

WTP for Conservation of Vietnamese Rhino

Research paper

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Abstract

This paper is part of a bigger research project – Local Willingness to Pay for the Conservation of Endangered Species in Southeast Asia. The research is to measure WTP for Conservation Program of Vietnamese rhinos and the Regional Conservation Program of sea turtles, which are now critically endangered, using contingent valuation method. Five levels of bid are used, based on the results of a pretest of 120 questionnaires in Ho Chi Minh City. A drop-off survey with 800 households was done in two cities: Ho Chi Minh City and Ha Noi, 690 collected. The mean WTP is estimated 2.5 USD/household.

Many ideas and substances of this proposal are joint work of the group of researchers: Anabeth Indab, Jin Jianjun and Rodelio Subade, under the instructions of Prof. Dale Whittington, Dr. Wictor Adamowicz, Dr. David Glover and Dr. Herminia Francisco.

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The problem

According to the Biodiversity Action Plan of the Government of Socialist Republic of Vietnam, the extinction rate of Vietnam in last decades is higher than that of the world, and 1000 times higher than the natural extinction rate. The most dangerous threats to biodiversity are expansion of economic (cultivation) activities, poaching and deforestation. Rhino is among the most endangered species.

The number of rhinos decreases from 15-17 in 1970 to 3-7 today. Among more than 350 endangered species in Vietnam, rhinos is the most endangered one.

Rhino, together with elephant, are the two biggest animal on land. Among 5 species of rhinos in the world, there are 3 types of Asian Rhinos: Indian Rhino (the Greater one-horned rhinoceros), Javan Rhino (Lesser one-horned rhinoceros) and Sumatran Rhino (Asian two-horned rhinoceros). The three are “among the most remarkable animals on earth and are of great cultural importance in Asia” (Foose and Strien. 1997, p. 5).

Javan rhino is the rarest among Asian rhinos. Javan Rhino are in Indonesia and Vietnam, with population of less than 75. In Vietnam, the number of rhinos remained is 3-7.

In Vietnam, the remaining rhinos live in Cat Loc Rhino Conservation Area, which is in Cat Tien National Park, with total area of 30,635 ha. These rhinos are now threatened by a group of people living nearby. This is an minor ethnic group, isolated from the rest of the world by rainforest. Cultivation activities of these groups are narrowing down the living area of rhinos. The people here also compete with rhinos for the same source of food.

There were many efforts to move people out of the conservation area. However, there were big difficulties in doing this. The people are familiar with living conditions and the sources of food here. They are extremely poor, with desperately low level of education and skills, and seems to be unable to survive elsewhere without great supports. In addition, funds for moving and resettling people, which would be very large, is not available now.

Cat Loc Rhino Conservation area was funded by the government of the Netherlands and Vietnam, in the framework of a big program for maintaining biodiversity of Cat Tien National Park. This program was coordinated by the World Wild Fund and ended in June 2004.

The Vietnamese rhinos seem to have no breeding activities in recent years, and with such situation, they are expected to be extinct in the next 3 years, said the manager of Cat Tien National Park.

There is a need of a program for protecting rhinos. However, such a program requires large fundings. This is because the costs of moving and resettling people currently living in the area is quite high. In addition, the number of individual rhinos is too small, implying that some interventions are required for the breeding activities of rhinos. And this, again, requires a lot of money.

Indeed, protecting rhinos provides some benefits. Protecting rhinos will maintain the existence of rhinos, which contributes to biodiversity. The existence of rhinos also indicates that the area is appropriate for other species.

Continued existence of rhinos will provide some recreational value. Cat Tien National Park is now open for tourists. Rhinos are of great cultural importance of Vietnamese. They are mentioned in many legends.

Objectives of the research

The endangered species are there. But they are non-marketable goods and there is a lack of information on economic value of these species and the mechanisms to capture non-market economic value. This research aims:

- To see whether Vietnamese are willing to pay for rhino conservation or not
- To assess awareness and attitudes toward rhino conservation
- To measure costs of rhino conservation
- To measure economic value and potential revenue for rhino conservation
- To recommend potential funding mechanism for the conservation
- To examine the determinants of WTP

Theoretical considerations

Non-use value of Vietnamese rhino is mainly existence value. This research use Contingent Valuation method to measure the existence value of Vietnamese rhino.

Among CV questions, discrete choice (or dichotomous) CV question is most widely adopted for others suffer the problems of incentive compatibility.

Random utility model is the basis for analyzing discrete choice CV questions.

The utility function of respondents j is:

$$u_{ij} = u_i(y_j, z_j, \varepsilon_{ij}) \quad (1)$$

where $i = 0, 1$. $i = 0$ is the status quo and 1 is the conditions that the environmental goods or services are supplied. Utility is a function of income y , a vector of respondent's characteristics and attributes of the choice. ε_{ij} is unobservable component.

Respondent will say "yes" to the payment t_j if the utility with the environmental improvements after the payment exceeds the utility of the status quo, or:

$$u_{1j} = u_1(y_j - t_j, z_j, \varepsilon_{1j}) > u_0(y_j, z_j, \varepsilon_{0j}) \quad (2)$$

Because of the unobservable component, one can only estimate the probability of "yes" or "no" response:

$$\Pr(\text{yes}_j) = \Pr(u_i(y_j - t_j, z_j, \varepsilon_{1j}) > u_0(y_j, z_j, \varepsilon_{0j})) \quad (3)$$

The utility function is assumed to be separable in deterministic and stochastic preference:

$$u_i(y_j, z_j, \varepsilon_{1j}) = v_i(y_j, z_j) + \varepsilon_{0j} \quad (4)$$

The probability statement is then become:

$$\Pr(\text{yes}_j) = \Pr(v_i(y_j - t_j, z_j) + \varepsilon_{1j} > v_0(y_j, z_j) + \varepsilon_{0j}) \quad (5)$$

Assume the utility function is linear:

$$v_{ij}(y_j) = \sum_{k=1}^m \alpha_{ik} z_{jk} + \beta_i(y_j) \quad (6)$$

The deterministic part of utility from environmental improvements is:

$$v_{1j}(y_j - t_j) = \sum_{k=1}^m \alpha_{1k} z_{jk} + \beta_1(y_j - t_j) \quad (7)$$

The status quo utility:

$$v_{0j}(y_j) = \sum_{k=1}^m \alpha_{0k} z_{jk} + \beta_0(y_j) \quad (8)$$

Change in deterministic utility:

$$v_{1j} - v_{0j} = \sum_{k=1}^m (\alpha_{1k} - \alpha_{0k}) z_{jk} + \beta_1(y_j - t_j) - \beta_0 y_j \quad (9)$$

Since marginal utility of income in the two situations is the same: $\beta_1 = \beta_0$. Then:

$$v_{1j} - v_{0j} = \sum_{k=1}^m \alpha_k z_{jk} - \beta t_j \quad (10)$$

The probability statement is then:

$$\Pr(yes_j) = \Pr\left(\sum_{k=1}^m \alpha_k z_{jk} - \beta t_j + \varepsilon_j > 0\right) \quad (11)$$

Welfare measure

A single-bounded CV question will be used. This section presents welfare estimation for this type of data.

Non-parametric estimation of WTP

Let N denotes the number of households in the sample and N_j is the sub-sample facing bid t_j , t_j is the level of bid ($j = 0$ to J , where J is the highest level of bid, and t_0 is always zero).

Let n_j be the number of households with WTP that is higher than or equal t_j within N_j , then the survivor function will be:

$$S(t_j) = \frac{n_j}{N_j} \quad (13)$$

Mean WTP is calculated using:

$$MeanWTP = \sum_{j=1}^J S(t_j) [t_j - t_{j-1}] \quad (14)$$

Parametric estimation of WTP

From the above analysis:

$$\alpha_1 z_j + \beta(y_j - t_j) + \varepsilon_{j1} = \alpha_0 z_j + \beta y_j + \varepsilon_{j0} \quad (15)$$

Therefore:

$$WTP = \frac{\alpha z_j}{\beta} + \frac{\varepsilon_j}{\beta} \quad (15)$$

Assume that $\frac{\varepsilon_j}{\beta}$ has mean zero and variance $\frac{\sigma^2}{\beta^2}$, then mean WTP is:

$$MeanWTP = E(WTP | \alpha, \beta, z_j) = \frac{\alpha z_j}{\beta} \quad (16)$$

Methods

To obtain the correct value of WTP, the most important thing is the questionnaire, especially the scenario that provide information about the good being valued. In constructing the questionnaire, a series of discussions with National Park managers, key informant interviews, focus group discussions, pretest surveys were done.

Discussions with NP managers are to obtain a feasible rhino conservation program and its costs. Key informant interviews and FGDs are to identify what institutions should be

involved in the program, the payment vehicle and timing of payment. Political feasibility of the program is also verified during this stage.

Several pre-testing survey were conducted in HCMC to test the wording of the questionnaire and identify potential problems. The questionnaire was revised after each pretesting survey.

A total of 800 questionnaires were distributed, 50% in HCMC and 50% in Ha Noi.

The questionnaire

The questionnaire consists of 4 sections:

- Common problems facing the country
- Knowledge and attitude
- The scenario and WTP questions
 - The scenario: descriptions, situation, threats, proposed program and WTP questions
 - Debriefing questions
- Household socio-economic information

Section 1 is to examine public priority and identify how environmental issue is concerned, and among environmental issues, how endangered species is prioritized. Section 2 is to obtain information on how rhino is “worth protecting” in comparison to other endangered species, and attitude towards existence value, rhino protection and contribution to protect rhino.

Section 3 is to provide information on the conservation plan, payment vehicle, timing and provision rule. Follow-up and debriefing questions are included in this section.

Finally, section 4 is to collect socio-economic information of respondents.

The Scenario

The scenario start with a description of the current threat to rhino, including small habitat and slash and burn cultivation of people living in the national park. Then a conservation plan is proposed with several activities: protect rhino from poaching, protect the habitats, reforestation, raising awareness, research and captive breeding. Next, the institutional

arrangement is described. The surcharge will be collected by Electricity Company and the fund will be administered by Vietnamese Rhino Conservation Fund. The provision rule is described in a way that the conservation program is implemented if majority of Vietnamese vote for it.

This study employed single-bounded dichotomous elicitation format for its incentive compatibility. Given a bid level provided, respondents just decide whether she/he vote for the program or not.

Cheap talk is also included to explain that although there is no connection between rhino conservation and electricity, but electricity bill is the most efficient way to collect money.

The WTP question is then stated:

“Would you vote in favor of a surcharge of VND <bid> that would be added to the electricity bills of your household and of other households in our country. Remember the surcharge is a one-time payment and would be added to your electricity bill next month. The money raised would go to the Vietnamese Rhino Conservation Program described above”

Payment vehicle and Bid levels

An mandatory one-time payment through electricity bill is used. Electricity bill appears to be the most efficient way to collect money in Vietnam. Electricity is provided in all districts in Vietnam and almost all the households are connected. The focus groups discussions and key informant interviews also confirm this. Several options were introduced: water bill, land tax, national defense fee, electricity bill and solid waste collection fee. Water bill is not good in terms of equality. Even in big cities, a large proportion of households are not connected to piped water. The situation is worse in rural areas. Land tax appears to be weakly enforced for there are many illegally built houses where land tax cannot be collected. National defense fee, which is collected quarterly, is quite difficult to collect. Solid waste collection system is operated by private sector, in which the people do not trust.

It is a one-time payment because Vietnamese rhinos are critically endangered and it would be better to know the amount that could be raised immediately for saving rhinos.

After several FGDs and pretests, the five bid levels VND 1,000; 10,000; 25,000; 50,000 and 300,000 are used, which are equivalent to USD 0.0625; 0.625; 1.5625; 3.125; 18.75.

Survey mode

Drop-off survey is used. The enumerators will go to the chosen households, introduce about the objective of the survey, leave the questionnaires there and return to collect after 2 or 3 days. Drop-off is expected to allow time for respondents to think and discuss with other members of the household. It also helps avoid enumerator bias.

To reduce the non-response rate, incentives will be used. For each city (Ha Noi and Ho Chi Minh), respondents who finish the questionnaire will have a chance to win one of the 3 prizes which are worth USD 100, 25 and 12.

Number of completed questionnaires

A survey of 800 questionnaires was conducted. The sample of 800 was stratified by districts of the cities. Population is used to stratify. Selection of households are different between Ha Noi and Ho Chi Minh City. In Ho Chi Minh City, a list of address to be chosen is obtained first. Then enumerators go to the address specified. In Ha Noi, Points and routes are specified on the map. Enumerators go to the starting points as specified, following the routes and enter one of every 5 households. Commercial and industrial building are omitted.

Of the 800 questionnaires delivered, 723 were collected. There are 690 usable observations, 357 in Ha Noi and 333 in Ho Chi Minh city. Table 1 shows the number of questionnaires collected by bid levels and city. Note that for each cell, a total of 80 questionnaires were delivered.

Table 1: Questionnaires collected by bid levels and city

Bid level (USD)	Ha Noi	Ho Chi Minh city	Total
0.0625	69	64	133
0.625	71	67	138
1.5625	71	69	140
3.125	70	67	137
18.75	76	66	142
Total	357	333	690

Most of the questionnaires were collected after 2 days. From day 4, the probability of losing the questionnaire is very high. In few case, the drop-off does not work. It is sometimes the

case that households with low schooling years can not read and answer the questionnaires by themselves.

Over the sample, 32% reported that they have discussed with other members in the household, and in most cases, they are discussing on how to answer the questions together and give best household's judgement. Table 2 show discussion time.

Table 2: Discussion time in answering the questionnaire

Time to discuss	Frequency	Percent
Less than 5 min	65	31%
6 - 15 min	68	32%
16 - 30 min	45	21%
31 - 60 min	21	10%
More than 60 min	12	6%
Total	211	100%

Results: Respondent profile

As stated in the introduction of the questionnaire, respondents should be household head or members that are earning. Average age of respondents is 39, range from 18 to 82. Because respondents are those earning, average schooling years is 12.15, higher than that of the country. Households size is approximately the same 4.7.

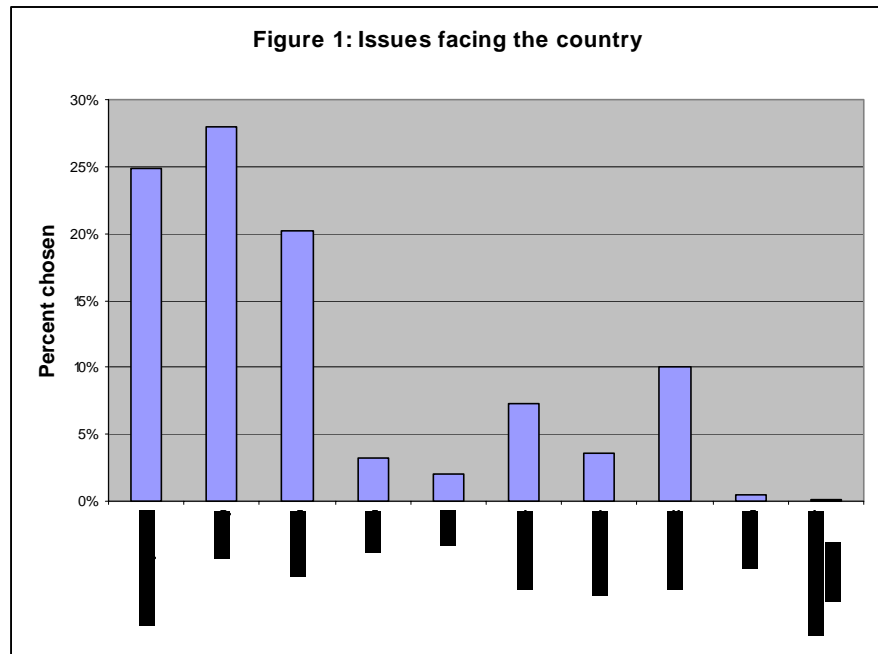
Income in HCMC is 222 USD/HH/month, slightly higher than that in Ha Noi (204). The average income is 213, of which 15.2 is spent for electricity.

Table 3: Respondents' profile

Variable	Mean	Std. deviation	Min	Max
Age	38.85	14.1	18	82
Education	12.15	3.77	0	27
Household size	4.7	2.25	1	25
Monthly HH Income (USD)	212.8	160.31	31.25	937.5
Monthly electricity bill (USD)	15.2	14.93	0.625	125

Result of respondents' priority

Among the respondents, 77% said that environment in Vietnam is not properly taken cared of. However, only 10% said that environment is the most important issues. The three most important problem are poverty, economic problem and education.

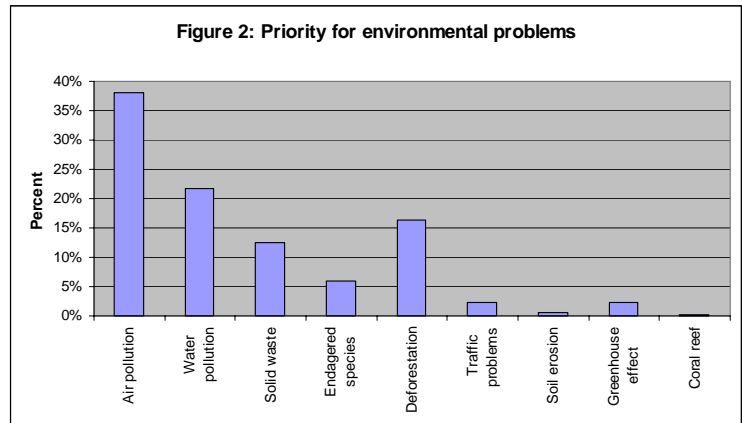


Among environmental issues, endangered species

is not of high priority. The most important problems are air, water pollution and deforestation.

Next important issue is solid waste management. Only 6% said that endangered species is the most important problem.

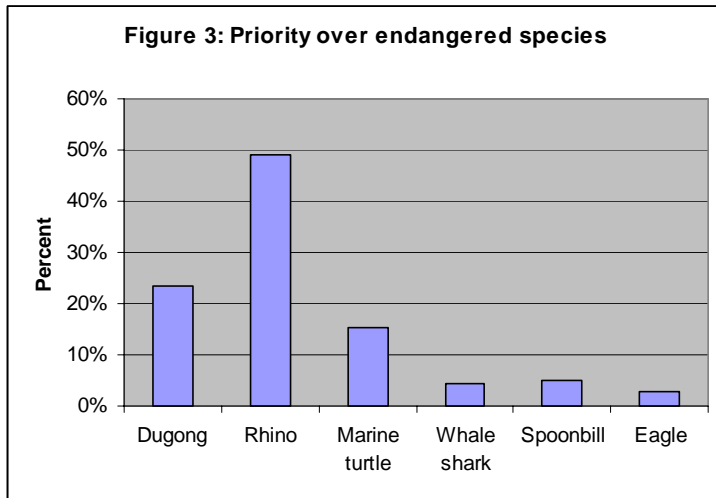
Rhino is determined to be the species that is most deserving of protection. However, this result could be biased. Some respondents could have read through the questionnaire before answering and this turns to be one shortcoming of drop-off survey.



Attitude toward endangered species conservation and knowledge about rhino

It is pointed out that people put some value on endangered species conservation. More than half of respondents strongly agree that poaching of wildlife species should be punished by law. 16.5% strongly agree and 49% agree that endangered species are important even if they

don't get to see or interact with them. When being asked about bequest value, 29% strongly agree and 47.5% agree that it is everyone's duty to ensure that plants and animals as we know them today will exist for mankind in the future. In brief, existence and bequest value are important to respondents.

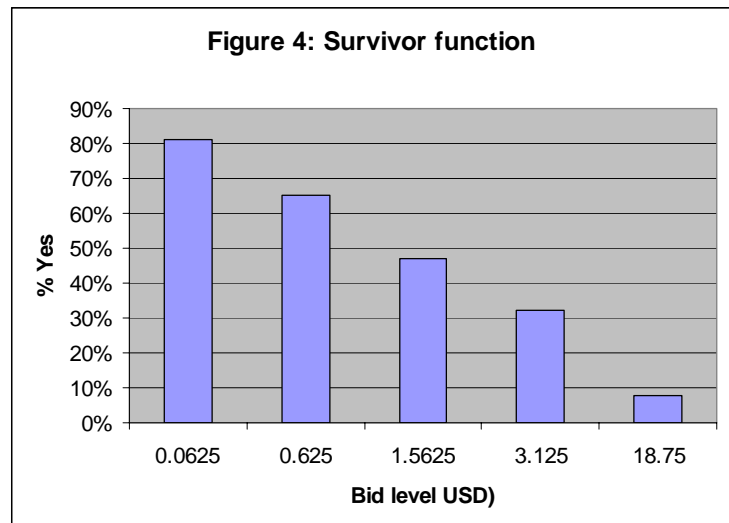


Majority of the respondents agree or strongly agree that endangered species should be a priority concern of the government. However, most of them agree that there are more important problems than endangered species. 63% agreed that there are more important environmental concerns than endangered species conservation. 66% agreed that the government should invest in helping people before it spends money on endangered

species. This is consistent with the result on respondents' priority.

Although majority of respondents put value on endangered species conservation, less agree when that money should be devoted to endangered species conservation. 10% strongly agree and 34% agree that the government should raise more funds to deal with environmental programs in the country. 7% strongly agree and 36% agree that citizens should contribute to endangered species conservation by making cash donations to this cause. And 7% strongly agree and 24% agree that government should raise taxes to pay for more endangered species protection.

About respondents knowledge on rhino, 19% reported that they have ever seen a live rhino. This could be over-reported for no one can see Vietnamese rhino. Or they could have seen rhino in other countries.



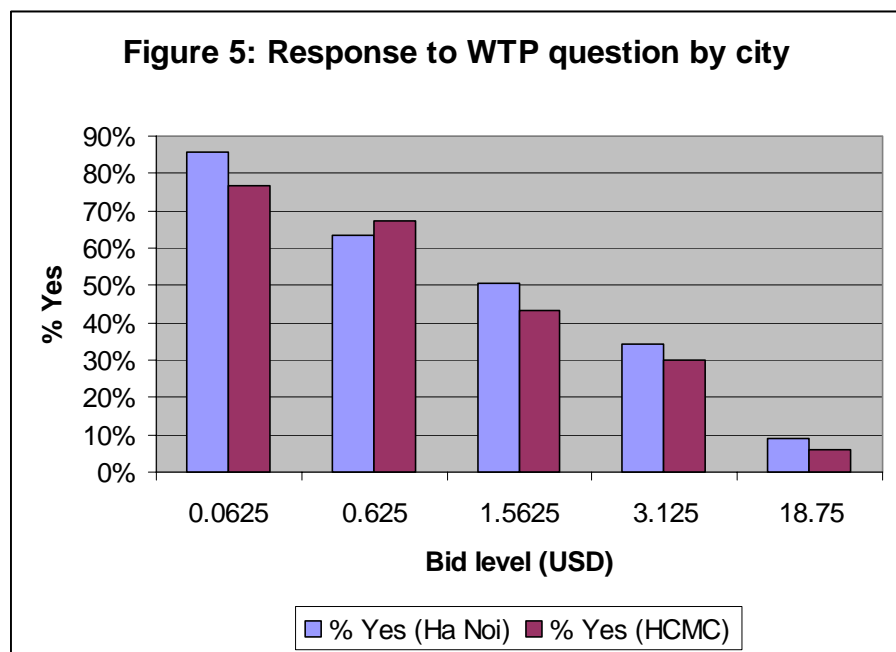
Only 53.7% said correctly that rhino comes in different sizes, shapes and colors. Note that 8% said incorrectly and 38.3% don't know.

About the question that some communities could obtain some still benefits from rhino without hunting them – example, through tourism, 70.4% responded correctly.

Responses to WTP question

Figure 4 shows the responses to different bid levels. 81% said voted for the program at the lowest level of bid and 8% at the hishest level. This indicates a well-behaved survivor function. Intuitively, a majority of respondents would vote for the program at 1.5 USD.

There is no significant difference in WTP responses in the two cities. Proportion of respondents voting for the program is slightly higher in Ha Noi at all bid levels, except at USD 0.625. However, the difference is tiny, as shown in Figure 5.



Frequently selected reasons of not WTP

This study allows respondents choose at most 3 reasons for not WTP. Table 4 show the most frequently selected reasons of not willing to pay. Among the reasons, that respondents are not affordable for the amount is dominant. 41% of those saying no to the program said that they can not afford the amount. This number varies by bid level. At the lowest bid level, only 20% said so and at the hishest level 64%.

The next most important reason of not willing to pay is respondents do not believe that the money they pay will not be actually used for rhino conservation. A considerable proportion of 23% not willing to pay because they do not like adding to electricity bill.

Table 4: Reasons of not WTP

Reasons of not WTP	Frequency	%
I can not afford that amount	148	41%
I do not think conservation of Rhino is worth doing	27	7%
I do not believe that the money I pay will actually be used for Rhino Conservation	137	38%
I do not like adding the amount to my electricity bill	82	23%
Only people who will directly benefit from rhino conservation should pay for this	41	11%
I think that other species are more important than rhino	34	9%
Majority of the poor will be affected	101	28%
Only those from higher income groups should pay for this	84	23%
I prefer giving money to humanitarian cause instead	60	16%
Others	35	10%

Respondents do pay attention to equity. Nearly one-third said that majority of the poor will be affected and 23% said that only those from higher income group should pay for this. Note that the figures are not affected by bid levels.

Frequently selected reasons of WTP

About the reasons of voting for the program, two-third of the respondents said that rhino is a special species that need to be protected. 40% said this is high time for Vietnamese to protect rhino. That the program can attract counterpart funding seems not to be attractive for only one-third choosing this reason. However, more than half of respondents agree that the program could lead to more protection efforts for other endangered species in Vietnam. This demonstrate a high potential of collecting payment for conserving rhino as well as other endangered species in Vietnam, which has never been done before.

Table 5: Reasons of WTP

Reasons of WTP	Frequency	%
The rhino is a special animal and should be protected	320	68%
I like the idea that we could get matching funds from international organization as long as we can provide counterpart funding	157	33%

It is high time that people in Vietnam do something concrete about protecting the rhino - since this is the center of illegal trade in the world	190	40%
This initiative can lead to more protection efforts for other endangered species in the country	245	52%
Others	30	6%

Validity of scenario design

The scenario design appears to be credible to respondents. Majority believe the description of the current situation of rhino, the payment vehicle, and that the proposed conservation program will be effective in saving rhino.

Most of the respondents believe the description of the current situation of rhino (86%). 69% believe the Rhino Conservation program will be effective in saving rhino. The main reason of not believing is corruption.

Two-third of the respondents believe that the Electricity Company will agree to collect fund. The main reasons of not believing are that EC is not bounded by law to do this (50%), and that there is no connection between rhino and electricity (60%)

Half of the respondents prefer electricity surcharge. Main reasons of not preferring electricity is, again, there is no connecting between rhino and electricity; that the collection should not be mandatory; and that electricity bill is always increasing and respondents are afraid that the fee will increase also.

The bid function

The variable choice is regressed on:

- Bid levels (USD)
- City (dummy, Ha Noi = 1)
- Last month electricity bill (USD)
- Monthly household income (USD/month)
- Schooling years (year)
- Age (year)
- Gender (male = 1)

- Households size (total member of the household)
- Marital status (married = 1)
- Member: a dummy variable to identify whether the respondent is member of an environmental organization or not (yes = 1). Note that only 3% over the sample are member of some environmental organizations.

Table 6 shows the regression results. Bid levels, as expected, is statistically affected WTP.

Table 6: Logit regression result

Dep var: Choice	Coef.	Std. Err.
Bid (USD) (*)	-0.20	0.024
City (HN=1)	0.17	0.192
Electricity bill (USD)	0.004	0.007
Income (USD)	0.0002	0.001
Schooling year	0.02	0.026
Age	-0.01	0.008
Gender (male=1)	0.27	0.182
Household size	0.03	0.043
Marriage (married=1) (*)	-0.43	0.258
Member	0.06	0.528
Constant	0.21	0.565
Log likelihood	-363	
Pseudo R-square	0.17	

(*) Significant at 10%.

Except marriage, no other variables is statistically affected WTP. The result indicates that those who are married tend to be less willing to pay for rhino conservation.

Variable “City” is insignificant shows that WTP of respondents in the two city do not differ. This is consistent with the above analysis.

Income does not affect WTP indicates that respondents from the lower and higher income have the same preference for rhino conservation. Similarly, respondents from different age groups, gender and household size have the same preference for rhino conservation.

Estimate of WTP

Applying equation (13) for a non-parametric estimate of WTP, we get the mean and median WTP of 2.57 USD/HH. Calculating for each city, this number is slightly higher in Ha Noi. In Ha Noi, it is \$2.86 and HCMC \$2.25.

Using the bid function and applying equation (16) for a parametric estimate of WTP, we get a WTP of \$2.88/HH. This is a little bit higher than non-parametric estimate. Note that using the bid function with bid only, WTP will be \$2.84/HH.

Taking the WTP of \$2.5/HH as in the lowest estimated value, WTP is low, but considerable. This takes 1.2% monthly income of the household. Note that this is a one-time payment.

Adjustment for certainty

A follow-up question on certainty in giving the answer to WTP question is included in the questionnaire. After responding WTP question, respondents were asked how certain they are when voting for the program. For a conservative estimate of WTP, those who said “Yes” to the program, but then said not sure about their answers are converted to “No”.

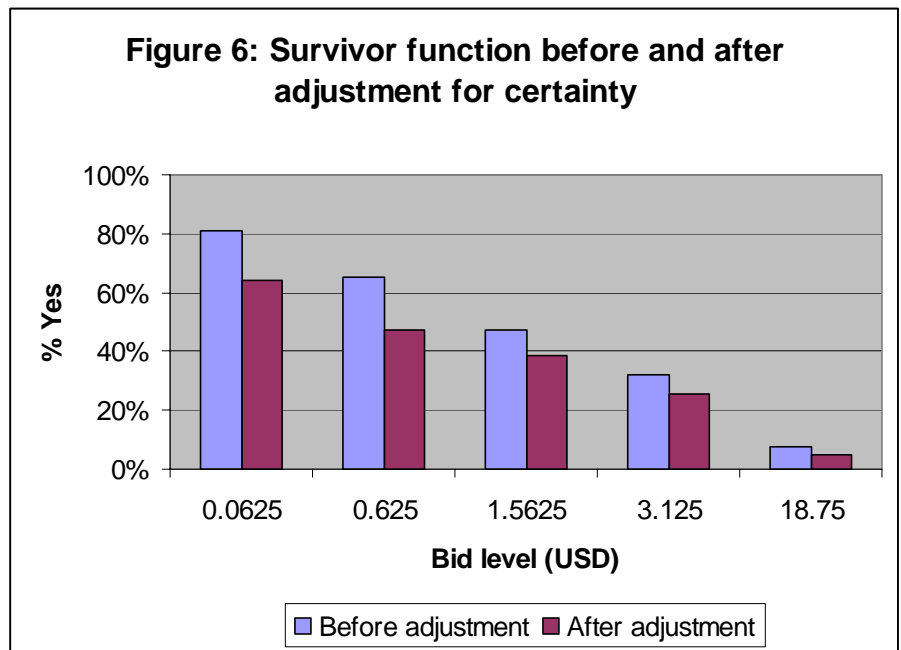


Figure 6 shows the survivor function before and after adjustment for certainty. The probability of voting for the program is lower after adjustment, especially at the two highest bid level.

Non-parametric estimate of WTP after adjustment becomes 1.84 USD/HH.

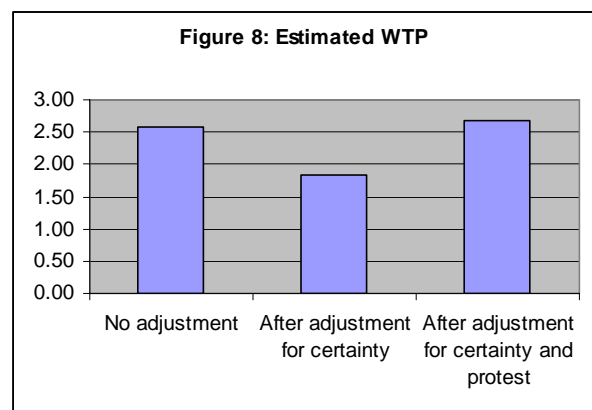
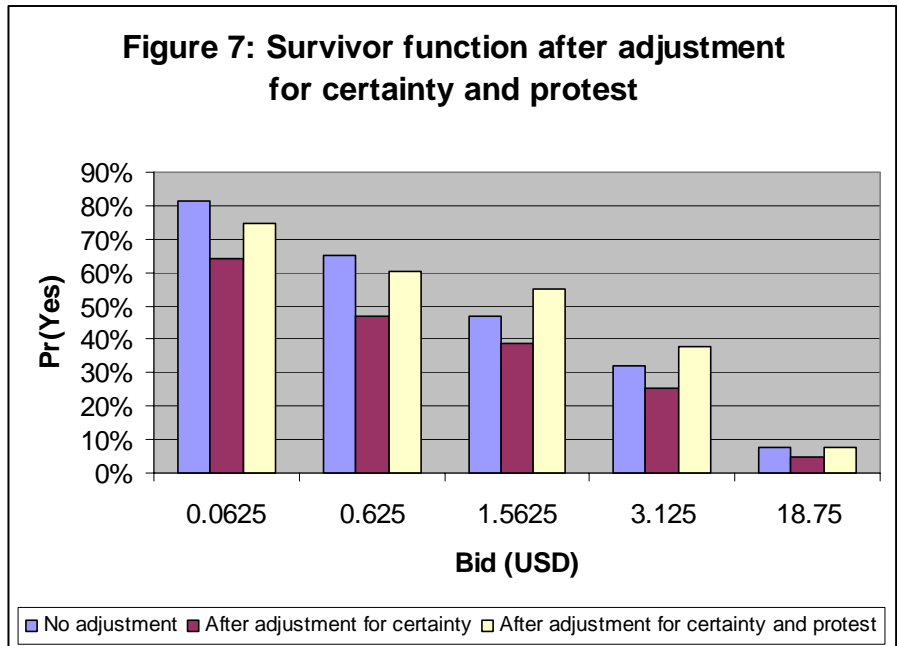
Adjustment for protest vote

Those who put some value on rhino conservation but said “No” to the WTP question could be considered protest voters. The reasons why do not vote is because they do not believe in the conservation program or some of its features. Protest voters could be identified through debriefing questions. Look at the reasons of not voting for the program, there are two reasons that could be considered protest:

- I do not believe that the money I pay will actually be used for Rhino Conservation: Respondents do not trust the institution that is implementing the program.
- I do not like adding the amount to my electricity bill: Respondents do not like the payment vehicle.

Figure 7 presents the survivor function before and after adjustment for certainty and protest. While adjustment for certainty lower the probability of saying yes, adjustment for protest increase it. At the third and fourth bid levels, the probability becomes even higher than that with no adjustment.

Non-parametric estimate of WTP after adjustment for certainty and protest is 2.69 USD/HH.



Cost and potential revenue of rhino conservation

It is estimated by managers of Cat Tien National Park that the total costs of rhinoceros conservation is 3.75 million USD. This amount is to cover all the activities described in the scenario, except for captive breeding.

Using the estimated WTP of 2.5 USD/HH, total potential revenue from Ha Noi and Ho Chi Minh city is 5.8 million USD.

The potential revenue is not much higher than the costs and it is not sure that will hold in a sensitivity analysis. But some aspects need to be considered. The most important thing is that people put value on rhino conservation and are willing to pay a non-zero amount for that, although this is quite a new thing in Vietnam. The total potential revenue estimated is in the two cities only, while there are other big cities that could contribute to Rhino Conservation Program. In addition, there could be counterpart funding.

Concluding remarks

This study applies contingent valuation method to measure willingness to pay for the conservation of rhino. A survey of 800 questionnaires were done in the two biggest cities: Ha Noi and Ho Chi Minh city. Although payment for environmental goods, especially endangered species, is quite new to Vietnamese, the study found that WTP for rhino conservation is 2.5 USD/HH.

The study also found that potential revenue is higher than the cost of conservation. In collecting the payment, electricity bill appears to be the most efficient one. Although some respondents said that there is no connection between rhino and electricity and thus collecting payment for rhino conservation is strange, majority of respondents agree that this is the cheapest way to collect for electricity is covered almost of all the country.

Socio-economic characteristics does not have statistically significant effect on WTP, indicating that different groups might have the same preference for rhino conservation.

Results of the study also pointed out that although people are willing to pay some amount for rhino conservation, endangered species is not of high priority among environmental problems. In addition, environment is not in the top three important problem in the country. This might change when income in the country is higher, given that environment is “luxury good” (Freeman, 2003). But it could be too late to protect the environment, particularly endangered species at the time where income is high enough to foster the demand for environmental goods and services.

Drop-off survey appears to work well in the two cities. Most of the questionnaires are collected after two days. However, in few case respondents with low education can not answer by themselves. This could imply that drop-off would not work in the rural area.

Preference

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Appendix: The Questionnaire

SURVEY ON ECONOMIC AND ENVIRONMENTAL PROBLEMS IN SELECTED COUNTRIES IN SOUTHEAST ASIA

Introduction:

Good day! This is a survey sponsored by the Economy and Environment Program for South East Asia (EEPSEA). The purpose of this survey is to find out how people in East Asia feel about some economic and environmental issues. This survey is being done in four countries: Thailand, Vietnam, Philippines and China.

Your household was randomly chosen to be part of the study. You will be asked some questions about your opinion on several issues relating to the economy and environment. It will probably take you about 45 minutes to complete the questionnaire. I would like to assure you that whatever information you will reveal during this interview will only be used for this research. Please take note that the information presented in the survey below regarding the Conservation Program is not yet in existence. The Program is presented only for the purpose of this survey in order for us to get your opinion on this matter.

If anything is unclear, please take note of any questions you might have. We will try to answer your questions when we come back to pick up the questionnaire. Of course, you have the right to refuse to participate in the survey.

There is no right or wrong answer to the questions. We only want to find out your honest opinion. We would like to request that only the household head (husband/wife/ or working adult) should answer this questionnaire. However, you may consult with other members of your household when answering the questionnaire if you wish. **We also request that you NOT discuss the questions with your neighbors or other people outside your immediate household before you provide your answers.**

Among 800 households selected, we will randomly choose 3 households that will receive our gifts worth 100, 25 and 12 USD. We will contact you directly by the address and phone number you provide. Selection will be done on Nov 11, 2005.

Name of respondent: _____

Address: _____

Name of enumerator: _____

SECTION 1: PROBLEMS FACING THE COUNTRY

1. In your opinion what are the **THREE BIGGEST PROBLEMS** facing our country today? On the right column, place **1** if you think it is the biggest problem, **2** if it is the second biggest, **3** if it is the **third biggest problem**.

Problem	Ranking 1, 2 and 3
a. Economic Problems (e.g price increase, unemployment...)	
b. Poverty	
c. Education	
d. Health	
e. Crime, violence, inequality	
f. Government and Governance (poor administration, corruption...)	
g. Infrastructure (e.g. roads, water)	
h. Environment (eg air pollution, deforestation...)	
i. Terrorism	
j. Relations with other countries (trade agreements...)	
k. Others, pls specify: _____	

2. Do you think our environment and natural resources here in Vietnam are properly taken cared of?

Please tick your choice.

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------

3. What do you think are the **THREE MOST** important issues related to nature and human impact on the natural environment? On the right column, place **1** if you think it is the **most important problem**, **2** if it is the **second important**, **3** for the **third most important**.







Natural Resource & Environmental Problem	Ranking 1, 2 and 3
a. Air pollution	
b. Water pollution	
c. Solid waste	
d. Loss of endangered species (<i>plants and animals considered to be facing a high risk of extinction</i>)	
e. Deforestation	
f. Traffic noise/problems	
g. Soil erosion	

i. Enhanced greenhouse effect (<i>reason why heat is trapped on earth</i>)	
j. Destruction of coral reefs (<i>loss of protective environment for marine animals</i>)	
k. Others, pls specify _____	

**SECTION 2: ATTITUDE ON CONSERVATION & KNOWLEDGE ABOUT
SELECTED ENDANGERED SPECIES**

4. In terms of endangered species protection, which species do you believe is more deserving of protection? On the right column, place **1** if you think it is the most **important species**, **2** if it is the **second important**, **3** for the **third most important species**.

Please check ONLY ONE species that you think most deserving of protection

Species			Species		
A	 Dugong	_____	D	 Whale Shark	_____
B	 Rhino	_____	E	 Spoonbill	_____
C		_____	F	 Eagle	_____

	Marine Turtle				
--	---------------	--	--	--	--

5. Please read the following statements and tell us your opinion (Strongly agree/Agree/Indifferent/Disagree or Strongly disagree). Please remember that there is no right or wrong answer to these questions.

Please check (✓) the column to enter your answer.

STATEMENT TO AGREE/DISAGREE ON...	Strongly agree	Agree	Indifferent/ Neutral	Disagree	Strongly disagree
a. The government should raise more funds to deal with environmental programs in this country.					
b. There are more important environmental concerns than endangered species conservation.					
c. Poaching of wildlife species should be punishable by law.					
d. It is everyone's duty to ensure that plants and animals as we know them today will exist for mankind in the future.					
e. Citizens should contribute to endangered species conservation by making cash donations to this cause.					
f. Endangered species are important even if I don't get to see or interact with them					
g. The government should raise taxes to pay for more endangered species protection					
h. The government should invest in helping people before it spends money on endangered species.					
i. Households who earn more income should pay higher taxes in order to pay for endangered					

STATEMENT TO AGREE/DISAGREE ON...	Strongly agree	Agree	Indifferent/ Neutral	Disagree	Strongly disagree
species conservation.					
j. Endangered species conservation should not be a priority concern of the government.					

Note: Endangered species are plants and animals considered to be facing a high risk of extinction.

6. Have you ever seen a live Rhino?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------

7. Rhinos come in different sizes, shapes and colors.

<input type="checkbox"/> True	<input type="checkbox"/> False	<input type="checkbox"/> Don't know
-------------------------------	--------------------------------	-------------------------------------


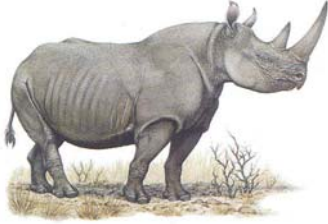

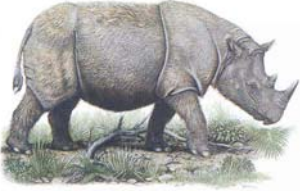
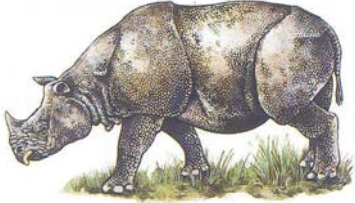
9. Some communities could obtain some still benefits from rhino without hunting them – example, through tourism?

<input type="checkbox"/> True	<input type="checkbox"/> False	<input type="checkbox"/> Don't know
-------------------------------	--------------------------------	-------------------------------------

SECTION 3: THE CONSERVATION PLAN FOR RHINO

We'll now provide you with some information about rhino.

Rhino is an ancient animal, living in the earth 60 million years. There is 5 species of rhinos:

AFRICAN RHINOS		
		
White Rhino	Black Rhino	
ASIAN RHINOS		
		
Indian Rhino	Sumatran Rhino	Javan Rhino

Vietnamese Rhino

Vietnamese rhino is a sub-species of Javan rhino. Among species of rhinos, Javan rhino is the rarest in the world. There remains 2 small population of Javan rhino: Ujung Kulon National Park (about 60 individuals) and Cat Loc Rhino Conservation Area, located in the Cat Tien National Park (about 5-7 individuals)



Vietnamese rhino was considered extinct in the 1960s. In 1988, a poacher killed a female rhino near Dong Nai River, Cat Tien District, Lam Dong Province. Then people pay more attention to the existence of Vietnamese rhino.



Rhino together with elephant are the two biggest animal on land. Among species of rhino, Javan rhino is the smallest. The length of Javan rhino is 2 – 2,5m, height 1 – 1,5m, weight 2 – 3 tons. They have thick skin, poor eyesight but good sense of smell. They are shy and always avoid meeting people. Their food are leaves. Is is the natural characteristics that Javan rhino has to soak themselves in mineral mud ponds every 2-3 days, or they will die.

Cat Loc Rhino Conservation Area

Cat Loc is in Cat Tien District, Lam Dong province. In 1992, this area is isolated for conservation. In 1998, this area was put under the administration of Cat Tien National Park

Major part of Cat Loc Rhino Conservation Area is rattan forests. Formerly this is primeval forest with big woods. The big woods were destroyed in war. Then rattan grew strongly. The rattan here has lots of thorns so that people can not get in the forest. Only rhino with thick skin can live in



these woods. This is the main reason the rhino remains. However, these rattan forests are not appropriate habitats of rhino. In the total area of 30,000 ha, rhino inhabit an area of 5,000 ha

Based on the analysis of footprint, camera trap and genetic anaysis of droppings, experts has found that trere remains 5-7 individual rhino in Cat Loc Rhino Conservation Area.

Thus, the population of rhino in Vietnam is extremely low. After 7 years of monitoring, there is no signal of breeding activity. Experts said this is because rhinos were stressful, resulted from the disturbance of their habitats such as noises from grass-cutter, motorbike and cattle grazing of villages of Stieng and Chau Ma people inside the core area of the Conservation Area. Consequently, rhinos always has to avoid people and do not have time for breeding activities.

These are main theats to rhino:

the habitat is so small, not enough for rhino. The population of rhino is limited to a small area. The presence of villages inside the Conservation Area is barriers for rhino moving from this area to another

slash and burn cutivation, poaching and the disturbance of the people: moving from village to village, grass-cutter and motorbike. Rhino is very sensitive to these disturbance



the existence of both male and female rhinos is necessary for conserving this population of rhino. However, there is no clear evidence for this. It has not been identified that rhino do not have breeding activity due to inability of natural breeding or due to disturbance

Now we'll provide information about an idea for a Rhino Conservation Program that could remain the existence of Vietnamese Rhino:

In 1998, the Institute of Ecology and Biological Resources, Bureau of Forest Management and the International Rhino Foundation has developed “The Action Plan for the Existence of Vietnamese Rhino in Cat Tien National Park”

Main activities of this Action Plan:

Objective of this Plan is to increase the population of rhino to 100 in 50 years. In order to achieve this, the following activities are required:

1. *Protect the rhino:* establish rhino protecting groups, guard stations
2. *Protect the habitats of rhino:* move people living inside Cat Loc Rhino Conservation Area to the buffer zone, reforestation in the sites where people live and around the mud pond
3. *Raising the awareness of people:* about the importance of conserving wild life and rhino. Explain them about activities and regulations of Cat Tien National Park
4. *Research:* on methods of reforestation, planting feeding trees, construct artificial mineral mud ponds, and on the passibility of pairing Vietnamese rhinos with Javan rhino. It is also necessary to ask for permission from Indonesia government for implementing this



According to experts, the proposed Rhino Conservation Program is comprehensive and may have great value in advancing the conservation of rhinos and their habitats. However, it is admitted that the probability of success is relatively low, about 50%.

But while the plan contains many good ideas, putting them into practice would require a lot of money. So far, the program has not received any funding or carried out any activities.

A number of international organizations do provide financial support to protect important endangered species. However, they usually require that counterpart funds be made available – in other words, people from the region must also contribute money to the protection effort. Suppose that this could be done by setting up a *Vietnamese Rhino Conservation Fund*, to which governments and citizens of the member countries could contribute. The Fund could then request

international organizations to provide the same amount of money, or more, that the Fund has raised for turtle conservation. The money raised locally and from international organizations would go towards the Vietnamese Rhino Conservation Program.

We would now like to find out if your household would be willing to contribute to rhino conservation by giving some money to the conservation fund.

Setting up a Vietnamese Rhino Conservation Fund to collect money from people in Vietnam would take considerable effort. We are undertaking this survey to find out if enough people would be willing to contribute to the fund to make it worthwhile. One proposal is that people would contribute to the fund by paying a surcharge to their electricity bill.

Let us suppose that there would first be a national vote in Vietnam. The purpose of this referendum would be to see how many people in our country would support a plan to impose a monthly surcharge on everyone's electricity bill. Suppose that the Program will only be implemented if a major of people in Vietnam vote for this Program.

Assume that this surcharge is a one-time payment. It would be added only ONE time to your household electricity bill next month. All the households in our country would pay the same amount. All funds raised through the surcharge would go to the Vietnamese Rhino Conservation Fund. The managers of this fund could then approach international organizations to provide additional financial support for the Program.

The reason that the surcharge is collected one time is that money collected will be enough for 50 year activities.

The survey you are participating in today is only to find out your opinion about this matter. It is not an actual referendum. We are interested in finding of how you would vote IF an actual referendum did take place our country.

Researchers have found that many people say that they would vote for a program like this when they are asked their opinion in a survey, but then they vote against the program in an actual referendum. In other words, respondents seem to have a tendency to say they would vote for the program even if they do not really mean it.

Researchers are not sure why people do this. It may be because it is feels good to say yes in a survey when people do not actually have to pay. Or it may be to please the person

dropping off the survey. Try to tell us how you think you would really vote in an actual referendum. Please vote for the program only if you are really willing to pay the surcharge.

Suppose that the next month surcharge that everyone had to pay was **<level of bid>**.

10. Would you vote in favor of a surcharge of **<level of bid>** that would be added to the electricity bills of your household and of other households in our country.

Remember the surcharge is a one-time payment and would be added to your electricity bill next month. The money raised would go to the Vietnamese Rhino Conservation Program described above.

Yes Go to Question 14 No Go to Question 11

10. What are the reasons why you did not vote for the program? Please tick the most appropriate answers (limit your answers to 3).

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

I can not afford that amount

I do not think conservation of Rhino is worth doing

I do not believe that the money I pay will actually be used for Rhino Conservation.

I do not like adding the amount to my electricity bill

Only people who will directly benefit from Rhino conservation should pay for this.

I think that other species are more important than Rhino.

Majority of the poor will be affected

Only those from higher income groups should pay for this.

I prefer giving money to humanitarian cause instead

Others (pls. specify) _____

11. IF you voted “NO” to the proposal of setting up the Rhino Conservation Program given that this will cost your household a onetime payment of **<bid>**, is there any amount that you would be willing to donate to support the Rhino Conservation Program?

<input type="checkbox"/>
<input type="checkbox"/>

Yes

No

Go to Question 15

12. If YES, what amount would this be? VND_____.

13. What was it about the Conservation program that made you willing to vote for it? *Check the most appropriate answers (limit your answers to 3).*

<input type="checkbox"/>	The Rhino is a special animal and should be protected
<input type="checkbox"/>	I like the idea that we could get matching funds from international organization as long as we can provide counterpart funding
<input type="checkbox"/>	It is high time that people in Vietnam do something concrete about protecting the Rhino
<input type="checkbox"/>	This initiative can lead to more protection efforts for other endangered species in the country
<input type="checkbox"/>	Other, please specify _____

15. Before you began answering this questionnaire, did you think there are real existing threats to the rhino as described?

Yes No

16. Please rank the following according to how effective you think they would be in encouraging people to contribute to the Rhino Conservation Fund. Write 1 for the method, which you think is most important, 2 as the second most important...and so on.

Method	Rank
Provide more information about the problems of rhino	
Provide more information about the charitable organizations and their activities	
Create more transparency and accountability on how to help	
Make it convenient for people to donate	
Get organizations to publicize their activities (i.e. use celebrities as presenters)	
Others (pls specify) _____	

*Now, I would like to give you a chance to review your answers in **Question 10** whether you would vote for or against the Rhino Conservation Program.*

17. How certain are you that you would vote "YES"/"NO" if such a referendum would really take place? Please check appropriate answer.

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Completely sure/Definitely vote YES/NO |
| <input type="checkbox"/> | Sure |
| <input type="checkbox"/> | Not very sure |
| <input type="checkbox"/> | Not sure |
| <input type="checkbox"/> | Completely not sure |

18. When you decided on your vote, did you believe the description of the current situation with regards status of the Rhino that was provided in this questionnaire?

- Yes (**Go to 20**) No

19. If no, why not? Please check the most appropriate answers.

- | | |
|--------------------------|---------------------------|
| <input type="checkbox"/> | 1. Have yet to see rhino. |
| <input type="checkbox"/> | 2. _____ |
| <input type="checkbox"/> | 3. _____ |

20. When you decided on your vote, did you believe that the Rhino Conservation Program would actually be effective in saving the rhino?

- Yes (**Go to #22**) No

21. If no, why not? Please check the most appropriate answers (limit your answers to 3).

- | | |
|--------------------------|--|
| <input type="checkbox"/> | 1. The funds may not be used to support the program activities due to graft and corruption |
| <input type="checkbox"/> | 2. The funds may not be used to support the program activities since the government may channel it to other uses |
| <input type="checkbox"/> | 3. The funds may not be remitted on time by the collecting agency |
| <input type="checkbox"/> | 4. Other (pls specify) _____ |
| <input type="checkbox"/> | 5. Other (pls specify) _____ |

22. When you decided on your vote, did you believe that the Electric Company would agree to collect the funds for this program?

Yes (**Go to #24**)

No

23. If no, why not? Please check the most appropriate answers (limit your answers to 3).

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

1. The Electric Company will not do this for free—they will get a big part of the collection money to pay for their effort

2. The Electric Company is not bound by law to do this—I don't know what will make them agree to do this task.

3. I don't see any connection between electricity and rhino.

4. Other (pls specify) _____

5. Other (pls specify) _____

24. When you decided on your vote, did you like the proposal to collect the people's contribution as a surcharge on your electricity bill, rather than, say an increase in other taxes?

Yes (**Go to #26**)

No

25. If NO, why not? Please check the most appropriate answers (limit your answers to 3).

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

1. The electricity bill is always increasing. I am afraid this fee will always increase also

2. I can't see any connection between electricity bill and rhino- this does not make sense to me

3. Not everyone has electricity connections - so, how can you collect from those not connected?

4. The collection should not be mandatory every month-why can't we just pay when we want to?

5. One time payment is simply too much...why not make this an annual payment?

6. I do not like compulsory payments

7. I prefer increasing taxes for the program rather than increasing my electric bill

8. Other (pls. specify): _____

Before we wrap up, we'd like to ask for some background information about you and your household.

SECTION 4: ABOUT YOUR HOUSEHOLD

Household Water Services

26. What is the main source of drinking and cooking water in the house?

Please check all applicable answers.

- | | |
|--------------------------|------------------------------------|
| <input type="checkbox"/> | Private or shared water connection |
| <input type="checkbox"/> | Own shallow well |
| <input type="checkbox"/> | Own hand pump |
| <input type="checkbox"/> | Bottled water |
| <input type="checkbox"/> | Water vendor |
| <input type="checkbox"/> | Public (communal) tap |
| <input type="checkbox"/> | Public (communal) well |
| <input type="checkbox"/> | Public hand pump |
| <input type="checkbox"/> | Other (pls specify) _____ |

Electricity

27. Does your household have electricity?

Yes

No

28. Does your household pay the entire electricity bill, or share the bill with anyone outside your household?

Household pays entire bill

Shares bill with someone else

29. How much was your household's own electricity bill last month? Or, if you share the bill, how much was your share? _____ VND/month

House Characteristics

30. Does your household own this house/apartment?

<input type="checkbox"/>	Own
<input type="checkbox"/>	Rent
<input type="checkbox"/>	Provided by Employer
<input type="checkbox"/>	Use for free
<input type="checkbox"/>	Other (pls. specify) _____

Socio-economic profile of the HOUSEHOLD HEAD-respondent.

31. How old are you?

Age	
-----	--

32. Gender
 Male Female

33. Civil Status
 Single Married Others, pls. specify _____

34. Main occupation

<input type="checkbox"/>	Government employment	<input type="checkbox"/>	Laborer/Mechanic/Tailor/Skilled Worker
<input type="checkbox"/>	Private employment	<input type="checkbox"/>	Overseas Foreign Worker
<input type="checkbox"/>	Self employment (Own business)	<input type="checkbox"/>	Pensioner (Retired)
<input type="checkbox"/>	Fisherman/Farmer		Others, pls. specify _____

35. Highest Educational Attainment

PLEASE GIVE the highest level attended on the left column. For example, college - 4th year)

Educational attainment	
<input type="checkbox"/> No formal schooling	
<input type="checkbox"/> Elementary	
<input type="checkbox"/> High school	
<input type="checkbox"/> Vocational	
<input type="checkbox"/> College	
<input type="checkbox"/> Master's	
<input type="checkbox"/> Higher than Master's degree	

35.a Total schooling years: _____ year.

36. Please list number of household members per age group.

	Number of household member
Children (<12 yrs)	
Teens (13-17 yrs)	
Adults (above 18 yrs)	

37. How many in your family, including yourself, earn cash income?

	Number of income earner
Male	
Female	

38. Please check the average monthly HOUSEHOLD income bracket where your household belongs (include the cash earning of all familymembers who are working or gainfully employed, including yourself.

<input type="checkbox"/> Less than 1 mil. VND	<input type="checkbox"/> From 8 to 9 mil. VND
<input type="checkbox"/> From 1 to 2 mil. VND	<input type="checkbox"/> From 9 to 10 mil. VND
<input type="checkbox"/> From 2 to 3 mil. VND	<input type="checkbox"/> From 10 to 11 mil. VND
<input type="checkbox"/> From 3 to 4 mil. VND	<input type="checkbox"/> From 11 to 12 mil. VND
<input type="checkbox"/> From 4 to 5 mil. VND	<input type="checkbox"/> From 12 to 13 mil. VND
<input type="checkbox"/> From 5 to 6 mil. VND	<input type="checkbox"/> From 13 to 14 mil. VND
<input type="checkbox"/> From 6 to 7 mil. VND	<input type="checkbox"/> From 14 to 15 mil. VND
<input type="checkbox"/> From 7 to 8 mil. VND	<input type="checkbox"/> More than 15 mil. VND

39. Please indicate how many items your household owns for each of the following.

<input type="checkbox"/>	Fan	<input type="checkbox"/>	Motorcycle
<input type="checkbox"/>	Radio	<input type="checkbox"/>	Air conditioner
<input type="checkbox"/>	Television	<input type="checkbox"/>	Computer
<input type="checkbox"/>	Refrigerator	<input type="checkbox"/>	Car
<input type="checkbox"/>	Washing Machine		

Economic Status and Access to Credit

40. How would you classify the economic status of your household relative to others in this country?

<input type="checkbox"/>	Much better than most people (rich)
<input type="checkbox"/>	Better than most people (relatively well off)
<input type="checkbox"/>	About average
<input type="checkbox"/>	Below average
<input type="checkbox"/>	Much worse than average
<input type="checkbox"/>	Don't know

41. How easy would it be for your household to borrow **US\$ 100** from a bank or from someone who is not a relative?

<input type="checkbox"/>	Very Easy
<input type="checkbox"/>	Somewhat easy
<input type="checkbox"/>	Somewhat difficult
<input type="checkbox"/>	Very Difficult
<input type="checkbox"/>	Impossible
<input type="checkbox"/>	Don't know/not sure

42. In the past year, did your household made donations to any organized charitable institution?

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
--------------------------	-----	--------------------------	----

43. Are you a member of any environmental organization?

Yes

No

44. Did you discuss the questions in this survey with other household members before you answered them?

Yes

No (*Go to Question 47*)

45. If yes, which of the following best describes how your household answered the questions in this survey?

I discussed some of the questions with others, but the answers I gave represented my own opinions

We discussed together how to answer the questions and gave our household's best judgment

Others (pls. specify) _____

46. How much time do you think you spent discussing the questions with other members of your household?

<5 minutes

6-15 minutes

16-30 minutes

31-60 minutes

> 60 minutes

47. Do you think your answers to the questions would have been different if you had not/had been able to discuss them with other members of your household?

Yes

No

THANK YOU VERY MUCH!