

Modeling Pro-Conservation Attitude Toward The Endangered Species Based On Demographics Variables Of The Suburban Community As The Basis For Extension Programs Planning: Study At Buffer Zone's Provincial Park Of Lampung _Indonesia

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Abstract. There are 24 endanger animal species (EDS) which 8 of them are enlisted in CITES Appendix I and II exists at Lampung's Provincial Park (Tahura WAR: Taman Hutan Raya Wan Abdul Rachman). These EDS are prone to illegal hunting due to Tahura's buffer zone is the suburb area of capital city of Bandar Lampung beside Pesawaran and South Lampung Regencies that surrounded by 36 poor villages. It needs model for predicting EDS pro-conservation attitude (PRO) based on sociodemographic data input. This model is very useful as a predictor tool in identifying individuals who have a high probability of being PRO so that extension services can be effective in line with overcoming cost constraints since forest management has been decentralized to the local authorities. The research objectives were: [1] to determine the level of people's knowledge about 24 protected animals in Tahura WAR, [2] to develop the PRO model. The field survey was conducted on August-September 2020 to interview 75 respondents at 3 villages to: [1] collect socio-demographic data, and [2] determine their knowledge (by showing the 24 EDS' photos) and their attitude to the EDS. Ordinary Least Square postulate model was applied at significant level of 90 and 95%. The total PRO is the respond variable. The predictor variables include their social demography, ethnicity, social capital and participation in social gathering. The model's goodness fits-test examined by Fisher statistic criterium while the significance of parameters model by T student statistic. Conclusions: [1] People's knowledge about 24 EDS is very low (average 33.4; SE=27.1%); [2] The model achieved is robust with R-Sq(adj)=68.16% with P= 0.000. The variables that affect on the PRO are : (a) positively includes the knowledge about EDS, the norm performance, participation in arisan and extension activities, (b) negatively (not pro to conservation idea) includes the gender that women were less than men, merchant compare to farmer, whose has more the dependence, and whose cropping in agroforestry pattern compared to monocultures one or else to non-farmer did.

Keywords: CITES, extension effectiveness, illegal hunting, social capital

Introduction

As can be referred to works by Lenton et al. (2020) and Rubin et al. (2021) that Gaia Theory concludes that the earth has become one cell only, that evolves since the universe was created about 4.5 billion years ago. If one components of the earth's cell extinct, it will threaten the sustainability of living system and therefore the civilization does. Meanwhile, Indonesia is the richest biodiversity in the world so that may contribute significantly to the global conservation. By September 2021, according to IUCN (2021) there are 298, 525, and 213 species groups of mammals, birds and amphibians which are Indonesian endemic. Among them are 132 mammals, 113 birds, and 24 reptiles in status of threatening to extinct. Beside the climate change, this numbers accelerated are by poaching, smuggling and trafficking for 10 years later. Prevention strategies against these causes need to be formulated, otherwise Indonesia will be in the spotlight and international pressure because since 1978 Indonesia has ratified the CITES or Convention on International Trade in Endangered Species (Sani, 2021).

The convention regulates international trade for animals and flora into 3 categories, namely a list of severely endangered to extinct species so that they are prohibited to trade (Appendix I), will become threatened to extinct if the trade continues (Appendix II), and a list of protection rules in certain countries within certain boundaries of their habitat areas that every year their status change when its status can be tightened, it can be entered into Appendix II even to Appendix I. In this regard, the list of species in conservation areas must be checked routinely, those that are included in the appendix must be a priority for prevention, especially for suppressing the 3 causes enhancement of total EDS (endanger animals species).

Nowadays, there are 76 conservation areas in Indonesia, one of which is prone to poaching, smuggling and trafficking is Wan Abdul Rachman of Lampung Provincial Park (Taman Hutan Raya = Tahura WAR). The Tahura WAR covers an area approximately 22,249.31 ha inhabited by 5 EDS of fauna enlisted Appendix I namely tapir (*Tapirus indicus*), gibbon (*Hylobates syndactylus*), stone cat (*Pardofelis marmorata*), slow loris (*Nycticebus coucang*), and pangolin (*Manis javanica*). Besides 3 EDS of fauna enlisted at Appendix II namely langur monkey (*Trachypithecus auratus*), langur (*Ratufa bicolor*), and brontok eagle (*Spizaetus cirrhatus*). Moreover, the tahura is also inhabited by 16 EDS which enlisted in UICN (Zulkarnain et al, 2018).

