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Estimating the Willingness to Pay for Eco-Labeled Products of Formosan Pangolin (*Manis pentadactyla pentadactyla*) Conservation

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Abstract: Pangolins are currently the most smuggled mammals in the world. Meanwhile, Taiwan has demonstrated the world's first case of the use of artificial feeding to raise pangolins to adulthood. The government has also begun to cooperate with farmers in pangolin-spotted areas. Agricultural products can earn the green label once they have passed the evaluation. The challenge is that very few farms have obtained the pangolin-friendly label so far. Our hypothesis is that farmers lack the knowledge that consumers would pay additional money for products that are labeled pangolin-friendly compared to regular ones. Thus, farmers have an insufficient incentive to apply for this label. This research aims to fill this gap by providing people with the necessary knowledge. Contingent valuation with the single-bounded dichotomous choice format was used, which involved investigating 417 valid observations. We found the following: (1) customers are willing to pay about 8.06 USD for pangolin-friendly rice (an increase of 397% in relation to the mean price of rice); (2) customers are willing to pay for about 11.46 USD for pangolin-friendly tea (an increase of 179% in relation to the mean price of tea); and (3) customers are willing to pay about 25.81 USD for pangolin-friendly coffee (an increase of 509% in relation to the mean price of coffee). Our findings give farmers more incentive to conduct eco-friendly production. Consequently, the quality of agricultural products as well as the habitats of endangered pangolins improve. Thus, consumers' health, the environment, and the future of pangolin conservation can benefit in this attempt to achieve sustainability.

Keywords: contingent valuation; eco-friendly; animal friendly; scaly anteaters



Citation: Tseng, W.-C.; Yang, Y.-C.; Chen, Y.-J.; Chen, Y.-C. Estimating the Willingness to Pay for Eco-Labeled Products of Formosan Pangolin (*Manis pentadactyla pentadactyla*) Conservation. *Sustainability* **2021**, *13*, 9779. <https://doi.org/10.3390/su13179779>

Academic Editor: Lluís Miret-Pastor

Received: 15 July 2021

Accepted: 27 August 2021

Published: 31 August 2021

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1. Introduction

Environmental labels have been used for over three decades to provide consumers with information about a product that is characterized by improved environmental performance and efficiency compared with similar products [1–3]. Food products with certified labels usually have higher transaction prices [4–6]. Organic labels are currently the most commonly seen agricultural products label. Organic farming avoids the use of synthetic substances to maintain soil fertility and ecological balance, thereby minimizing pollution and wastage [7,8]. Additionally, it provides people with safer agricultural products, while the production process also has a lower impact on the environment [9,10]. However, the habitat of native animals and plants is often ignored in the process of cultivation and farming. Therefore, Taiwan's Green Conservation Program, which was launched in 2010, means that fields that provide habitats for animals or plants of "protected species", "commemorative species", "indicator species", or "rare species" can apply for green conservation labels (GCLs) for specific species [11].

The Convention on the International Trade in Endangered Species (CITES) of Wild Fauna and Flora officially upgraded pangolins from its Appendix II list to its Appendix I

list on 28 September 2016, thus prohibiting any form of pangolin trade. However, the move has not stopped the illegal poaching, trafficking, and smuggling of pangolins. Pangolins are the most smuggled mammals in the world and potentially even the most trafficked animal species, overtaking elephants and rhinos [12]. This is mainly caused by the high demand for pangolins in the Chinese market. Some Chinese people believe that pangolins' scales, skin, and meat have special medical value.

The world is striving to develop better rehabilitation methods and habitats for pangolins. Eight pangolin species are found in Asia and sub-Saharan Africa. Today, Taiwan has the highest population density of pangolins and the highest GDP among these regions. It also leads the field in the research and conservation of pangolins. In addition, the Taiwanese government has established a label for endangered-animal-friendly agricultural products for endangered species such as the leopard cat, pheasant-tailed jacana, crab-eating mongoose, golden birdwing, and tributary flying frog. The GCL policy was launched a decade ago, and the total number of farmers in Taiwan who have applied for GCLs has reached 392; 14 of them have applied for labels specific to pangolins so far [13]. However, only a very limited number of consumers are aware of this pangolin-friendly eco-label in the Taiwanese market, despite the fact that the Taiwanese are familiar with the pangolin.

Consumer willingness to pay (WTP) for certain agricultural product quality attributes is an important indicator of consumer response to food labels [14–18]. Researchers have used contingent valuation (CV), choice experiments (CEs), and experimental auctions (EAs) or combinations of the three methods extensively to elicit consumer preferences for food labels on attributes. In consumer WTP studies, only the limited information on food quality attributes can be provided to respond. A clear view of how additional labeled food quality attributes affect consumer WTP would help farmers to better understand the welfare of food labeling policy.

Conservation species are one of the commodities forbidden to be traded by law. Non-market goods are the value of goods that cannot be estimated from market transaction prices. The main assessment of non-market goods focuses on non-use value or conservation value. It includes the price that human beings are willing to pay to retain the right to conserve of this biological resource, called existence value, and the price that human beings are willing to pay to leave biological diversity to future humans, which belongs to heritable value [19–21].

The current literature on pangolins is limited to biological studies. Few researchers have estimated the value of pangolin conservation in economic studies. Moreover, as far as we know, to this date, there have been no articles using animal-friendly labels to examine the value of products and assess the conservation value of the pangolin. This study estimated Taiwanese citizens' WTP for agricultural products that are cultivated in ways that are friendly to pangolins by examining the value of agricultural products with GCLs for pangolins. The results from this study might encourage more farmers to invest in animal-friendly farming practices to achieve a mutually beneficial outcome for both farmers and animals. This study also estimated the public's WTP for cooperation with farmers to implement pangolin conservation programs and carried out pangolin studies. The quality of agricultural products and the habitats of pangolins could be improved in this effort to achieve sustainability.

2. Literature Review

Pangolins are the world's only extant species under the order of *Pholidota*, belonging to the genus *Manis* of the family *Manidae*. *Manis* comprises eight known species [22], four of which are found in Africa: *M. tetradactyla*, *M. tricuspis*, *M. gigantea*, and *M. temminckii*. Meanwhile, the other four are found in Asia: *M. crassicaudata*, *M. javanica*, *M. culionensis*, and *M. pentadactyla*. Taiwan's unique Formosan pangolins (*M. Pentadactyla Pentadactyla*) are a subspecies of *M. pentadactyla*. Pangolins are nocturnal animals and are highly sensitive to environmental changes. As viviparous animals, mother pangolins mostly only give birth to one baby pangolin at a time, meaning their population growth is slow [23,24]. The

International Union for the Conservation of Nature (IUCN) announced on 23 October 2014 that it has elevated Chinese pangolins to the protection level of critically endangered [25].

Formosan pangolins used to live all over the Taiwanese island, mainly in forest areas at 300–500 m above sea level [26]. They like to build their homes in caves on the slopes of forest areas. From 1950 to 1970, the booming leather processing industry in Taiwan annually demanded 60,000 pangolins [27]. Years of hunting have led to a sharp decline in the Formosan pangolin population. In line with people's growing concern about environmental conservation, relevant regulations have been developed to classify Formosan pangolins as a rare and endangered species that needs to be conserved. However, even if they can be protected from traps, poachers, smugglers, and stray dogs, it is difficult to obtain relevant research data because pangolins are active at night, live in burrows, and change their homes after less than a week. It is challenging to raise pangolins artificially. Due to their sensitive nature and special feeding habits, they tend to be stressed and refuse to eat artificially prepared food under captivity. Veterinary research centers in Taiwan, Hong Kong, mainland China, and Vietnam have found that captive pangolins are likely to develop stomach ulcers and gastrointestinal bleeding and often die within 100 days of being raised [28,29]. In the past 20 years, Taiwan has gained considerable experience and made great achievements in the rescue and breeding of pangolins. In particular, Taiwan set the world record for artificially breeding a pangolin for the longest time [28]. However, the conservation and research work on pangolins remains insufficient. Given the substantial differences among individual pangolins, it is difficult to directly apply past successful practices. More research funds and time are needed in order to develop a better understanding of their physiology and a general conservation strategy. Therefore, first-line conservationists need to perform regular medical interventions. Taipei Zoo has maintained a long-term pangolin study plan for many years. In 2010, it successfully implemented a feeding regime for Formosan pangolin babies [28]. Later on, it succeeded in pair breeding attempts and raising the offspring. Moreover, Taiwan has actively participated in international cooperation and information exchange, promoted public awareness of the latest research results, and implemented outreach campaigns to improve pangolin conservation.

International conventions and national memoranda adopted in recent years have slowed down the irrational exploitation of particular animal or plant resources but have only succeeded in reducing the risks slightly. Thus, consumers' WTP for the conservation of rare nature resources has been extensively studied. Researchers have assessed the recreational and conservation benefits of coral reefs. Using the travel cost and contingent valuation method (CVM), scientists have calculated the local potential tourism value of the coral reefs in Bolinao Lingayen Bay, the Philippines. According to the actual number of tourists in the area in 2000, their tourism value is about \$4.8 million. Considering the rising temperatures expected due to climate change and coral reefs' sensitivity, it is expected that this value will increase on an annual basis [30]. Tseng et al. [21] estimated the potential of climate change to damage coral reefs. Employing the CVM, the authors estimated that the mean WTP per capita each year for coral reef protection is about \$35.75 or a total of \$0.43 billion per year.

Kontoleon and Swanson [31] underlined the role of giant pandas as an indicator species for Wolong Nature Reserve. Pandas help to maintain biodiversity and are an important factor for encouraging the public to support the establishment of a nature reserve (accounting for 73% of the respondents' willingness to pay). It was found that foreign visitors were more willing to pay for panda conservation. Such respondents were willing to pay an average of \$8.43 per year to protect the environment in an artificial cage and \$14.86 per year to maintain the natural environment. The total value of consumers' WTP was about \$50 million.

Hamed et al. [32] employed CVM to estimate the WTP for sea turtle nesting habitats on the east coast of Florida among people living in central Florida. The findings of this study were used to understand residents' views on conservation issues. The study found that residents are interested in the feasibility and efficiency of conservation. The average

WTP per person per year was estimated to be \$42–57. The local residents were found to have a high degree of identification with the habitats of native species.

Tseng and Chen [20] examined the relationship between species conservation and global warming. They noted that, for cold water fish such as Taiwanese trout (*Oncorhynchus masou formosanus*), temperature rises associated with global warming drove up water temperatures, leading to shrinking habitats. The study employed the CVM to estimate the WTP for Taiwanese trout. The researchers subsequently calculated the impact of global warming on Taiwanese trout in terms of economic value. The empirical study showed that expected decreases in their quantity would affect the respondents' WTP. The further the number of Taiwanese trout drops, the more people would be willing to pay to conserve them.

Restrictions imposed for conservation may affect farming practices. However, with the provision of production and marketing history and the introduction of green labeling, ecological labeling, conservation labeling, friendly labeling, and organic labeling, consumers' WTP can usually be increased, and product awareness could also be raised [17,33,34]. A study on French consumers' WTP for apples with different labels showed that labeled apples increased different consumer groups' WTP [15]. Another study in Poland indicated that when the sustainability logo is poorly known, even consumers with positive attitudes toward sustainability do not use it as a cue when shopping for food. Moreover, urban consumers were found to be very price sensitive and were unwilling to pay a higher price for sustainably labelled products [16]. According to a study on consumers' WTP for eco-labeled forest products in Northern Ireland, people were willing to pay up to 88% more for eco-labeled wood products. They also preferred fewer product certificates and thought that sustainable and eco-friendly labels were more important [35]. Chinese consumers had different levels of WTP for rice with different labels [18]. Regardless of their reasons, individual interests, or the products' social benefits, Chinese consumers were willing to pay more for seafood products with green labels or ecological labels [36]. A survey of Korean consumer preferences showed that if consumers consider price as an important factor, their consumption of eco-labeled products may decrease [37].

Similarly, the price of eco-labeled products is also one of the motivations for farmers to adopt eco-friendly farming [38]. Timely coordination with the food supply chain to obtain better production and marketing may play a key role in encouraging environmentally friendly practices [39,40]. The additional bonus of eco-friendly farming is retaining the original landscape and protecting field biodiversity, which is instrumental for the development of environment education and the promotion of food and agriculture [41].

3. The Method

With the public's growing interest in conservation, many countries have banned the trade of animals listed under conservation categories. There are goods whose value cannot be calculated directly or indirectly through the transaction price on the market. For such non-market goods, the CVM could be employed to measure their value [19–21]. As a method based on questionnaire data, it provides researchers with more information about respondents' preferences. For the respondents, a well-designed questionnaire enables them to quickly understand the background of the hypothetical market and bid accordingly.

The mainstream of economists who conduct non-market valuation estimations typically uses a two-stage survey design because it is easier for the respondents to answer closed-ended questions for non-familiar goods such as eco-friendly products. The most common closed-ended questionnaire format is the single-bound dichotomous choices format. Its advantage is that it saves time and the means of bidding is closer to people's normal practices. The disadvantages are that the questionnaire design and application are more difficult, and there may be errors, such as assumption errors, starting point errors, investigator errors, and protest bidding errors. This method was proposed by [42], and it offers simple binary choices: "setting the price at a specific level and asking the respondents whether their WTP is higher than the offered price for the goods or services". To retrieve

WTP values from respondents, assumptions need to be made regarding the distribution of the error term of the WTP function. The two most frequently chosen distributions lead to the probit model and the logit model, respectively. Thus, we used both models, as many researchers do in the literature. McFadden's R-square can be used to choose between these two models. However, as in our case, researchers just report results from both models that are close and consistent. If the i th respondent has a WTP higher than the offered price T_i (we will denote the fixed price in New Taiwan Dollars, NTD), then the answer is "Yes". If the respondents have a WTP lower than the offered price T_i , the answer is "No". The probabilities of the two answers are defined separately as:

- (1) $\Pr_n(T_i) = G(T_i; \theta)$ (probability of respondents answering "No").
- (2) $\Pr_y(T_i) = 1 - G(T_i; \theta)$ (probability of respondents answering "Yes").

For relevant model assumptions, please refer to [42,43], according to whom: $G(\cdot; \theta)$ is the distribution function with vector parameter θ . This distribution function can be interpreted as the cumulative density function (CDF) with maximum utility under a random utility environment. It also shows individual respondents' actual maximized WTP, because utility maximization implies:

$$\Pr \{ \text{No to } T_i \} \Leftrightarrow \Pr \{ T_i > \text{Maximum WTP} \}.$$

$$\Pr \{ \text{Yes to } T_i \} \Leftrightarrow \Pr \{ T_i \leq \text{Maximum WTP} \}.$$

According to the theoretical model of [42], and defining $G(\cdot; \theta)$ as logistic CDF, then: $G(T_i) = [1 + e^{a - b(\ln T_i)}]^{-1}$. If $\theta \equiv (a, b)$, then: $G(T_i) = [1 + e^{a - b(T_i)}]^{-1}$.

We can assume that if n respondents answer the single-bounded dichotomous questions, T_i is the price offered by the i th respondent. Then, we can write the log-likelihood function of this subset as:

$$\ln L(\theta) = \sum_{i=1}^N \left\{ d_i^y \ln \pi^y(T_i^S) + d_i^n \ln \pi^n(T_i^S) \right\} = \sum_{i=1}^N \left\{ d_i^y \ln [1 - G(T_i^S; \theta)] + d_i^n \ln G(T_i^S; \theta) \right\}.$$

In this theoretical model, one should first find the first-order conditional equilibrium solution for the log-likelihood function (that is, $\partial L^S(\theta^S) / \partial \theta = 0$); then, the ML can be estimated as $\hat{\theta}^S$. The estimator $\hat{\theta}$ may generate biased results with a small sample, but in most cases, the results are consistent.

The asymptotic variance of θ^S and the asymptotic variance-covariance matrix can be expressed as:

$$V^S(\theta^S) = \left[-E \frac{\partial^2 \ln L^S(\theta^S)}{\partial \theta \partial \theta'} \right]^{-1} \equiv I^S(\theta^S) - 1.$$

where $I^S(\theta^S)$ is the information matrix.

According to the model for single-bounded dichotomous choices, we can calculate the WTP among Taiwanese citizens for agricultural products cultivated in ways that are friendly to pangolins using the following equation:

$$WTP = f(KL, LI, BA)$$

where KL represents the respondents' level of pangolin conservation knowledge, LI is their preference for conservation, and BA is the respondents' background.

4. Survey

4.1. Survey Design

This study implemented two surveys. The first was the trial interview, which was used to exclude inappropriate questions and determine an appropriate offered price with an open-ended WTP question. It also provided us an opportunity to observe whether the questionnaire could be completed easily. The revision of the final questionnaire helped us to improve the acceptance rate and clarify the questions. The trial interview was performed

between 3–8 April 2019, in Taichung and Taoyuan. We used convenience sampling, but we did our best to include a more diversified sample when selecting the participants. A total of 33 valid observations were obtained from a total of 45 questionnaires. With open-ended questions, the respondents could state their WTP (the net price of the market price that they are willing to pay) freely. A method implemented in prior studies was used to determine the most appropriate price. Specifically, after excluding outliers of the highest and lowest 10% to reduce their effects, the prices corresponding to the 25th, 50th, and 75th percentiles were used as the reference prices in questionnaires A, B, and C. Three questionnaires with three different prices were designed.

The final questionnaires were distributed in person and online. In consideration of environmental protection, all the questionnaires were collected electronically. An in-person interview was performed to obtain feedback from people who may not be adept in using online devices. Their responses were recorded by the interviewer. Again, we used convenience sampling, but we did our best to include a more diversified sample when selecting the participants. We met respondents in front of shops, at metro stations, and on the street. The online survey was distributed through Facebook and Line, using both young persons' and their parents' groups and forwarded redistributions to increase the diversification. The questionnaires were chosen by randomly selecting one questionnaire among A, B, or C for the respondents to complete.

The final questionnaires used in this study were completed in 16–30 April 2019. A total of 513 questionnaires were sent out, comprising 215 online questionnaires and 298 in-person questionnaires. With 417 valid questionnaires, the effective recovery rate was 81.29%. Three types of valid questionnaires were returned: 154 copies of A(Q1) (36.93%), 141 copies of B(Q2) (33.81%), and 122 copies of C(Q3) (29.26%). A descriptive statistical analysis of the 417 valid questionnaires was carried out, as described below. In this study, the questionnaires were randomly distributed. However, due to our inability to control the types of questionnaires people chose to complete during the online participation, the proportion respondents answering questionnaire C(Q3) in the online surveys was high, leading to a relatively low proportion of effective questionnaires being returned for C (Q3). This constitutes one of the limitations of this study.

4.2. Questionnaire

The questionnaire was designed to help us understand Taiwanese consumers' WTP for pangolin-friendly agricultural products. To utilize diverse data sources, both in-person interviews and online questionnaires were used for the survey of Taiwanese people. Before designing the final questionnaire, trial interviews were performed. Among the four quartiles of results, Q1, Q2, and Q3 were used as the reference points separately for the dichotomous choices in the three questionnaires, A(Q1), B(Q2), and C(Q3). The final questionnaire had four sections (please see the Appendix A): "basic knowledge of pangolins in Taiwan", "issues related to conservation preferences", "bid of WTP for pangolin conservation", and "basic data of the respondents".

Section 1: basic knowledge of pangolins in Taiwan. This section comprised six questions that were used to investigate people's knowledge of pangolins and their views on the methods that are effective in enhancing their knowledge of pangolins. Specific questions included: whether consumers were aware of the species of "pangolin", the habits of pangolins, the importance of the Taiwanese subspecies, and Taiwan's leading position in the field of pangolin research, as well as a trap question to determine whether the respondents paid close attention to the survey questions and had the correct attitude toward wild animals. In Taiwan, hunting is illegal, especially for an endangered species such as the Taiwan pangolin. Therefore, the correct attitude is to select the answer "Leave quietly and leave on the same path" to question 4 of Appendix A.

Section 2: questions related to conservation preferences. This section was mainly designed to understand the respondents' opinions of conservation issues. It contained six questions, including whether consumers know that the government has introduced

conservation labels for animal and plant protection, whether they enjoy outdoor activities, their attitude toward conservation issues, their willingness to make contributions with labor or financial resources to show support for the conservation of the environment, their attitude regarding setting up a pangolin conservation area, and the perceived value of Formosan pangolins. These questions aimed to help respondents decide their WTP with sufficient information.

Section 3: people's WTP for pangolin conservation. This section formed the core of the study. Before inquiring about the participants' WTP, an introduction was used to inform the respondents about the latest developments related to pangolins. For those willing to pay the offered price, a question was included to ask about their preference regarding payment types. Unwilling respondents were asked to try to explain their reasons for not paying the proposed price. The information collected by this question would help the government to develop better public awareness policies to address the underlying problems. The offered price was further divided into (1) payment for Formosan-pangolin-friendly agricultural products and (2) payment for biological research on pangolins. The introduction before the offered price was drawn from the situation mentioned by [44,45] and the research team of Taipei Zoo. Pangolin-friendly products were determined according to the cultivated areas of the agricultural products as audited by the government and reported by [44,45].

Section 4: basic data of respondents. The last section of the questionnaire comprised questions related to the respondents' basic information, including their sex, age, educational background, occupation, childhood residence, and monthly disposable income.

The statistics for the sex of the interviewees are 190 males (45.56%) and 227 females (54.44%). Their average age was 33.04 years, of which 39 people were under 20 (including 20 years old) (9.35%), 186 people were 21–30 years old (44.6%), 99 people were 31–40 years old (23.74%), 41–50 were 41 (9.83%) years old, and 52 (12.48%) were over 50 years old. There were 46 freelance professionals (including doctors, accountants, and lawyers) in occupations listed as "other" (11%); 31 persons (8%) who were unemployed/retirees; 55 persons employed in science and technology (13%); 42 persons employed in the military and public education (10%); 43 household managers (10%); 14 employed in agriculture, forestry, fishery, and animal husbandry (3%); 82 students (20%); 62 blue-collar workers (15%); and 42 others (10%). We believe that the childhood living area may affect a person's attitude regarding animal protection. In our sample, 216 people (51.8%) lived in the north during their childhood (Keelung, Shuangbei, Taoyuan, Hsinchu, and Miaoli), 85 people (20.38%) lived in the center of Taiwan (Taichung, Changhua, Yunlin, and Nantou), 98 people (23.5%) lived in the south (Chiayi, Tainan, Kaohsiung, and Pingtung), 17 people (4.08%) lived in the east (Yilan, Hualien, and Taitung), and 1 person (0.24%) lived in the outlying islands (Kinmen, Penghu, Matsu, and other outlying islands).

5. Results and Discussion

Table 1 presents the distribution of observations according to WTP and willingness to answer questionnaires A, B, and C. The first three questions were used to solicit bids for major agricultural products (rice, tea, and coffee) cultivated in planting zones certified as pangolin-friendly. The next question assessed whether consumers were willing to pay farmers to support the continued implementation of their pangolin conservation programs. The last question assessed whether consumers were willing to pay a certain amount of money annually to the pangolin research team.

After reviewing the issues, which show what world is facing regarding pangolin protection and Taiwan's efforts in conserving and studying Formosan pangolins, this study examined how much the respondents were willing to pay for the conservation and rehabilitation of Formosan pangolins under various intertwined scenarios. WTP is crucial for the long-term success of pangolin-friendly farming; studies on artificial breeding techniques for pangolins; and, eventually, the expansion of the population size of Formosan pangolins to avoid extinction.

Table 1. Distribution of observations according to WTP and willingness to answer our survey questions.

Questions	Offered Price (NTD/per Capita)	Willingness	Number of Observations Proportion
Are you willing to pay NTD for a 1 kg pack of pangolin-friendly rice? (The average price per kilogram is NTD 45.)	50	Yes	143 (92.86%)
		No	11 (7.14%)
	100	Yes	84 (59.57%)
		No	57 (40.43%)
	200	Yes	84 (68.85%)
		No	38 (31.15%)
Are you willing to pay NTD for a 1 kg pack of pangolin-friendly tea? (The average price per kilogram is NTD 113.)	100	Yes	126 (81.82%)
		No	28 (18.18%)
	150	Yes	95 (67.38%)
		No	46 (32.62%)
	200	Yes	83 (68.03%)
		No	39 (31.97%)
Are you willing to pay NTD for a 1 kg pack of pangolin-friendly coffee? (The average price per kilogram is NTD 115.)	50	Yes	121 (78.57%)
		No	33 (21.43%)
	100	Yes	108 (76.6%)
		No	33 (23.4%)
	200	Yes	86 (70.49%)
		No	36 (29.51%)
Are you willing to pay NTD each year to support the cooperation with farmers program?	300	Yes	119 (77.27%)
		No	35 (22.73%)
	500	Yes	101 (71.63%)
		No	40 (28.37%)
	1000	Yes	84 (59.84%)
		No	38 (40.16%)
Are you willing to pay NTD each year to support continuous pangolin studies?	200	Yes	123 (79.87%)
		No	31 (20.13%)
	500	Yes	101 (71.63%)
		No	40 (28.37%)
	1000	Yes	69 (56.56%)
		No	53 (43.44%)

Note: NTD refers to New Taiwan Dollar.

We collected information on four issues: citizens' awareness of Formosan pangolins, citizens' preference for conservation issues, WTP and the payment types set by this study, and the background information of the respondents. The appropriate variables were selected from the variables as defined in Table 2 and incorporated in theoretical models to construct the following empirical model equation:

$$WTP_i = \beta_0 + \beta_1 KL2_i + \beta_2 KL3_i + \beta_3 KL5_i + \beta_4 LI1_i + \beta_5 LI2_i + \beta_6 LI3_i + \beta_7 LI4_i + \beta_8 LI5_i + \beta_9 FEEL_i + \beta_{10} PAY_{AGRI_i} + \beta_{11} PAY_{TRA_i} + \beta_{12} GENDER_i + \beta_{13} AGE_i + \beta_{14} CHILD_i + \beta_{15} EDU_i + \beta_{16} OCU_i + \varepsilon_i$$

1. The subscript i denotes the i th respondent.
2. β_0 is a constant term; β_j is the coefficient for a variable
3. ε_i is the error term

In this study, we use probit and logit estimation for single-bounded dichotomous choices with the statistical software Stata MP 13.0 to estimate the coefficients. The estimated coefficient values were then used in the equation to calculate WTP in this study.

Table 2. Mean and standard deviation of explanatory variables.

Explanatory Variables	Definitions	Mean	SD
ti_rice	Offered price for pangolin-friendly rice	110.79	61.17
ti_tea	Offered price for pangolin-friendly tea	146.16	40.54
ti_coffee	Offered price for pangolin-friendly coffee	110.79	61.17
ti_coopfarm	Offered price for cooperation with farmers for pangolin conservation programs	572.42	287.87
ti_study	Offered price for continuous pangolin studies	535.49	324.61
kl2	1 for ticking “knowing pangolin is nocturnal”, 0 otherwise	0.5084	0.5005
kl3	1 for ticking “knowing Formosan pangolins are a unique subspecies”, 0 otherwise	0.5276	0.4998
kl5	1 for ticking “Taiwan is the only country that has successfully raised pangolins to adulthood”, 0 otherwise	0.3189	0.4666
li1	1 for ticking “knowing that the government has launched the labels for animal-friendly agricultural products”, 0 otherwise	0.3669	0.4825
li2	1 for ticking “enjoying outdoor activities”, 0 otherwise	0.7938	0.4051
li3	1 for ticking “establishing a conservation area”, 0 otherwise	0.9472	0.2238
li4	1 for ticking “willing to support for the conservation with labor or money”, 0 otherwise	0.9041	0.2948
li5	1 for ticking “supporting the establishment of pangolin conservation area”, 0 otherwise	0.9712	0.1674
feel	1 for ticking “pessimistic about the future of pangolins”, 0 otherwise	0.5851	0.4932
pay_agri	1 for ticking “willing to pay by purchasing pangolin-friendly agricultural products”, 0 otherwise	0.5540	0.4977
pay_tra	1 for ticking “willing to pay by participating in pangolin-themed tourism”, 0 otherwise	0.3933	0.4891
gender	1 for ticking “male”, 0 otherwise	0.4556	0.4986
age	The actual age of the respondent	33.09	11.97
child_north	1 for ticking “childhood residence in the north”, 0 otherwise	0.5180	0.5003
child_south	1 for ticking “childhood residence in the south”, 0 otherwise	0.2350	0.4245
child_east	1 for ticking “childhood residence in the east”, 0 otherwise	0.0432	0.2035
edu	Number of years of education received by the respondent	17.44	3.2481
ocu_1	1 for ticking “working in agriculture, forestry, fishery, and herding”, 0 otherwise	0.0336	0.1803
ocu_2	1 for ticking “blue-collar workers”, 0 otherwise	0.1391	0.3465
ocu_3	1 for ticking “occupation as household management”, 0 otherwise	0.1007	0.3045
ocu_5	1 for ticking “occupation as military personnel, civil servants, and teachers”, 0 otherwise	0.1318	0.3013
ocu_6	1 for ticking “occupation as science workers”, 0 otherwise	0.1319	0.3388
ocu_7	1 for ticking “occupation as freelance”, 0 otherwise	0.1103	0.3137
ocu_8	1 for ticking “occupation as retired/unemployed”, 0 otherwise	0.074	0.2626

Tables 3 and 4 show the empirical results of the probit and logit estimations for the single-bounded dichotomous choices, respectively. In terms of the likelihood ratio test, the chi-square test with a degree of freedom of 25 and a 90% significance level was used to check the overall fitness of the model. Except for pangolin-friendly tea, the estimates of WTP for the all products passed the chi-square test (degree of freedom of 25 and a 99% significance level), suggesting that the design of the empirical model has considerable statistical explanatory power. In this study, the empirical estimation results of the probit and logit analyses were highly similar. The significant and negative explanatory variables in the estimation of WTP for pangolin-friendly rice are: the price offered for rice (ti_rice); childhood residence in the east of Taiwan (child_east); years of education (edu); working in agriculture, forestry, fishery, and herding (ocu_1); occupation in household management (ocu_3); occupation as a freelancer (ocu_7); and occupation marked as retired/unemployed (ocu_8). This yields a total of seven explanatory variables. These empirical results are in line with those of [46]. The author found that residents living near the main habitats of

protected species had a lower WTP than non-local residents. The significant and positive explanatory variables are: those who are willing to assist breeders with labor or money (li4), those who are willing to pay by purchasing pangolin-friendly agricultural products (pay_agri) and age (age). This yields a total of three explanatory variables. Among them, age was consistent with the study result of [47]. The east part of Taiwan is the most eco-friendly and rural area. In addition, the Luan Mountain Tribes of the east Taiwan are a community that has been successful in protecting the pangolin; they are significant from the estimation of the rice equation.

Table 3. Probit estimates for single-bounded dichotomous choices.

	Rice_Ans	Tea_Ans	Coffee_Ans	Farm_Ans	Study_Ans
ti_rice	−0.00691 *** (−4.59)				
kl2	−0.111 (−0.69)	−0.0763 (−0.50)	0.125 (0.79)	0.196 (1.29)	0.121 (0.80)
kl3	0.110 (0.65)	−0.188 (−1.20)	−0.0253 (−0.16)	−0.151 (−0.98)	−0.310 ** (−2.00)
kl5	−0.0172 (−0.09)	0.268 (1.51)	−0.0443 (−0.25)	−0.0540 (−0.31)	0.0496 (0.29)
li1	0.0890 (0.51)	0.0500 (0.30)	−0.0325 (−0.19)	−0.0231 (−0.14)	0.0845 (0.52)
li2	0.292 (1.53)	0.0244 (0.13)	0.0462 (0.25)	0.213 (1.18)	−0.0440 (−0.24)
li3	0.151 (0.44)	−0.222 (−0.68)	−0.289 (−0.80)	0.000563 (0.00)	0.117 (0.38)
li4	0.498 ** (1.99)	0.257 (1.07)	0.524 ** (2.17)	0.552 ** (2.29)	0.677 *** (2.80)
li5	0.183 (0.42)	0.0828 (0.21)	−0.181 (−0.42)	−0.496 (−1.22)	−0.100 (−0.24)
feel	−0.0891 (−0.56)	0.000214 (0.00)	−0.0515 (−0.33)	−0.0725 (−0.49)	−0.164 (−1.11)
pay_agri	0.483 *** (3.07)	0.407 *** (2.72)	0.376 ** (2.42)	0.347 ** (2.34)	0.181 (1.21)
pay_tra	0.201 (1.25)	0.111 (0.74)	0.0277 (0.18)	−0.0137 (−0.09)	−0.0531 (−0.36)
gender	−0.235 (−1.45)	−0.0583 (−0.39)	0.223 (1.44)	0.119 (0.79)	−0.112 (−0.75)
age	0.0169 * (1.95)	0.00318 (0.40)	−0.00249 (−0.29)	−0.00230 (−0.27)	−0.00643 (−0.79)
child_life_north	−0.103 (−0.51)	−0.189 (−0.97)	−0.198 (−1.00)	−0.312 (−1.65)	−0.306 (−1.59)
child_life_south	−0.268 (−1.17)	−0.261 (−1.20)	−0.139 (−0.62)	−0.0135 (−0.06)	−0.110 (−0.51)
child_life_east	−0.850 ** (−2.28)	−0.158 (−0.42)	−0.0287 (−0.07)	0.575 (1.33)	−0.00699 (−0.02)
edu	−0.0557 ** (−2.27)	0.0340 (1.48)	0.0403 (1.68)	0.0232 (1.02)	0.0518 ** (2.28)
ocu_1	−1.145 ** (−2.69)	0.227 (0.52)	0.620 (1.37)	0.653 (1.35)	0.521 (1.18)
ocu_2	−0.226 (−0.87)	−0.0228 (−0.10)	0.332 (1.41)	0.0447 (0.19)	−0.0849 (−0.37)
ocu_3	−0.752 ** (−2.39)	0.0627 (0.21)	0.913 *** (2.84)	−0.0253 (−0.09)	0.0771 (0.27)
ocu_5	−0.450 (−1.63)	0.131 (0.48)	0.370 (1.36)	−0.0229 (−0.09)	−0.187 (−0.72)
ocu_6	−0.372	−0.172	0.529 **	−0.0434	0.0432

Table 3. Cont.

	Rice_Ans	Tea_Ans	Coffee_Ans	Farm_Ans	Study_Ans
	(−1.46)	(−0.74)	(2.06)	(−0.19)	(0.18)
ocu_7	−0.479 *	0.290	0.739 ***	0.224	0.239
	(−1.82)	(1.09)	(2.60)	(0.88)	(0.94)
ocu_8	−0.838 ***	−0.255	0.0508	0.556 *	0.254
	(−2.86)	(−0.92)	(0.18)	(1.78)	(0.84)
ti_tea		−0.00391 *			
ti_coffee			−0.00130		
			(−0.91)		
ti_coopfarm				−0.000507 *	
				(−1.72)	
ti_study					−0.000624 **
					(−2.43)
_cons	1.248	0.357	−0.301	0.226	−0.100
	(1.63)	(0.46)	(−0.39)	(0.30)	(−0.14)
N	417	417	417	417	417
Log-likelihood	−197.7737	−226.2941	−208.5935	−229.3302	−229.3418
Log-likelihood Ratio(LR)	75.08	34.66	46.79	48.92	48.90

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Note: (1) Values without parentheses are estimated coefficients. (2) $\chi^2(0.1, 25) = 34.382$, $\chi^2(0.01, 25) = 44.314$. (3) Parameters highlighted in gray have statistical significance.

Table 4. Logit estimates for single-bounded dichotomous choices.

	Rice_Ans	Tea_Ans	Coffee_Ans	Farm_Ans	Study_Ans
ti_rice	−0.0117 ***				
	(−4.47)				
kl2	−0.174	−0.114	0.222	0.360	0.206
	(−0.62)	(−0.44)	(0.82)	(1.41)	(0.80)
kl3	0.163	−0.288	−0.0156	−0.236	−0.509 *
	(0.56)	(−1.10)	(−0.06)	(−0.91)	(−1.95)
kl5	−0.0511	0.435	−0.101	−0.127	0.0587
	(−0.16)	(1.45)	(−0.33)	(−0.44)	(0.20)
li1	0.232	0.0827	−0.0763	−0.0382	0.152
	(0.77)	(0.30)	(−0.26)	(−0.14)	(0.55)
li2	0.519	0.0302	0.0677	0.366	−0.0701
	(1.59)	(0.10)	(0.21)	(1.21)	(−0.22)
li3	0.284	−0.414	−0.447	−0.0121	0.216
	(0.48)	(−0.73)	(−0.73)	(−0.02)	(0.42)
li4	0.840 **	0.409	0.890 **	0.919 **	1.123 ***
	(2.03)	(1.03)	(2.21)	(2.32)	(2.78)
li5	0.334	0.134	−0.299	−0.909	−0.159
	(0.47)	(0.20)	(−0.41)	(−1.22)	(−0.23)
feel	−0.141	0.00685	−0.0955	−0.0966	−0.282
	(−0.51)	(0.03)	(−0.36)	(−0.39)	(−1.12)
pay_agri	0.872 ***	0.683 ***	0.642 **	0.564 **	0.283
	(3.17)	(2.70)	(2.41)	(2.27)	(1.13)
pay_tra	0.335	0.201	0.00839	−0.0315	−0.0986
	(1.18)	(0.79)	(0.03)	(−0.13)	(−0.40)
gender	−0.438	−0.0847	0.368	0.207	−0.189
	(−1.55)	(−0.33)	(1.39)	(0.82)	(−0.75)
age	0.0282 *	0.00561	−0.00373	−0.00335	−0.0107
	(1.85)	(0.42)	(−0.26)	(−0.24)	(−0.79)
child_life_north	−0.242	−0.341	−0.405	−0.514	−0.502
	(−0.67)	(−1.01)	(−1.16)	(−1.60)	(−1.53)

Table 4. Cont.

	Rice_Ans	Tea_Ans	Coffee_Ans	Farm_Ans	Study_Ans
child_life_south	−0.535 (−1.31)	−0.466 (−1.24)	−0.302 (−0.77)	−0.0199 (−0.05)	−0.195 (−0.52)
child_life_east	−1.491 ** (−2.39)	−0.312 (−0.50)	−0.0810 (−0.12)	1.053 (1.29)	0.0255 (0.04)
edu	−0.102 ** (−2.32)	0.0582 (1.52)	0.0701 (1.70)	0.0367 (0.96)	0.0821 ** (2.18)
ocu_1	−1.996 *** (−2.76)	0.322 (0.44)	1.152 (1.36)	1.074 (1.26)	0.838 (1.13)
ocu_2	−0.403 (−0.90)	−0.0645 (−0.17)	0.541 (1.37)	0.0725 (0.19)	−0.112 (−0.29)
ocu_3	−1.335 ** (−2.49)	0.0958 (0.19)	1.565 *** (2.74)	−0.0371 (−0.08)	0.191 (0.38)
ocu_5	−0.769 (−1.57)	0.246 (0.52)	0.588 (1.27)	−0.0530 (−0.12)	−0.295 (−0.68)
ocu_6	−0.668 (−1.49)	−0.300 (−0.77)	0.907 ** (2.00)	−0.105 (−0.27)	0.0596 (0.15)
ocu_7	−0.874 * (−1.90)	0.494 (1.07)	1.289 ** (2.52)	0.343 (0.79)	0.419 (0.96)
ocu_8	−1.436 *** (−2.82)	−0.426 (−0.92)	0.0881 (0.19)	0.940 * (1.71)	0.433 (0.84)
ti_tea		−0.00619* (−1.75)			
ti_coffee			−0.00206 (−0.83)		
coop_farm				−0.000861 * (−1.76)	
study					−0.00106 * (−2.47)
_cons	2.242 * (1.70)	0.557 (0.43)	−0.566 (−0.43)	0.460 (0.36)	−0.119 (−0.10)
N	417	417	417	417	417
Log-likelihood	−197.2924	−226.6479	−208.7135	−229.4049	−229.7607
Log-likelihood Ratio(LR)	76.04	33.96	46.55	48.77	48.06

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Note: (1) Values without parentheses are estimated coefficients. (2) $\chi^2(0.1, 25) = 34.382$, $\chi^2(0.01, 25) = 44.314$. (3) Parameters highlighted in gray have statistical significance.

In the estimation of the WTP for pangolin-friendly tea, the significant and positive explanatory variable is being willing to pay by purchasing pangolin-friendly agricultural products (pay_agri), while and the significant and negative explanatory variable is the price offered for tea (ti_tea). The other explanatory variables are not statistically significant. Therefore, in the likelihood ratio test, fewer likelihood ratio estimates for pangolin-friendly tea pass the significance level. Significant and positive explanatory variables in the estimation of pangolin-friendly coffee are: those who are willing to assist breeders with labor or money (li4), those who are willing to pay by purchasing pangolin-friendly agricultural products (pay_agri), years of education (edu), occupation in household management (ocu_3), occupation as a science worker (ocu_6), and occupation as a freelancer (ocu_7). This yields a total of six explanatory variables. Educational factors are often positive variables that affect the WTP for eco-labeled products [18,36]. Significant and positive explanatory variables in the estimation of supporting cooperation with farmers for conservation programs are being willing to assist breeders with labor or money (li4), being willing to pay by purchasing pangolin-friendly agricultural products (pay_agri), being retired/unemployed (ocu_8), and being willing to pay the price of supporting the conservation programs implemented by farmers (ti_coopfarm). A significant and negative explanatory variable in the estimation of supporting continuous pangolin studies is being willing to pay the price of supporting

studies (ti_study); significant and positive explanatory variables include being willing to assist breeders with labor or money (li4) and the number of years of education (edu).

WTP was calculated for the probit and logit models (Table 5). We found that the pangolin-friendly label has a high value across three agricultural products. These higher prices may cover the additional costs of farmers who follow pangolin-friendly practices. Thus, farmers have a higher incentive to carry out eco-friendly business. We found: (1) the WTP for pangolin-friendly rice is NTD 223.65–224.66 (about 8.06 USD) (an increase of 397% in relation to the mean price of rice); (2) the WTP for pangolin-friendly tea is NTD 315.74–322.00 (about 11.46 USD) (an increase of 179% in relation to the mean price of tea); (3) the WTP for pangolin-friendly coffee is NTD 701.38–766.35 (about 25.81 USD) (an increase of 509% in relation to the mean price of coffee). In addition, we also found that people have a high willingness to cooperate with farmers for pangolin conservation as well as to support pangolin studies. Under the probit model: (4) the annual WTP per capita for cooperation with farmers for pangolin conservation programs is NTD 1729.00–1698.97 (about 61.70 USD); and (5) the annual WTP per capita for continuous pangolin studies is NTD 1479.09–1439.37 (about 52.49 USD).

Table 5. Estimates of WTP for relevant pangolin-friendly agricultural practices.

Targets	PROBIT	LOGIT
RICE	223.65	224.66
TEA	315.74	322.00
COFFEE	701.38	733.75
FARM	1729.00	1698.97
STUDY	1479.09	1439.37

NOTE: These are in New Taiwan Dollars (NTDs). (1 NTD = 0.036 USD).

More and more studies have found a positive WTP for labelled food products [14,33,34]. Therefore, eco-labelling might play a role in gaining added value for food items and influencing the relative importance of their price. Consumers' WTP for organic food rises to a premium of around 30%, according to a review carried out from 2000 to 2014 [48]. High percentages of consumers in Greece were willing to pay 65–87% more for certified organic food [49]. The results of this study show that animal-conservation labels have a higher value than organic labels. In addition, regarding the WTP for conservation research funds, similar studies have been carried out. For example, the single-bounded dichotomous choice method was used to evaluate the willingness of Taiwanese citizens to pay for the conservation of Taiwan's precious species. Each person was willing to pay 35.75 USD per year to protect coral reefs [21] and 37.55 USD to protect Taiwanese black bears [19]. Both are less than the price of conservation of Formosan pangolins.

6. Concluding Remarks

According to the Food and Agriculture Organization (FAO), the demand for food may continue to increase every year due to population growth and changes in diet and income. The current global market outlook could be affected by considerable uncertainties determined by economic, political, climate, and biological factors (e.g., new diseases of crops and animal diseases). For instance, there have been food chain disruptions during the COVID-19 pandemic and other negative phenomena, such as extreme weather. The growing demand for animal products for purposes other than food exposes some animal species to major risks. One of the species most exposed to the illegal trade in by-products is the pangolin, a species that has been intensely hunted in many parts of the world. The latest catch of scales and claws, with a market value of over \$54 million [50], proves the vulnerability of this species. Public policies that ensure food security and the sustainable and harmonious development of agriculture and the agri-food chain are important from an economic and social perspective.

The study shows that pangolin-friendly planting methods and the certification of agricultural product labels can effectively improve consumers' WTP for pangolin-friendly agricultural products and raise consumers' awareness of pangolin conservation. It is expected that the implementation of the eco-labeling system achieves a mutually beneficial outcome. Furthermore, it is worth considering whether products with such labels can be readable and whether they can also reach consumers who do not yet know about the endangered Formosan pangolin population. Thus, the government and environmental organizations should work in this direction.

Answers to questions related to the knowledge of Formosan pangolins were informative. For the question "By the end of 2018, which is the only country in the world that has successfully raised pangolins to adulthood?", only 31.65% of the respondents knew the correct answer, while 63.79% said that they did not know anything about this issue. The result showed that although researchers in Taiwan have made outstanding contributions to pangolin studies, the general public is not made fully aware of these achievements. According to [51], a greater number of people knowing about researchers' achievements in conservation could enhance people's feeling of connection with this species, thereby increasing consumers' WTP for conservation.

This research was conducted carefully. However, the interests of local residents and non-residents regarding conservation issues may be in conflict. Thus, we suggest that, in future research, the opinions of residents living near existing pangolin habitats and the opinions of residents of other areas should be distinguished in order to achieve an accurate result. In addition, the test of embedding effects was not included in our original research design. It could be worthwhile to carry this out in future studies. Furthermore, in the design of the questionnaire, this study tried to be fully electronic and collected the questionnaires in an environmentally friendly way without printing out paper questionnaires. However, our face-to-face interviews often involved situations in which the elderly had to be assisted in filling out our forms. Our survey used convenience sampling, which is a limitation of this research. Additionally, there is room for improvement in the questionnaire. Finally, limited by funding issues, the number of questionnaires used in this study, the regional unevenness of the interviewees, and the high number of years of education of the participants' are areas that could be improved on in the future.

Author Contributions: All the authors made contribution to this paper. W.-C.T., Y.-J.C. and Y.-C.Y. conceived and designed the experiments; writing—original draft preparation, Y.-C.Y. and Y.-C.C.; writing—review, editing and revision, Y.-C.C. and W.-C.T.; supervision, W.-C.T. and Y.-J.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors thank the anonymous referees for comments that improved the content as well as the presentation of this paper.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Survey Questionnaire

Survey for willingness to pay of Formosan-pangolin-friendly products.

The purpose of this survey is to obtain information regarding Taiwan citizens willingness to pay for the friendly animal products that "avoid the extinction of Formosan pangolins". All answers will only be used for academic purposes. We will not reveal your private information. Thank you.

I. Basic knowledge of pangolins in Taiwan

1. Do you know the species of "pangolin"

☐Yes ☐No (Please skip to Question 6)

2. Is pangolin a nocturnal animal?
☐Yes ☐No ☐I don't know
3. Do you know that Formosan pangolin is a subspecies endemic to Taiwan?
☐Yes ☐No
4. What should I do if I meet Formosan pangolins in the wild?
☐Leave quietly and leave on the same path ☐Use flashlight ☐Take a group photo with friends ☐Entrap ☐Not sure
5. By the end of 2018, which is the only country in the world where successfully raised pangolins artificially to adulthood?
☐Germany ☐United States ☐China ☐Taiwan ☐Philippines ☐I don't know
6. Where do you think more people can access conservation information? (Multiple choices)
☐Newspapers and magazines ☐Government publications ☐Zoo activities ☐TV media ☐Internet ☐Others

II. Questions related to conservation preferences.

1. Do you know that the government has launched conservation labels for animal-friendly agricultural products?
☐Yes ☐No
2. Do you like outdoor activities?
☐Yes ☐No ☐Not sure
3. Regarding the way of conserving animals, do you think it is better to raise them in a zoo or establish a wildlife conservation area?
☐Raise them in zoo ☐Establish a wildlife conservation area
4. Do you willing to contribute with labor or financial resources to show your support for the conservation of the ecological environment?
☐Yes ☐No
5. Do you agree to the establishment of a pangolin conservation area?
☐Yes ☐No
6. The following is a description of the characteristics of Formosan pangolins. Please check the options that you think are valuable. (Multiple choices)
☐The cave can help other species build nests and stabilize biodiversity ☐A subspecies endemic to Taiwan ☐Part of Taiwan's precious natural and cultural assets ☐Defined as an endangered animal ☐World-leading pangolin research ☐For future generations to watch ☐Other: _____

III. People's WTP for pangolin conservation.

Pangolins had become the most smuggled mammal in the world (it has surpassed elephants, lions, and tigers). In order to prevent illegal poaching, the United Nations has banned any form of trading. The pangolin that inhabits in Taiwan is a subspecies endemic to Taiwan, the "Formosan pangolin". They were all over the island of Taiwan. However, They were hunted in large numbers during the development of the leather industry in Taiwan, and they are now classified as endangered species. Pangolins are sensitive, it is extremely difficult to estimate the number and track them. In aspect of feeding and breeding, the acceptance of artificial feed is extremely low. It was not until the end of 2018 that the Taipei Zoo was successful to raise a juvenile pangolin to adulthood by artificial feeding.

1. According to the above statement, what do you think of the future situation of Formosan pangolins in the future?
☐Pessimistic ☐Normal ☐Optimistic

With the assistance of the Forestry Bureau of the Council of Agriculture, a group of farmers tried farming practices for friendly pangolins near the known habitats of Formosan pangolins. A patrol team regularly inspects whether there are poachers infested every day, and the people in the village have also begun to develop “Pangolin-Themed Tourism.”

Note: Based on the above assumptions, please pay attention when answering the following questions: A. Your income is limited, and there are other important ways to use it. B. There are many conservation issues in Taiwan. C. The following bids are only for the conservation of “Formosan pangolin”.

2. Regarding the above-mentioned farmer groups, do you willing to donate money to them to continue to conserve Formosan pangolins?
If Yes, what is your preferred payment types? (Multiple choices)
☐Purchase the pangolin-friendly agricultural products they cultivated ☐Donations
☐Go to the pangolin-themed tourism ☐Other:____
If No, what is the main reason?
☐The conservation is subsidized by the government (Please skip to Part IV)
☐Oppose the use of taxes on conservation issues (Please skip to Part IV) ☐My income cannot support these conservation issues ☐Other:____
If farmers use the pangolins-friendly farming to grow the following three crops: rice, tea, and coffee. Please make individual bids for these three agricultural products:
3. Are you willing to pay NTD____for a 1 kg (1000 g) pack of pangolin-friendly rice? (The average price per kilogram is NTD 45.)
☐Yes ☐No
4. Are you willing to pay NTD____for a 1 kg (1000 g) pack of pangolin-friendly tea? (The average price per kilogram is NTD 113.)
☐Yes ☐No
5. Are you willing to pay NTD____for a 1 kg (1000 g) pack of pangolin-friendly coffee? (The average price per kilogram is NTD 115.)
☐Yes ☐No
If there is a plan for the conservation of pangolins, the organization is responsible for cooperating with these farmers to strengthen local conservation. It is expected that at least the existing numbers of pangolins in Taiwan can be maintained. Without this plan, Formosan pangolin will disappear (extinct) in the future.
6. Are you willing to pay NTD____each year to support the cooperation with farmers program?
☐Yes ☐No
7. Are you willing to pay NTD____each year to support continuous pangolin studies?
☐Yes ☐No

IV. Basic data of respondents. (Skip due to limitations of space)

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