

Estimating the Willingness of Residents in Savannakhet Province to Pay for the National Eld's Deer Sanctuary Conservative Area: the CVM Approach.

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ABSTRACT

This study aims to estimate the willingness to pay (WTP) of residents in Savannakhet Province for the National Eld's Deer Sanctuary Conservation Area (NEDSCA) and to identify the factors influencing WTP. The Contingent Valuation Method (CVM) was applied using an open-ended, face-to-face questionnaire survey. The analysis employed the Tobit Model (TM). Data were collected from 400 households in Savannakhet Province, with an average WTP of 15,250 kip per household per month. The results indicate that occupation, education, household location, length of residence, access to NEDSCA, and monthly household income have a statistically significant positive effect on WTP. In contrast, gender, age, marital status, household size, number of laborers, and monthly expenditure were found to be statistically insignificant. These findings offer practical advice to policymakers in forestry, wildlife, and biodiversity conservation and contribute to promoting the long-term sustainability of NEDSCA.

Keywords:

The National Eld's Deer Sanctuary Conservative Area (NEDSCA); contingent valuation method (CVM); willingness to pay (WTP).

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1. Introduction

The National Eld's Deer Sanctuary Conservation Area (NEDSCA) is the first officially designated wildlife conservation area in Laos, established on March 25, 2020, under Decree No. 209/PM. It covers an area of 130,745 hectares across five districts: Xonnabuly, Thapangthong, Phalanxay, Songkhone, and Phin, with the largest portion located in Xonnabuly District. Since its establishment, the NEDSCA in Xonnabuly District, Savannakhet Province, has also emerged as a new conservation-based tourism site, officially opened to visitors at the end of 2020. The upgrading of the Eld's Deer Conservation Area to the NEDSCA reflects its primary objective of conserving forests and the diverse ecosystems they support. The Eld's deer, the area's flagship species, is classified as endangered and is found only in Cambodia and the Lao PDR (Xonnabuly District). In addition to protecting this species, the NEDSCA plays a crucial role in safeguarding habitats, conserving biodiversity, supporting ecosystem services, and promoting ecotourism. Furthermore, it contributes to local livelihood improvement through sustainable agriculture and animal husbandry initiatives.

According to previous reports, the population of wild animals in the NEDSCA, particularly the Eld's deer, remains small and was projected to decline by 2022.

Historically, major threats to the Eld's deer and its habitat have included the conversion of forest land to rice paddies in the absence of land-use planning, uncontrolled grazing of cattle and water buffalo by local villagers, and frequent forest burning to promote grass regrowth for livestock. Additional pressures include the collection of non-timber forest products, selective logging, opportunistic hunting by both villagers and outsiders, and competition for water resources due to villagers' construction of water holes and use of seasonal watercourses. In response, the Ministry of Agriculture and Forestry, in collaboration with local authorities, has implemented conservation measures tailored to local conditions. Furthermore, from 2016 to 2022, the United Nations Development Programme (UNDP) provided financial support for a six-year initiative aimed at conserving the Eld's deer and its forest ecosystem. This initiative, undertaken in cooperation with residents from 16 villages across five districts, has contributed to an increase in the Eld's deer population, now estimated at nearly 200 individuals. Beyond the deer population, the NEDSCA supports rich biodiversity, including 278 bird species, 67 mammal species, 47 reptile species, 38 semi-terrestrial and semi-aquatic species, and 9 fish species, as well as 126 species of trees and plants (Ministry of Agriculture and Forestry, 2020).

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The active participation of Lao citizens, particularly residents living near the NEDSCA in Savannakhet Province, is essential to reducing threats to the Eld's deer population and strengthening the capacity of government agencies to implement effective conservation measures. Such involvement is critical to ensuring that the sanctuary is not further degraded and that the Eld's deer population is preserved. Recognizing the ecological importance of the NEDSCA and its potential to generate both direct and indirect economic benefits for local communities, the information obtained from this study can provide valuable insights for entrepreneurs and government agencies in designing economic plans that enhance nature-based tourism while promoting sustainable conservation. If external support diminishes, the responsibility for protection will ultimately rest with the Lao people themselves. Therefore, broad participation across all sectors of society, particularly among residents of Savannakhet Province, is indispensable for the long-term conservation of the NEDSCA. One possible mechanism is the establishment of a conservation fund, supported by household and community contributions, to finance the management of the sanctuary. In this context, the present study seeks to assess residents' willingness to pay (WTP) for the conservation of the NEDSCA using the Contingent Valuation Method (CVM), thereby addressing a gap in the empirical understanding of local support for biodiversity conservation in Laos

2. Literature Review

Concept of Willingness to Pay (WTP) in Environmental Economics

Willingness to Pay (WTP) is a key concept in environmental economics, defined as the maximum amount individuals are willing to pay for goods and services not traded in conventional markets. It is particularly relevant for valuing non-market benefits such as biodiversity, ecosystem services, and wildlife conservation (Hanemann, 1991; Carson, 2012). Rooted in welfare economics, WTP captures both use and non-use values, thereby informing policy decisions and conservation financing (Bateman et al., 2002; Pearce & Moran, 1994). As such, WTP provides a crucial framework for integrating ecological sustainability into development planning (Mitchell & Carson, 1989; Freeman et al., 2014).

Contingent Valuation Method (CVM) as a Tool for Environmental Valuation

Overview of CVM and its application in environmental studies: The Contingent Valuation Method (CVM) is a survey-based economic technique used to estimate individuals' willingness to pay for non-market environmental goods. It has been widely applied in studies of biodiversity, ecosystems, and wildlife conservation,

providing policymakers with monetary values to inform sustainable resource management and conservation strategies (Mitchell & Carson, 1989; Bateman et al., 2002; Freeman, Herriges, & Kling, 2014).

Determinants of Willingness to Pay (WTP) in Previous Studies: A considerable body of literature has examined the socioeconomic and demographic factors influencing willingness to pay (WTP) for forestry, biodiversity, ecosystems, wildlife, and non-timber resources using the Contingent Valuation Method (CVM). The results, however, remain mixed across different contexts and study areas.

Gender: Several studies confirm that gender has a statistically significant positive effect on WTP, suggesting that males or females (depending on context) may be more supportive of conservation initiatives (Phothitay et al., 2020; Xiongtoua et al., 2020; Kamri, 2013; Peng-Wei Wang et al., 2012). In contrast, other studies reported no statistically significant relationship between gender and WTP (Tounmanysone et al., 2018, 2021; Vongkeo et al., 2021; Xainhiayang et al., 2020; Kyophilavong et al., 2011; Chansina et al., 2017; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Rakthai, 2017; Kamonrattanon et al., 2009; Wongchai et al., 2020; Hang et al., 2023; Sun et al., 2023).

Age: Findings on age are also inconsistent. Some studies a positive and significant relationship between age and WTP (Xiongtoua et al., 2020; Chansina et al., 2017; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Rakthai, 2017; Kamonrattanon et al., 2009; Peng-Wei Wang et al., 2012), while others reported a negative effect (Mohammad Younus Bhat et al., 2021; Hang et al., 2023). Several studies found no significant association between age and WTP (Tounmanysone et al., 2018; Phothitay et al., 2020; Vongkeo et al., 2021; Xainhiayang et al., 2020; Kyophilavong et al., 2011; Fongsamouth et al., 2022; Kamri, 2013; Sun et al., 2023).

Marital Status: A number of studies found marital status to be a positive and significant predictor of WTP (et al., 2018; Xiongtoua et al., 2020; Vongkeo et al., 2021; Kyophilavong et al., 2011; Chanthasene et al., 2022; Kamri, 2013; Hang et al., 2023). However, Phothitay et al. (2020) reported a negative significant effect, while others indicated no significant relationship (Xainhiayang et al., 2020; Chansina et al., 2017; Rakthai, 2017; Kamonrattanon et al., 2009).

Occupation: Evidence on occupation generally supports its role as a significant factor influencing WTP, with positive effects observed in several studies (Phothitay et al., 2020; Xiongtoua et al., 2020; Chanthasene et al., 2022). Nevertheless, some studies reported no significant impact (Tounmanysone et al., 2018, 2021; Vongkeo et al., 2021; Xainhiayang et al., 2020; Chansina et al., 2017; Fongsamouth et al., 2022; Rakthai, 2017; Sun et al., 2023).

Education: Education has frequently been found to positively and **significantly** influence WTP, reflecting the role of awareness and knowledge in shaping conservation preferences (Tounmanysone et al., 2021; Xiongtoua et al., 2020; Kyophilavong et al., 2011; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Kamri, 2013; Rakthai, 2017; Mohammad Younus Bhat et al., 2021; Hang et al., 2023; Sun et al., 2023). Conversely, a few studies observed negative effects (Phothitay et al., 2020; Xainhiaxang et al., 2020), while others found no significant relationship (Tounmanysone et al., 2018; Vongkeo et al., 2021; Chansina et al., 2017; Fongsamouth et al., 2022; Kamonrattanapon et al., 2009; Peng-Wei Wang et al., 2012).

Ethnicity: Some evidence suggests ethnicity is positively associated with WTP (Chanthasene et al., 2022), though other studies did not find a significant effect (Tounmanysone et al., 2018, 2021).

Household Size (Number of Family Members): Household size has shown mixed results. Positive and significant effects were reported by Tounmanysone et al. (2021) and Kyophilavong et al. (2011). Negative significant effects were found by Tounmanysone et al. (2018), Vongkeo et al. (2021), and Hang et al. (2023). Meanwhile, several studies identified no significant impact (Chansina et al., 2017; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Fongsamouth et al., 2022; Kamonrattanapon et al., 2009; Peng-Wei Wang et al., 2012; Mohammad Younus Bhat et al., 2021).

Length of Residence (Period of Living): Some studies found length of residence to be a positive and significant determinant of WTP (Tounmanysone et al.,

2018, 2021), suggesting that longer-term residents may develop stronger conservation preferences.

Access to Protected Areas: Evidence is also mixed regarding access. Tounmanysone et al. (2018) found a significant positive relationship between access and WTP, whereas other studies observed no significant association (Tounmanysone et al., 2021; Phothitay et al., 2020).

Household Income: Consistent with economic theory, many studies report a positive and significant effect of income on WTP (Tounmanysone et al., 2018; Xiongtoua et al., 2020; Vongkeo et al., 2021; Kyophilavong et al., 2011; Chansina et al., 2017; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Fongsamouth et al., 2022; Kamri, 2013; Kamonrattanapon et al., 2009; Mohammad Younus Bhat et al., 2021; Sun et al., 2023). However, some studies reported negative effects (Xainhiaxang et al., 2020), while others found no significant impact (Tounmanysone et al., 2021; Phothitay et al., 2020; Rakthai, 2017; Peng-Wei Wang et al., 2012; Hang et al., 2023).

The National Eld’s Deer Sanctuary (NEDSCA)

The National Eld’s Deer Sanctuary Conservative Area (NEDSCA) was established in 2004. The current area is 130,745 ha, with 2 natural values: Eld’s Deer and Forest, covering 55% of the biodiversity survey area in 2017-2018. Potential for ecotourism based on wildlife viewing. NEDSCA Savannakhet Province, which is now the NEDSCA. It covers 5 important towns in the open forest ecosystem: Chonnaburi, Phalanxay, Phin, Thapangthong, and Sungkhon (Figure1).

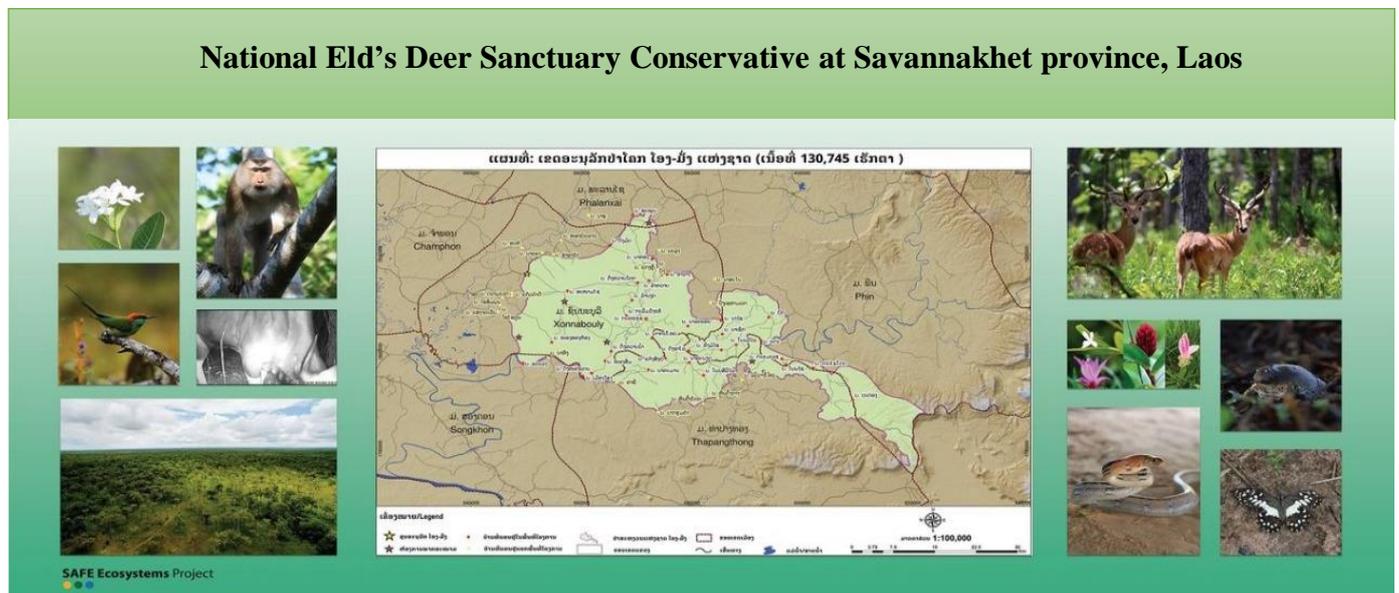


Figure 01: National Eld’s Deer Sanctuary Conservative Area

3. Methodology

The questionnaire for this study was developed based on key sources (Kyophilavong and Bennett, 2011; Tounmanysone et al., 2021). A pre-test with 15 respondents was conducted prior to the formal survey, and the feedback obtained was used to revise and improve the questionnaire. Each interview lasted approximately 15–20 minutes. The finalized questionnaire comprised five sections: (1) overview of problems related to the NEDSCA, (2) willingness to pay (WTP) for the NEDSCA, (3) information about the NEDSCA, (4) personal data, and (5) socioeconomic characteristics.

In the willingness-to-pay (WTP) section of the survey, respondents were asked to state their maximum WTP for the conservation of the NEDSCA, which aims to prevent illegal logging, hunting, and the harvesting of non-timber forest products over a 10-year period. An increase in respondents' electricity bills was specified as the payment vehicle. Prior to the open-ended WTP question, respondents were provided with background information. First, the negative impacts of illegal logging, wildlife poaching, and the collection of non-timber forest products were explained. Second, details of the proposed conservation project were presented. Third, the expected impacts of the project on deforestation, wildlife hunting, and forest product harvesting were described. Finally, the mechanism of the payment vehicle was clarified. To

support comprehension, visual materials depicting current biodiversity loss and deforestation were included in the questionnaire and shown to respondents during the interviews.

The survey was conducted between March and April 2022 in Savannakhet Province, yielding a total of 400 responses. Data collection was carried out through face-to-face interviews with household heads by trained students and lecturers from the Faculty of Business Administration, Savannakhet University (Kyophilavong and Tsechalicha, 2011). For the sampling procedure, six main roads within the boundaries of Kaysone Phomvihane City in Savannakhet Province were selected as survey routes, each with clearly defined starting and ending points. Households located on the right-hand side of these roads were included in the sampling frame. Data collection commenced with the first household, after which every third household was systematically selected (i.e., counting 1, 2, 3). In cases where a selected household was unavailable, the next accessible household was surveyed. This systematic procedure was repeated consistently until the required sample size was achieved.

In this study, a Tobit model, originally developed by Tobin (1958), is employed to estimate the following equation, under the assumption that the dependent variable, willingness to pay (WTP), is uncensored.

$$WTP(kip / mont) = \beta_0 + \sum_{i=1}^6 \beta_i (PF_i) + \sum_{j=1}^4 \delta_j (HC_j) + \lambda_k (EDS_k) + \sum_{l=1}^2 \mu_l (EH_l) + \varepsilon_t$$

Where *WTP* is Willingness to pay of the respondent; PE_i is a vector of personal characteristics such as the gender of respondent, age of respondent, marital status of respondent, occupation of respondent, education level of respondent and ethnicity of respondent, HC_j is a vector of household characteristics such as the number of families, the number of laborers in the family, the location of the household, and the period of living in Savannakhet province. EDS_k is a vector of the access to NEDSCA of the respondent, EH_l is a vector of the economic household such as the monthly household income, monthly household expenditure; β_0 is constant; β_i , δ_j , λ_k , μ_l are unknown parameters; and ε_t is an error term representing unmeasured characteristics that determine the outcomes. Table 1 details the variables for the regression.

The socio-economic characteristics of the respondents are summarized in Table 2. Approximately 47% of respondents were male, with an average age of 34 years. Around 34% were married, and the average level of education was 13 years. About 32% were employed as government officers, and 84% identified as Lao. The average household size was 5 members, including children, with an average of 3 members engaged in work. The average length of residence in the area was 23 years. In addition, 32% of respondents reported having access to the NEDSCA, and 73% resided in urban areas

4.2. Willingness to pay

The mean willingness to pay (WTP) of households in Savannakhet Province for the conservation of the NEDSCA was estimated using the full sample, including both positive and zero WTP responses as well as protest votes. The mean WTP was 15,250 kip per household per month. The largest proportion of respondents (27.5%) reported a WTP of 5,000 kip per month, followed by 22.75% at 10,000 kip per month and 14.25% at 20,000 kip per month. In addition, 11.5% of respondents reported zero WTP

4. Results and Discussion

4.1. Socio-Economic Characteristics

Table 1: Definition of Regression Variables

Variables	Definitions	Unit	Expected Sign	Source of Variables
Dependent Variable				
WTP	Willingness to Pay of Respondents	Kip/month		
Independent Variable ((X_i))				
Personal Factors (PF)				
Gender	Gender of Respondents	1: Male 0: Otherwise	positive	Wongchai et al., (2020)
Age	Age of Respondents	year	positive	Vongkeo et al., (2021)
Status	Status of Respondents	1: Married 0: Otherwise	positive	Tounmanysone et al., (2018)
Occupation	Occupation of Respondents	1: Government 0: Otherwise	positive	Xiongtoua et al., (2020)
Education	Education of Respondents	year	positive	Kyophilavong et al., (2011)
Ethnic	Ethnic of Respondents	1: Lao 0: Otherwise	positive	Chanthasene, et al., (2022)
Household Characteristic (HC)				
Household Size	The number of family members	Person	negative	Sengkhamyong, et al., (2022)
Labour	The number of labour in family	Person	positive	Author
AR	The household located at urban area	1: Urban 0: Otherwise	positive	Author
PL	Period of living in Savannakhet	year	positive	Tounmanysone et al., (2018)
Eld's Deer Sanctuary (EDS)				
AEA	Access to Eld's Deer Sanctuary area	1: Access 0: Otherwise	positive	Phothitay et al., (2020)
Economic Household (EH)				
Lnincome	Logarism of monthly household income	-	positive	Hang, N. D et al., (2023)
LnExpenditure	Logarism of monthly household income	-	negative	Author
β_0	Constant			
β_i	vectors of coefficients			
ε_t	Error term			

Sources: Compiled by authors.

Table 2 Socio-Economic Characteristics of Respondents

Socio-Economic Characteristics	Percentage (%)
Male (%)	47.50
Age (year)	34.16
Married (%)	59.00
Education Level (year)	13.55
Occupation is Government (%)	32.50
Lao ethnic (%)	84.62
Number of family members (person)	5.33
Labor (person)	3.07
Period of living (yea)	23.09
Access to the NEDSCA (%)	32.00
Income (Kip/month/household)	5,593,750
Expenditure (Kip/month/household)	3,503,650
Urban (%)	77.75

Sources: Authors' survey, 2022, and the author's calculations

Table 3 Range of WTP of Respondents

Willingness to pay (Kip)	Number of interviewees	Percentage (%)
0	46	11.5
5,000	110	27.5
10,000	91	22.75
15,000	12	3
20,000	57	14.25
25,000	20	5
30,000	12	3
40,000	14	3.5
50,000	38	9.5
Total	400	100

Mean WTP = 15,250 kip/ household/month

Sources: Authors' survey, 2022, and the authors' calculations

Respondents reported various reasons for their willingness to pay (WTP) toward the conservation fund of the NEDSCA. Among those who answered "yes" to the WTP question, the majority (65.25%) stated a desire to conserve the NEDSCA for future generations. Other motivations included the belief that plants and wildlife have an inherent right to exist (14.41%), the intention to use the area in the future (9.32%), the prospect of visiting

the NEDSCA (5.93%), the perception that conservation contributes to protecting the environment of Laos more broadly (2.26%), and a sense of moral obligation (10.48%). The results further indicate that mean WTP is higher when protest votes are excluded. On average, each household was willing to pay 15,250 kip per month for ten years to support the conservation plan.

Table 4 Reasons for Positive WTP

Reasons for payment	Number of Interviewees	Percentage (%)
I want to conserve the NEDSCA for future generations	231	65.25
I am willing to contribute to using NEDSCA in the future	33	9.32
I am contributing because plants and wildlife have the right to exist.	51	14.41
It is my moral duty to contribute to the NEDSCA	8	2.26
I want to conserve the National NEDSCA because this also contributes to protecting the environment of Laos in general	10	2.82
I want to conserve the NEDSCA because I will visit it	21	5.93
Total	354	100

Sources: Authors' survey, 2022, and the authors' calculations

Table 5 Reasons for Zero WTP

Reasons not to pay	Number of Interviewees	Percentage (%)
I don't believe that paying will solve the problem	28	60.87
A person who gets direct use should pay	8	17.39
Do not have money, other expenditures too high	6	13.04
Government should pay	3	6.52
Other places are more important	1	2.17
Total	46	100

Sources: Authors' survey, 2022, and the authors' calculations

Table 5 presents the reasons given by respondents who were not willing to pay (WTP) for the conservation of the NEDSCA. The majority (60.87%) indicated that they did not believe financial contributions would effectively address the problem. A further 17.39% argued that only those who directly benefit from the sanctuary should bear the cost. Additionally, 13.04% cited financial constraints, reporting insufficient income. Another 6.52% believed that conservation should be financed by the government, while 2.17% considered other areas to be of greater importance for conservation efforts.

4.3. Factors Affecting Willingness to pay

Multiple regression analysis was employed to estimate residents' willingness to pay (WTP) for the conservation of the NEDSCA. As with any econometric model, potential issues such as multicollinearity, heteroskedasticity, and autocorrelation were considered. Multicollinearity is particularly problematic in censored Tobit regression models and is typically identified when the absolute value of the correlation coefficients between explanatory variables is equal to or greater than 0.60 (Kyophilavong, 2006). In this study, the explanatory variables were verified to have correlation coefficients below this threshold, indicating no multicollinearity. Furthermore, the White test was applied to detect heteroskedasticity, and the results confirmed that heteroskedasticity was not present in the WTP regressions.

The regression results are presented in Table 7. As expected, income was found to have a strong influence on willingness to pay (WTP). Respondents with higher incomes exhibited a positive and statistically significant relationship with WTP at the 1% level, indicating that wealthier households are more likely to contribute financially to conservation. This finding is consistent with several previous studies that identified household income as a significant determinant of WTP (Tounmanysone et al., 2018; Xiongtoua et al., 2020; Vongkeo et al., 2021; Kyophilavong et al., 2011; Chansina et al., 2017; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Fongsamouth et al., 2022; Kamri, 2013; Kamonrat-tanapon et al., 2009; Mohammad Younus Bhat et al., 2021; Sun et al., 2023). In contrast, Xainhiayang et al. (2020) reported that household income was negatively and significantly associated with WTP. However, other studies found that household income was statistically insignificant in influencing WTP (Tounmanysone et al., 2021; Phothitay et al., 2020; Rakthai, 2017; Peng-Wei Wang et al., 2012; Hang et al., 2023).

Respondents' access to the NEDSCA was also found to have a significant influence on willingness to pay (WTP). The coefficient was positive and statistically significant at the 1% level, indicating that individuals with direct access to the site demonstrated a higher WTP. This result is logical, as those who have visited the area are more likely to be aware of its ecological conditions and

conservation challenges, thereby increasing their willingness to contribute financially. These findings are consistent with previous studies (Pangxang, 2016; Tounmanysone et al., 2018).

Household location in urban areas was also found to significantly influence willingness to pay (WTP). The coefficient was positive and statistically significant at the 1% level, indicating that urban households exhibited a higher WTP compared to those in rural areas. This outcome is reasonable, as households residing in urban areas generally have higher income levels, which increases their capacity and willingness to contribute to conservation efforts.

Education was found to have a significant positive influence on willingness to pay (WTP), with the coefficient statistically significant at the 1% level. This indicates that respondents with higher levels of education are more likely to contribute financially to conservation efforts. These findings align with several previous studies that reported education as a significant determinant of WTP (Tounmanysone et al., 2021; Xiongtoua et al., 2020; Kyophilavong et al., 2011; Chanthasene et al., 2022; Sengkhamyong et al., 2022; Kamri, 2013; Rakthai, 2017; Mohammad Younus Bhat et al., 2021; Hang et al., 2023; Sun et al., 2023). However, contrasting evidence exists, with some studies reporting a statistically significant negative relationship (Phothitay et al., 2020; Xainhiayang et al., 2020), while others found education to be statistically insignificant in influencing WTP (Tounmanysone et al., 2018; Vongkeo et al., 2021; Chansina et al., 2017; Fongsamouth et al., 2022; Kamonrattanapon et al., 2009; Peng-Wei Wang et al., 2012).

The length of residence in Savannakhet Province was found to have a significant positive effect on willingness to pay (WTP), with statistical significance at the 5% level. This suggests that respondents who have lived in the area for longer periods are more likely to contribute to conservation efforts. The result is consistent with previous studies that identified duration of residence as an important determinant of WTP (Tounmanysone et al., 2018; Tounmanysone et al., 2021).

Respondents' occupation was found to have a positive and statistically significant effect on willingness to pay (WTP) at the 10% level. This indicates that occupational status may influence households' readiness to contribute to conservation efforts. The finding is consistent with studies that identified occupation as a significant determinant of WTP (Phothitay et al., 2020; Xiongtoua et al., 2020). However, Chanthasene et al. (2022) reported a negative and statistically significant relationship between occupation and WTP. In contrast, several other studies found occupation to be statistically insignificant in influencing WTP (Tounmanysone et al., 2018; Tounmanysone et al., 2021; Vongkeo et al., 2021; Xainhiayang et al., 2020).

al., 2020; Chansina et al., 2017; Fongsamouth et al., 2022; Rakthai, 2017; Sun et al., 2023).

The socio-economic variables of age, marital status, ethnicity, labor participation, and household expenditure were found to have positive but statistically insignificant

effects on willingness to pay (WTP). In contrast, gender and household size exhibited negative relationships with WTP; however, these effects were also statistically insignificant.

Table 6 Factors Affecting WTP

Variables	Definitions	Tobit Model			
		Coefficient	prob	Marginal effect	prob
Personal Factors (PF)					
Gender	Gender of Respondents	(11.2666)	0.9930	(11.2666)	0.9930
Age	Age of Respondents	44.5810	0.5740	44.5810	0.5740
Status	Status of Respondents	237.9111	0.8700	237.9111	0.8700
Occupation	Occupation of Respondents	2,443.0250*	0.0930	2,443.0250*	0.0920
Education	Education of Respondents	1,070.9160***	0.0000	1,070.9160***	0.0000
Ethnic	Ethnic of Respondents	1,220.6070	0.4860	1,220.6070	0.4850
Households Characteristics (PF)					
Households Size	The number of family members	(429.9739)	0.3280	(429.9739)	0.3280
Labour	The number of labour in family	885.3264	0.1430	885.3264	0.1420
AR	The household located at urban area	4,795.0110***	0.0060	4,795.0110***	0.0050
PL	Period of living in Savannakhet	116.7853**	0.0260	116.7853**	0.0250
Eld's Deer Sanctuary (EDS)					
AEA	Access to Eld's Deer Sanctuary area	3,773.584***	0.0100	3,773.584***	0.0090
Economic Household (EH)					
Lnincome	Logarism of monthly household income	4,769.9340***	0.0000	4,769.9340***	0.0000
LnExpenditure	Logarism of monthly household income	165.0285	0.8730	165.0285	0.8730
Constant		(86,223.4900)***	0.0000		
Number of Obs	= 400				
LR chi2(13)	= 114.66				
Prob > chi2	= 0.0000				
Pseudo R2	= 0.0130				

Note:

1) The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values and ns denotes not significant.

2) Heteroskedasticity has been tested and corrected.

Source: Authors' survey data, 2022, and the authors' estimations.

5. Conclusion

The primary objective of this study was to estimate residents' willingness to pay (WTP) for the conservation of the National Eld's Deer Sanctuary Conservation Area (NEDSCA) in Savannakhet Province, Laos. The Contingent Valuation Method (CVM) was applied, and the determinants of WTP were analyzed using a censored Tobit regression model.

The estimated willingness to pay (WTP) for the conservation of the NEDSCA in Savannakhet Province was 15,250 kip per person per month. The primary motivation for respondents' WTP was the protection of

this nationally protected area and the reduction of illegal logging, hunting, and harvesting. Higher WTP was associated with respondents who had higher incomes, were single, had longer residence in the village, and had previously visited the NEDSCA. These findings provide valuable insights for policymakers to strengthen conservation policies and law enforcement.

Research on the valuation of public goods in Laos remains limited, and this study represents a valuable contribution to the broader application of the Contingent Valuation Method (CVM) for evaluating non-market goods in the country. Nonetheless, both this analysis and the wider use of non-market valuation face several

challenges in the Laotian context. First, the use of monetary measures may introduce biases in an emerging market economy with a strong legacy of central planning. Second, the application of stratified random sampling is constrained in Savannakhet Province, where population data are available only at highly aggregated levels. Third, future research should explore alternatives to the closed-ended CVM format, with dichotomous choice CVM or choice modeling offering potentially more robust approaches.

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