The whole buffer zones of the Tahura WAR is the suburban of Bandar Lampung capital city, municipalities of Pesawaran and South Lampung interface with of 35 villages consisted of around 125 thousand people (Winarno, 2019). This situation make the 24 EDS as if a hot-spot under siege by human ecology. While the poverty of Lampung Province is around 12.43%, in Pasawaran District is reach 15.97 followed by Pringsewu Regency and Bandar Lampung Municipality namely 10.50 and 9.04% respectively (BPS, 2020 cited Simamora, 2020). Even though Bandar Lampung's poverty is the lowest one, but at the Kemiling Sub-district, where directly adjacent to Tahura WAR is the poorest one (Simamora et al, 2020). Poverty is not always the cause of an increase in the chain of illegal hunting, smuggling and EDS trafficking, but sometime be triggering. Poverty alleviation programs, therefore, should always be accompanied by some efforts to raise awareness of the obligation to protect the potential existence of EDS.

Poverty alleviation indeed is the task of the local government, the Manager of Tahura WAR should always look for a synergy program to increase the awareness of the importance of conservation on EDS for all 35 villages in the buffer zones. The extension activities, which are the most urgent programs for raising awareness on EDS protection. But in reality are only carried out once a year for last 5 years. If it is assumed that the maximum participants are 20 people in each extension event, so that the effectiveness in disseminating information or in building public awareness for the 35 buffer villages can be ascertained doubtful. In relation to the effort to increase the effectiveness of this kind of extension, Nurhaida et al (2018) suggested on targeting to certain individuals by using a linear model based on demographic characteristics, social background, culture, ethnicity and social capital performance. With this model, each member community can be calculated how big his/her probability to accept an idea such as choosing contraceptive method, choosing a particular product, choosing candidate for regional head, or the idea of tightening EDS conservation. Only for individual group with high probability, let us say more than 95%, has to be prioritized in extension event so the results will be surely effective. To the pioneers who are pro to the EDS conservation idea, Tahura WAR's manager has to proposes an incentive for example social safety net allotment or other kind of incentive. This benefits will be able to attract other individuals of early adopters group, and subsequently the early majority groups, and the perhaps the laggard groups (Gonera et al., 2021; Rogers, 2003).

In connection with the development of the model, it is necessary to understand that attitude is an individual's behavioral response to any stimuli, including idea of agreeing to strengthen protection against EDS. This attitude may be more genuine than an attitude of obedience to protect EDS which is aroused by the fear of legal regulations that contain criminal threats. Meanwhile, according to Altmant (2008) that the term of attitude used widely variously in social sciences, but there is no defined in conclusively. This is different from Almant (2008) Gebregziabher and Soltani (2019) proposed that attitude is defined as a mental evaluation of a particular entity with some degree of favor or disfavor as the respond toward any stimuli such as idea, object, or other entities that gives by any one. In line with this definition according to Karant and Nepal (2012), the favor respond as positive value and the otherwise is negative one. Accordingly, we respect as is a positive attitude (PRO) to whom agree with the idea to enhance protecting status to any EDS by means of applying conservation law or regulation. As for the reverse attitude as is the negative or anti-conservation. According Izard (2009 as cited by Castillo-Huitro, et al, 2020) that attitude commonly control by human emotions that classified into two groups: positive, representing interest and joy (happiness and surprise), and negative, including anger, disgust, fear, and sadness.

Additionally, an attitude, including to animal caring, is commonly influenced by several socio-demographic variables including ethnicity, age, gender, occupation, status in family, education level, knowledge, access to information, social relation, income level, physical capital ownership, and social capital performance. While poverty eradication programs will continue to promote in increasing family income, the knowledge improvement on EDS is also extremely important to enhance the PRO, particularly through extension activities by utilizing some habituation in community's meeting such as in lottery club (arisan) meeting, neighborhood meeting, Qur'an recitation event. The extension programs expected to make community live in the Tahura WAR's buffer zone to be more pro to conservation idea enhancement particularly to rise the sense of individual's sympathy to animal life, as the corner stones to lead into improve their literary of protection regulations for wildlife conservation (Nurhaida et al, 2011) and the rest is to rise up their attitude to PRO.

Based on the background, it is needing to conduct research objected to: [1] determine the level of people’s knowledge about 24 protected EDS in Tahura WAR, [2] to design a model of PRO attitude to wildlife animal. People's attitudes towards EDS conservation, including through extension or other conservation campaigns. This model can also be applied in buffer zones for other conservation areas namely the 22 others tahura, and 54 national parks in Indonesia that are also undergoing similar problem of illegal poaching.

Research Method

This research took place from August to September 2020 at three villages adjacent to the Tahura WAR border, namely Villages of Sumber Agung, Batu Putu, and Berigin Raya of Kemiling District of the Capital City of Bandar Lampung that takes around 30 minutes from National Air Porth Radin Inten II (Figure 1). As for the research step is presented in Figure 2.

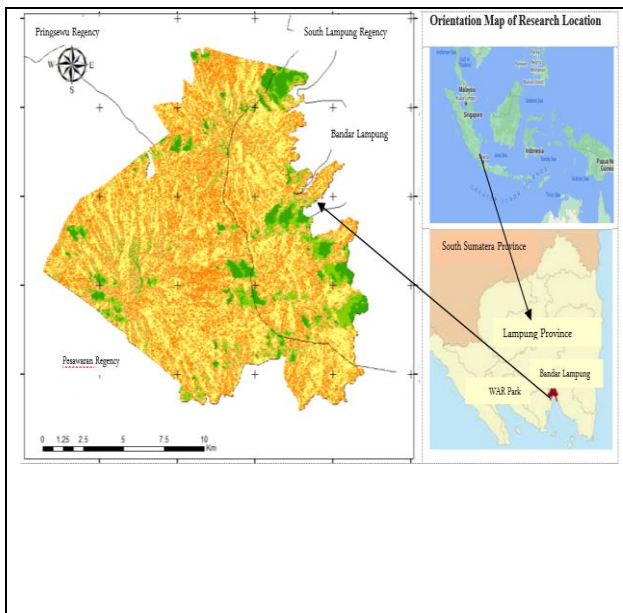


Figure 1. Research location

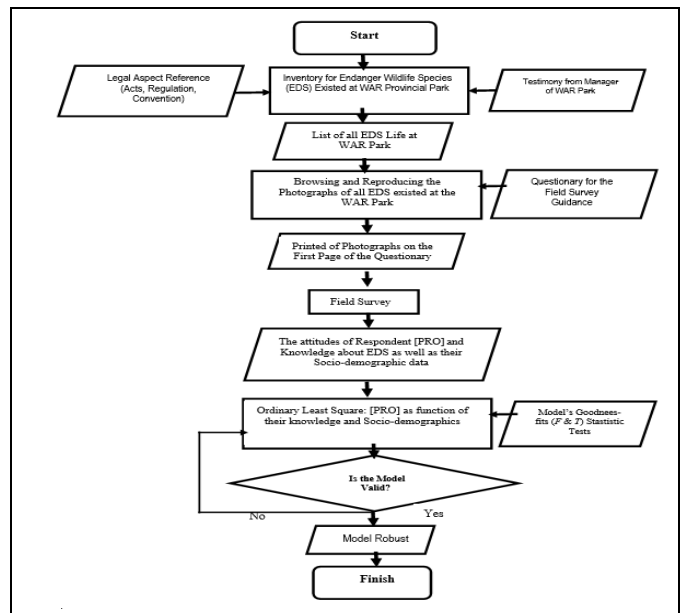


Figure 2. The research steps

In order to measure the response variable, each respondent was shown one by one photographs of 24 quarto-sized EDS, then asked: (1) do you know the name of this animal? and (2) Do you agree in case this more protected by law? The answer to the second question is a measure of a PRO attitude. Meanwhile, the number or proportion of EDS names correctly mentioned is the level knowledge of each respondent [KNOW] and treated as the predictor variable. As for the other 32 predictor variables, their symbols in model, as well as data scoring, are summarized in Table 1.

Table 1. Predictor variables, symbol in model, unit as well as data scoring

Predictor Variables	Symbol in Model	Unit or Data Scoring
I. Demographic Variables		
Respondent’s age	[AGE]	Year

Respondent's Status in Family (husband=0)		
Dummy Wife	[D ