	68.5
50,001 to 100,000	26	6.9	24	92.3
100,001 & above	9	2.4	7	77.8
Total	378	100	263	69.6
Min	5,000			
Mean	32,068			
Max	400,000			

Source of data: Field survey from 26 April to 2 May, 2007. N= 271.

Table 2-17. Proportion of water and electricity costs in the respondents’ monthly income

Mean	Value (kip)	Ratio (%)
Monthly Income	2,127,146	-
Monthly Water Bill	32,068	1.5
Monthly Electricity Bill	159,575	7.5

Source of data: Field survey from 26 April to 2 May, 2007.

The MWTP of 10,741 kip/month was equivalent to 0.5 per cent of the respondents’ monthly income. This suggests that the surcharge of this amount was affordable for VCC households.

However, if compared to the monthly household expenditure for electricity and water of 191,643 kip/month expenditure, the estimated 10,741 kip/month/household would be equivalent to increasing the average monthly utility bill by some 5.6 per cent. With an average monthly water bill of 32,069 kip/month, the monthly surcharge would be an increase of 33 per cent.

2.4.3.5 Aggregation of MWTP

The MWTP value was compared with the responses to the WTP question at different bid prices. Table 2-10 showed that less than 50 per cent would vote in favor of the proposed park improvement if they had to pay 10,000 kip/month. However, the referendum passed at lower bid levels. In Table 2-18 below, calculations were made for the lower bids that passed, namely, 1,000 kip, 3,000 kip and 5,000 kip.

Table 2-18. Aggregate MWTP for the three lower bids

Aggregate MWTP (Kip/Month/Household)		Bid 3	Bid 2	Bid 1
Kip	Currency	5,000	3,000	1,000
USD		0.53	0.32	0.11
No. of households in VCC	Unit	123,174	123,174	123,174

Aggregate MWTP (Kip/Month/Household)		Bid 3	Bid 2	Bid 1
Monthly Income	kip ('000)	615,870,000	369,522,000	123,174,000
	USD	64,828.42	38,897.05	12,965.68
Yearly Income	kip ('000)	7,390,440,000	4,434,264,000	1,478,088,000
	USD	777,941.05	466,764.40	155,588.21

Source: Field survey from 26 April to 2 May, 2007. N= 271.

Note: 1 USD = 9,500 kip (September, 2007)

If the surcharge was set at 5,000 kip/month (USD 0.53), 75 per cent of the respondents in the split sample were willing to pay for it. This was equivalent to 0.24 per cent of the respondents' mean monthly income and 15.6 per cent of their mean monthly water bill. The total revenue per month would amount to USD 64,828 and the revenue per year would be USD 777,941. At 3,000 kip/month (USD 0.3), 85 per cent of respondents in the split sample were willing to pay this. The total revenue per month would amount to USD 38,897 and the revenue/year would be USD 466,764. Finally, at 1,000 kip/month (USD 0.1), 100% of the respondents who got this bid at random were willing to pay for it. The potential collection was USD 12,966/month or USD 155,588/year.

2.4.3.6 Factors influencing WTP

To better understand the factors that influenced how the respondents voted, a binary logistic regression model was used. In Table 2-19, the determinant variables are listed with their definitions and indications of expected signs. The regression results show that the two determinant variables are bids and income. The negative coefficient sign for the bids variable indicates that as bids become higher, the probability of respondents being willing to pay becomes lower. On the other hand, the positive coefficient sign for the income variable indicates that the respondents from high-income households are more likely to contribute to the sustainable development and maintenance program than households with low monthly incomes.

Table 2-19. Definitions and expected trends of variables used in the contingent valuation model

Variable	Definitions and Units	Expected signs
Bids	Bids price level	-
Age	Respondents' age (years)	?
Gender	Female= 1, Male = 0	?
Use of park	Yes = 1, No = 0	+
Education	High school and above = 1, Other = 0	+
Income	Monthly household income (kip)	+
Water bill	Monthly household water bill	-

Source: Field survey from 26 April to 2 May, 2007

The results in Table 2-20 show that the bid variable for both models (Model 1 where the logit regression is run with only the bid variable and Model 2 where the dependent variables included the bid as well as other demographic variables) was statistically significant at the 99% level of confidence. The coefficient had the expected negative sign indicating that as the bids got higher, the probability of the respondents saying 'yes' to the WTP question became lower. In Model 2, the income variable was significant at the 90% level of confidence. The positive coefficient sign corresponded to *a priori* expectations that as the income level increased, the probability that the respondent would be willing to pay would also increase.

Table 2-20. Parameter estimates of the logit model

Model 1 (Bids only)			
Variable	Coefficient	t-ratio	P-value
Constant	2.75621949	10.49	0.0000
Bids*	-0.0002566***	-9.435	0.0000
Model 2 (Full function)			
Variable	Coefficient	t-ratio	P-value
Constant	2.4785	2.894	0.0038
Bids*	-.0002642***	-9.4	0.0000
Age	0.00811	0.006	0.9952
Gender	-0.3055	-1.1	0.2732
Use park	0.7229	0.172	0.8637
Education	0.004846	0.013	0.9897
Income*	0.001148*	1.647	0.0996
Water bill	0.005391	1.23	0.2185

Source: Field survey from 26 April to 2 May, 2007

Note: *** =significant at 1%, * =at 10%, Variables which are significant in bold

2.5 Conclusions and Recommendations

This study was the first to apply CVM to investigate the WTP to pay of VCC residents for the sustainable development and maintenance of urban parks in the city, by taking Saysetha Park as a case study.

We found that the majority of the respondents considered urban parks as very important areas of relaxation in their free time, and a high proportion of them were willing to pay to sustain and improve the quality of urban parks in VCC through a monthly water bill surcharge for ten years. However, the probability of paying varied with the bid prices and household income. High bids led to lower WTP and low bids led to higher WTP. In contrast, those from high income households were more likely to pay.

The 400 respondents were split into five groups based on the five bid prices used, which were 1,000 kip, 3,000 kip, 5,000 kip, 10,000 kip and 15,000 kip. The referendums that passed were 5,000 kip and below per month per household, while the mean willingness to pay was 10,741 kip/month/household, which was much higher. Thus, this study recommends a monthly water bill surcharge of 3,000 kip/month/household which would result in a total monthly collection of USD 38,897 (USD 466,764 per year).

In order to encourage local residents to support the sustainable development and maintenance of urban parks in VCC as well as in other cities and provinces in Laos, the government should provide three important incentives uncovered by this study. First of all, the government should build public awareness of the importance of urban parks among the residents. Secondly, it should publish and disseminate information about the authorities responsible for collecting the fees and improving and maintaining the parks as well as about their actual activities. Finally and most importantly, the government should ensure more transparency and accountability on how the funds collected are utilized for project activities.

References

- Boyle, Kevin J. 1990. "Dichotomous choice, contingent valuation questions: functional form is important. *Northeastern Journal of Agricultural and Resource Economics* Vol. 19 (pp. 125-132).
- Boyle, Kevin J. 1989. Commodity specification and the farming of contingent valuation questions. *Land Economics* Vol. 65 (pp. 57-63).
- Carson, R and Y. Jeon, 1997. "*The Relationship Between Air Pollution Emissions and Income: U.S. Data*," University of California at San Diego, Economics Working Paper Series 97-08, Department of Economics, UC San Diego.
- Davis, Robert K. 1963. "*The Value of Outdoor Recreation: An Economic Study of the Maine Woods*" Ph.D. dissertation. Harvard University.
- Hammack, J. and G. M. Brown Jr. 1974. *Waterfowl and Wetlands: Toward Bioeconomic Analysis*. Resources for the Future / The Johns Hopkins University Press, Baltimore, MD, USA and London, UK.
- Seenprachawong, Udomsak. 2005. Economic Valuation of Cultural Heritage: A Case Study of Historic Temples in Thailand. *EEPSEA Research Report No. 2005-RR12*.

3.0 USING CVM FOR IN-SITU BIODIVERSITY CONSERVATION AND SUSTAINABILITY: A CASE STUDY OF THE HOUAY NHANG PROTECTED AREA

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3.1 Background of the Study

Lao PDR is a country with vast natural resources, especially forest resources. In 1940, it was estimated that forests accounted for 17 million hectares, approximately 70 per cent of the total land area. Recent surveys reveal that this forest area reduced at an average of 53,000 hectares per annum. In 2004, Lao PDR forest cover was found to account for only 41.5 per cent of the country's total land area.

Lao PDR currently has 20 National Protected Areas (NPAs) and two conservation corridors covering almost 3.34 million hectares or 14 per cent of the country's land resources. Protected areas provide many goods and services not traded in commercial markets. As a result, they have no evident market value. The total economic value of a park consists of its direct and indirect use values and its non-use values.

A protected area's indirect uses largely comprise its ecological functions such as climate stabilization, carbon sequestration, and providing watershed protection and breeding habitats for migratory species, insects that pollinate local crops and raptors that control rodent populations.

Non-use values are particularly difficult to measure. These are values not linked to the use of the protected area. The two types of non-use values are bequest values and existence values. Bequest values relate to the benefit of knowing that others benefit or will benefit from a protected area. Existence values reflect the benefit of knowing that a protected area exists even though there is no likelihood that it will be visited or used in any other way.

The Houay Nhang Protected Area (HNPA) is located in Saythani District, the northeastern part of Vientiane Capital City (VCC)⁸, and is only 14 km from the city center. It is among the four protected areas situated in the city. The recent estimate of HNPA's area is 808 hectares, reportedly one-third smaller than its size in 1952.

HNPA is fertile with many kinds of trees particularly *Pterocarpus macrocarpus*, *Afulia xylocarpa*, and *Dipterocarpus alatus*. The protected area used to be a major habitat for tigers, elephants, deer, wild pigs, snakes, monkeys, and insects. Currently, the forest density has decreased due to illegal logging, unsustainable collection of non-timber forest products (NTFP), and inadequate protected area management. Some areas have even been converted into illegal garbage dumps. Thus, there has been a decline in the flora and fauna, especially tigers, elephants, and deer. For this reason, HNPA must be preserved and developed so that it may regain its previous level of biodiversity.

⁸ Vientiane Capital City is the capital of Lao PDR. It is the administrative, political and economic center of the country. HNPA makes up about 40% of its forest area. There are two National Protected Areas and four Provincial Protected Areas located within the boundaries of Vientiane Capital City covering 28.35 per cent of its total surface area.

The Xuay Stream, a tributary of the Nam Ngum River⁹ that joins the Mekong River, flows into HNPA. This stream used to have abundant water flow all year round, but this flow has been severely limited during the dry season for the last few years.

Until now, local communities have been extracting NTFPs such as mushrooms, flowers, insects and other plants from HNPA for consumption, for use as medicinal plants, and as a source of income. Local communities have been allocated around eight hectares within the HNPA for communal rice production, but only on a temporary basis. Contracts have been signed with the Science Technology and Environment Agency (STEA) wherein the villagers have agreed to give up their rice fields should the STEA require the land back for reforestation or conservation purposes.

Although management plans and regulations have been passed, insufficient funds and resources have hampered the monitoring and management of the protected areas. The HNPA has come under increasing pressure. One of the causes is population growth. VCC has the highest population density and the fastest growth of approximately 3.4 per cent per annum. With 770,000 inhabitants and an area of approximately 3,920 km², there is increasing pressure for land as well as for water. Apart from the population factor, economic growth has also contributed to the growing demand for land from competing sources.

There is the perception that protected areas have little economic or developmental value, generate few tangible financial benefits or little public revenue, limit access to livelihood resources and deprive local communities of their livelihood. At the same time, there is also the perception that conservation measures compete for and deplete national and local budget funds. Thus, protected area conservation faces the challenge of tapping non-traditional sources of funding.

VCC authorities, together with the STEA, initiated this study to explore if VCC residents could be called upon to support HNPA protection/conservation. The study aimed to find out people's perceptions about protected areas and, with the use of the Contingent Valuation Method (CVM), to estimate their willingness to pay (WTP) for conservation measures. The expectation was that this research would provide relevant information on the viability of receiving financial assistance from the local urban communities for biodiversity conservation and protected area management.

3.2 The Objectives of the Study

The study's general objective was to estimate the value of improved HNPA management to the people of Vientiane Capital City (VCC).

The research questions were:

1. Are VCC residents aware of the importance of HNPA conservation in ensuring them a better quality of life, such as in providing them with sustainable water supply, clean air, and recreational areas?

⁹ The Nam Ngum River provides the water for the Nam Ngum hydropower plant, which serves Vientiane Capital City and Vientiane Province. The hydro-electricity is also sold to Thailand.

2. Are they willing to pay for the implementation of a program to improve the management of HNPA?
3. If so, what is the maximum amount that they are willing to pay for such a program?
4. If they are not willing, what are the reasons of their unwillingness to pay for the program?
5. What is the most acceptable mechanism for collecting protected area management and protection fees?

3.3 Research Methodology

In this study, the non-use value of HNPA was estimated by using the CVM to determine their WTP for HNPA conservation. The survey was conducted through face-to-face interviews. In December 2006, the researchers prepared a draft questionnaire and discussed it with focus groups made up of key stakeholders from the local communities in and surrounding HNPA. The questionnaire's content and wording as well as the bid price values to be used in the pretests were discussed. Additional information was collected on the current situation and issues related to protected areas, particularly HNPA.

The revised questionnaire was pretested in February 2007. Altogether, 38 respondents were interviewed for the pretests. Of this, 18 respondents lived inside or nearby HNPA. The other 20 respondents lived outside HNPA and were mainly from four districts in VCC, namely Chanthabouly, Saysetha, Saythani, and Pak Ngum. The questionnaire was revised with inputs from the pretests. The actual survey was conducted in March, 2007.

3.3.1 Sampling and sample size

The survey covered 400 respondents. Table 3-1 shows their distribution based on the four surveyed districts in VCC.

Table 3-1. Distribution of respondents by district

District	No. of households	No. of villages	Population	Ratio of total population (%)	No. of respondents
Chanthabouly	12,246	37	73,595	19	75
Saysetha	17,785	52	96,589	27	109
Saythani	26,820	104	149,507	41	165
Pak Ngum	8,348	53	45,226	13	51
<i>Total</i>	<i>65,199</i>	<i>246</i>	<i>364,917</i>	<i>100</i>	<i>400</i>

Source: Vientiane Statistics Authority, 2005

3.3.2 Questionnaire structure

The questionnaire had three parts. The first part contained questions on the communities' general awareness regarding protected areas. The second part contained the

proposed measures for improving the management of HNPA and a description of the proposed trust fund that would be set up to mobilize funds from the general public for additional conservation measures. The final part contained questions on the respondents' socio-economic profiles.

3.3.3 CV scenario, payment vehicle and elicitation method

The Contingent Valuation (CV) scenario described the proposed policy to improve the HNPA management system. Under the proposed improvements, the protected area would be divided into three zones, namely, the preservation zone, the recreation zone, and the study zone. Activities to be implemented included the preservation of existing forests and biodiversity resources; regulatory monitoring and maintenance; the establishment of an ecological center for research, education and awareness-building; and the establishment of a butterfly house to conserve existing butterfly species. Recreational activities would be encouraged by promoting indigenous knowledge, naming the trees, and creating sidewalks, among other initiatives.

The respondents were informed that implementing the Proposed Policy for Sustainable Ecology/Biodiversity Conservation to improve the sustainability of HNPA would require a considerable amount of resources. Therefore, it was proposed that an Ecological/Biodiversity Trust Fund be set up to collect contributions from households in VCC.

The HNPA Board will manage this Ecological/Biodiversity Trust Fund. An advisory council and staff, with representatives from relevant agencies and local communities will support the Board. Contributions will be collected from households in VCC for five years, after which funds to continue the conservation activities will come from entrance fees.

After being informed of the hypothetical program to improve the management of HNPA, the respondents were told that the survey was being administered to explore the potential of mobilizing funds from the general public and to find out how they would vote if asked to support a referendum to make monthly payments. It was explained that for the referendum to pass, more than 50 per cent of the respondents would have to vote in its favor. If the referendum passed, VCC would collect the proposed payment from its households every month for a period of five years. If less than 50 per cent supported the plan, the proposed improvement program would not be implemented.

The WTP question was posed as a single-bounded dichotomous choice. In other words, each respondent was asked to decide whether she would vote for or against paying a specified bid price. Five bid prices were used namely, 1,000 kip, 3,000 kip, 5,000 kip, 8,000 kip and 10,000 kip. These were determined using information from the focus group discussions (FGDs) and three pretests previously conducted. Negative responses were followed by an open-ended question that asked the respondents to specify a monthly sum that they would be willing to pay.

3.4 Findings

3.4.1 Socio-economic profile of the respondents

There were 383 completed usable questionnaires from the household survey. Of these, 58 per cent were women respondents. The majority of the respondents fell in the 31-50 years age group. Approximately 88 per cent were married. Around 35.2 per cent were

housewives. In terms of occupation, more than 24.5 per cent were engaged in a non-farm occupation such as trade; 14.4 per cent were farmers; and 12 per cent were government officers.

In general, the respondents' educational level was low. More than one-fourth of the respondents (27.2 per cent) completed primary school (five years), 18.3 per cent had secondary school level education and only 24.3 per cent reached high school level.

Over 50 per cent of the respondents reported that their monthly income was one million kip/month or less. On the expenditure side, 41.5 per cent reported a monthly expenditure of between 500,000 and 1,000,000 kip. Around 21 per cent reported that they spent between 1 million and 2 million kip/month on average. About 16 per cent said that their monthly expenditures were higher than 2 million kip/month (Table 3-2).

Table 3-2. Respondents' socio-economic characteristics

Variables	Categories	Frequency	Percentage
Resident's Location	Distance	205	53.5
Gender	Female	222	58.0
Age	<20	7	1.8
	20 – 30	58	15.1
	31- 40	109	28.5
	41 – 50	107	27.9
	51 – 60	66	17.2
	>60	35	9.1
Qualification	Primary school	104	27.2
	Lower secondary school	70	18.3
	High school	93	24.3
Civil Status	Married	337	88.0
Occupation	Worker	26	6.8
	Officer	46	12.0
	Housewife	135	35.2
	Farmer	55	14.4
	Business	7	1.8
	Private Company	12	3.1
	Others (trader and merchant)	94	24.5
Income/month	<500,000	78	20.4
	500,000 - 1,000,000	153	39.9
	1,000,001 - 1,500,000	51	13.3
	1,500,001 - 2,000,000	36	9.4
	2,000,001 - 2,500,000	14	3.7
	2,500,001 - 5,000,000	25	6.5
	3,000,001 - 3,500,000	6	1.6
	3,500,001 - 4,000,000	7	1.8
	4,000,001 - 4,500,001	4	1.0
>4,500,000	6	1.6	
Mean Income/month	1,273,118 kip/132 USD		
Expense/month	<500,000	86	22.5
	500,000 - 1,000,000	159	41.5
	1,000,001 - 1,500,000	53	13.8

Variables	Categories	Frequency	Percentage
	1,500,001 - 2,000,000	29	7.6
	2,000,001 - 2,500,000	21	5.5
	2,500,001 - 5,000,000	17	4.4
	3,000,001 - 3,500,000	7	1.8
	3,500,001 - 4,000,000	5	1.3
	4,000,001 - 4,500,001	3	.8
	>4,500,000	2	.5
Mean Expenses/month	1,144,125 kip/118 USD		

Note: 1 USD = 9,642 kip. N = 383.

3.4.2 Awareness and concern about protected areas

Many respondents (91.9 per cent) reported that they were aware that protected areas conserve and maintain biodiversity. Around 26 per cent appeared to be aware of the legal and management aspects specific to protected areas. Only a very small number thought that protected areas provided land for agricultural production, logging and collection of NTFPs (Table 3-3).

Table 3-3. Respondents' awareness about the nature and functions of protected areas

Functions of protected areas	Frequency	Percentage
Areas that are managed through legal or other effective means	99	25.8
To protect and maintain biological diversity	352	91.9
As land for agriculture	20	5.2
For illegal logging and collecting NTFPs	8	2.1
To provide natural and cultural resources	3	0.8
Others	42	11

Note: Multiple response table. N = 383.

To find out how people were already benefiting from HNPA, the respondents were asked if they had visited it and, if so, how frequently. The results showed that although HNPA was not far from the city center, 77.8 per cent of the respondents had never visited it. Another 5 per cent had only been there once. Just over 6 per cent were frequent visitors (daily to monthly visits) while 3.4 per cent (13 respondents) said they lived inside it (Table 3-4).

Table 3-4. Frequency of respondents' visits to HNPA

Frequency of visits to HNPA	Frequency	Percentage
Never	298	77.8
Once	19	5.0
Many times per day	4	1.0
Once a week	8	2.1
Once a month	13	3.4
Once a year	27	7.0
Live there	13	3.4
<i>Total</i>	<i>382</i>	<i>100</i>

Although most of the respondents had not visited HNPC, many had either visited the market next to it or passed by. Thus, when asked what type of wildlife and NTFPs they had seen or knew could be found in HNPC, quite a number of respondents said they had seen or were aware that the following animals and plants could be found in HNPC: birds, wild fowl, wild ducks, snakes, squirrels, and large trees such as *Pterocarpus macroarpus* and *Afulia xylocarpus*.

Table 3-5. Wildlife and NTFPs found in HNPC

Animals and NTFPS in HNPC	Frequency	Percentage
Winged animals (birds, wild fowl, wild ducks, etc.)	69	18
Large trees (<i>Pterocarpus macroarpus</i> , <i>Afulia xylocarpus</i>)	69	18
Saurians (snakes, squirrels, etc.)	60	15.7
Herbs	45	11.7
Terrestrial animals	39	10.2
Amphibians (frogs, turtles, etc.)	39	10.2
Flora	11	3.3
Other	1	0.3

Note: Multiple response table. N = 383.

The results also confirmed that VCC residents who lived near or in HNPC benefited from it. The respondents were asked to state the most important benefit they derived from HNPC. The most common benefit reported (12.3 per cent) was the collection of NTFPs such as medicinal plants, wild vegetables, fish and frogs (Table 3-6). For some respondents, HNPC was also important because it was a source of water, firewood, and timber for building and repairing houses. A number of people also visited HNPC for recreational and study purposes.

Table 3-6. Benefits from HNPC

Types of benefits from HNPC	Frequency	Percentage
Source of NTFPs (medicinal plants, wild vegetables, fish, frogs)	47	12.3
Site for recreation	35	9.1
Source of water for livelihood	28	7.3
Site for research study	26	6.8
Source of wood (for fuel, agriculture, and house construction)	24	6.3
Other	14	3.7

Note: Multiple response table. N = 383.

The respondents were then presented with a list of the various causes that contributed to HNPC deforestation. They were asked to rank these causes according to importance. Illegal logging, poor management and the unsustainable harvesting of NTFPs were the highest ranked causes. Conversion to agriculture was not recognized as widely as a cause of deforestation, ranking the lowest (50.7 per cent) (Table 3-7). Interestingly, the respondents identified an additional threat to the sustainability of HNPC resources that was not mentioned in the questionnaire; the uncontrolled dumping of garbage in the area.

Table 3-7. Respondents' ranking of the most important causes of HNPA's deforestation

Various causes to HNPA deforestation	Frequency	Percentage
Illegal logging	281	73.4
Mismanagement of HNPA	275	71.8
Unsustainable harvest of NTFPs	255	66.6
Collecting firewood, hunting and fishery	215	56.1
Deforestation for agriculture	194	50.7
Others (e.g., uncontrolled garbage dumping)	362	94.5

Note: The frequency cited refers only to the number who chose the particular reason as the most important.

The question on the respondents' perception over the causes of HNPA deforestation was followed by a question on their perception on the importance of HNPA. The results showed that the respondents recognized HNPA's significant role in the ecological system. The majority (76 per cent) said that HNPA protected the stream and natural water systems, increased oxygen in the air (71 per cent), and prevented floods and droughts (65 per cent). Around 61 per cent also recognized the importance of HNPA as a wildlife habitat. Over half believed that HNPA protected and conserved soil quality (Table 3-8).

Table 3-8. Respondents' perception of HNPA's functional importance

HNPA' role	Frequency	Percentage
Protects the stream and natural water systems	291	76
Increases oxygen in the air	272	71
Prevents disaster (floods, droughts)	248	64.8
Provides habitat for wildlife	234	61.1
Protects and conserves soil quality	212	55.4
Place for research study and relaxation	148	38.7

Note: Multiple response table. N = 383.

Based on the assumption that the protection and conservation of HNPA would be beneficial to many concerned parties, the respondents were asked whom they believed would benefit the most from the improved management program. The results indicated that the largest group of respondents (48 per cent) thought that both the government and the people would benefit the most (Table 3-9) while 30 per cent thought that the local residents would most stand to gain.

Table 3-9. Sectors that will benefit from HNPAs protection

Beneficiaries	Frequency	Percentage
Both government and local residents	185	48.3
Local residents	114	29.8
Government	47	12.3
Program implementers	2	0.5
Others (e.g., government, NGOs and local residents)	35	9.1
<i>Total</i>	<i>383</i>	<i>100</i>

3.4.3 Willingness to pay for the conservation of HNPAs

3.4.3.1 Willingness to pay across bids

The respondents were divided into five split sample groups corresponding to five bid prices (1,000; 3,000; 5,000; 8,000 and 10,000 kip). After presenting the hypothetical program to improve HNPAs conservation, the respondents in each split sample were then asked if they would vote ‘for’ or ‘against’ a referendum that would collect the specified monthly sum from their household for a period of five years to finance the said conservation program.

The results in Table 3-10 and Figure 3-1 show the pattern of responses to the different bid prices. At the lowest bid price (1,000 kip), 97.4 per cent of the respondents in the split sample said that they would vote in favor of the referendum. The percentage of respondents that supported the referendum reduced as the bid price increased to 3,000 kip and 5,000 kip. At the bid price of 8,000 kip, the percentage of responses that supported the referendum in the split sample was just under 50 per cent. At the highest bid (10,000 kip), the percentage of responses in favor of the referendum dropped to 35 per cent. Given the provisional rule that the referendum would only pass if more than 50 per cent of the respondents voted in favor of it, this meant that it passed only for the three lower bids (i.e., 1,000 kip, 3,000 kip and 5,000 kip).

Table 3-10. Percentage of respondents willing to pay for HNPAs conservation

Bid Level (kip)	Split sample size	Frequency	Percentage
1,000	N = 78	76	97.4
3,000	N = 77	67	87.0
5,000	N = 74	53	71.6
8,000	N = 77	38	49.4
10,000	N = 77	27	35.1
<i>Total</i>	383	<i>261</i>	-

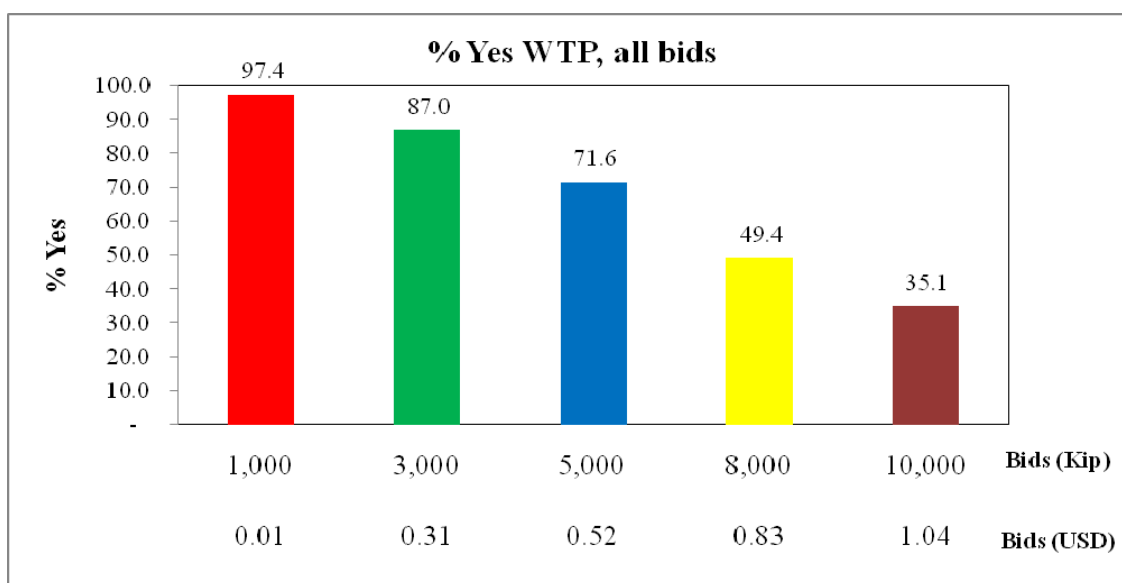


Figure 3-1. Percentage of respondents willing to pay for HNPAs conservation

The 261 respondents who voted in favor of the referendum were then asked why they were willing to contribute to the Ecological/Biodiversity Trust Fund. The most important reasons given were that they believed that HNPAs was a habitat for many species and its rich biodiversity should be protected for future generations. (Table 3-11).

Table 3-11. Respondents' reasons for responding favorably to the WTP question

Statements	Frequency	Percentage
This program will ensure biodiversity and forest conservation for future generations.	64	24.5
HNPAs needs to be conserved as it still possesses many trees and is a refuge for many species.	118	45.2
I support the idea of a conservation program for HNPAs.	33	12.6
This program will improve the management of other protected areas in the country.	29	11.1
Other	17	6.5

Note: Total number of respondents who answered 'yes' to the WTP question = 261.

The 121 respondents who did not support the referendum were also asked for their reasons. The most important reason provided was that they could not afford the amount of money specified (68.6 per cent). Five per cent said that the government should be responsible for such a conservation program (Table 3-12).

Table 3-12. Respondents' reasons for responding unfavorably to the WTP question

Statements	Frequency	Percentage
I cannot afford that amount of money.	83	68.6
This should be the government's responsibility	6	5.0
This is not an appropriate solution to ensuring biodiversity conservation.	2	1.7
Other environmental issues are more important than biodiversity conservation.	2	1.7
HNPA is not damaged yet.	10	8.3
Others (give money to the poor, etc.)	18	14.9

Note: Total number of respondents who answered 'No' to the WTP question = 121

3.4.3.2 Mean willingness to pay

The mean willingness to pay (MWTP) was estimated at 8,806 kip/month/household (Table 3-13). At this bid level, the referendum almost passed since 49.4 per cent of the respondents had voted in favor of the referendum at the 8,000 kip/month/household bid price (Table 3-10).

Table 3-13. Mean willingness to pay

Variables	Coefficient
Constant	2.967271728
	(9.662)***
Real bid	-0.000373567
	(-8.806)***

Source: Analysis of field survey results using the Limdep program.

3.4.3.3 Potential sum that can be tapped from lower bids

The potential sum that can be mobilized to support HNPA conservation efforts was calculated for 1,000 kip, 3,000 kip and 5,000 kip as these were the bid prices which majority of the respondents had voted in favor of. If all VCC households were to contribute 1,000 kip/month, the total sum collected over a five-year period would be USD 766,484. If the monthly contributions were raised to 3,000 and 5,000 kip/month, the potential revenue collected would be approximately USD 2.3 million and 3.8 million, respectively (Table 3-14).

To assess whether it was realistic to expect VCC households to pay on a monthly basis, the bid prices were compared with information on household expenditure obtained from the Sub-National Estimates of Food Security Statistics based on the Lao Expenditure and Consumption Survey (LECs 2002-03). Given the monthly expenditure of 1.1 million kip/month, a payment of 1,000 kip would be equivalent to a very small proportion of 0.09 per cent. If the households paid 5,000 kip/month, they would be paying less than half a per cent of the current monthly household expenditure (Table 3-15).

Table 3-14. Potential revenue at the different bid prices

Bids		Total number of HHs	Monthly		Annually		Five Years	
kip	USD		kip ('000)	USD	kip ('000)	USD	kip ('000)	USD
1,000	0.1	123,174	123,174	12,775	1,478,088	153,297	7,390,440	766,484
3,000	0.31	123,174	369,522	38,324	4,434,264	459,890	22,171,320	2,299,452
5,000	0.52	123,174	615,870	63,874	7,390,440	766,484	36,952,200	3,832,421

Source: Vientiane Statistics Authority, 2005

Note: 9,642 kip = 1 USD (Banque Pour Le Commerce Exterieur Lao-BCEL, June 2007)

Table 3-15. Comparison of the bid prices with current household expenditure

Bids/kip	Households Expenditure (kip/month)	Percentage of payment to current monthly expenditure
1,000	1,100,000	0.09
3,000	1,100,000	0.27
5,000	1,100,000	0.45

Note: The monthly household expenditure (1,100,000 kip) was derived from the Lao Expenditure and Consumption Survey (LECs, 2002/03).

3.4.3.4 Factors influencing WTP

The factors that influenced the respondents' WTP were analyzed using binary logistic regression. In Table 3-16, in addition to the bid prices, the independent variables included demographic variables such as age, gender, education, income, and the location of the respondent's house in relation to HNPA.

The results showed that the factors that significantly influenced the respondents' decision to vote for or against the referendum were bid, gender and education. The bid variable was significant at the 99 per cent confidence level. The negative coefficient sign corresponded to the *a priori* expectation that as the bid price rose, the willingness to pay would decline.

Table 3-16 also shows that gender is significant at the 95 per cent confidence level. The positive coefficient sign suggests that there is a higher probability of women voting in favor of the referendum compared to men. Although the educational level of the majority of the respondents covered in this survey was low, education still came up as a significant determinant factor at the 95 per cent confidence level. Its positive coefficient sign corresponds to the expectation that the more educated the respondent, the more likely she would be willing to pay.

The other independent variables were not significant suggesting that there was no clear relationship between those variables and the respondents' WTP. Even the residential location did not influence WTP. This was contrary to the expectation that there would be a

higher probability for residents who lived in the core of or close to HNPA to be willing to pay than those who lived further away.

Table 3-16. Linear regression model for the factors affecting WTP

Variable	Definition and Units	Expected Signs	Coefficient
Constant			2.307454028
			(-3.264)***
Real bid	Bids price level	-	-0.000382832
			(-8.683)***
Age	Respondents' age (Years)	+	-0.002359249
			(-0.194) ^{ns}
Gender	Male=1, Female=2	+	0.564815126
			(2.072)**
Education	Primary school	+	0.054846743
			(1.628)**
Income	Household's monthly income(Kip)	+	-4.3356E-08
			(-0.449) ^{ns}
Respondent's location	Near HNPA = 1, Far from HNPA = 2		0.401290752
			(1.572) ^{ns}

Note: *** significant at 99 per cent; ** significant at 95 per cent; * significant at 90 per cent; ns – not statistically significant

3.5 Conclusions and Recommendations

3.5.1 Conclusions

The study found that despite the overall low level of education among the respondents, the majority had a high level of awareness of environmental protection and natural resource conservation issues. Nearly half of the respondents expected that both the government and VCC residents would benefit from implementing the HNPA conservation program and that the government had an important role to play.

Responses to the WTP question showed that the majority voted in favor of the referendum for the three lower bids, namely 1,000 kip (USD 0.1), 3,000 kip (USD 0.31) and 5,000 kip (USD 0.52). The referendum did not pass at the two highest bids (i.e., 8,000 and 10,000 kip). Some of the respondents stated that VCC residents not only recognized the importance of environmental and biodiversity protection for future generations, they also believed that this initiative would improve the management of other protected areas in the country. Few respondents thought that the proposed program should be the sole responsibility of the government and that the proposed conservation measures were inappropriate.

The logit regression results showed that the factors that influenced WTP were bid prices, gender, and educational level. The negative coefficient sign for the bid variable corresponded with the *a priori* expectation that as the bid price rose, the likelihood that the respondents would be willing to pay would decline. The probability of voting in favor of the referendum was higher among women and more educated respondents.

The monthly contribution that would be acceptable to the people was at most 5,000 kip. The program should be designed to collect this amount in order to support the conservation of HNPA.

References

- Boyle K.J.; P.A. Champ and T.C. Brown. n.d. A Primer on Nonmarket Valuation. *Kluwer Academic Publisher*. Norwell, Massachusetts. USA.
- Carson R.T.; R.C.Mitchell; M.B.Conway; and S.Navrud. 1997. *Non-Moroccan Values for Rehabilitating the Fed Medina*. Washington: World Bank Report. World Bank. USA.
- Davis R.K. 1963. Recreation Planning as an Economic Problem. *Natural Resources Journal* 3: 239-249.
- Laplante, B. (Ed.). 2006. *“Workshop on Economy and Environmental Programme for Southeast Asia: Methodologies to Perform Economic Valuation of Environmental Impacts”*. October, 23-27th 2006. Vientiane, Lao PDR. IDRC and EEPSEA.
- Seenprachawong, U. 2006. *Economic Valuation of Cultural Heritage: A Case Study of Historic Temples in Thailand*. Research Report. The Economy and Environment Program for Southeast Asia. Singapore.
- Willis K.G. 1994. Paying for heritage: What price for Durham Cathedral. *The journal of Environmental Planning and Management*. 37 (3). 267-278.

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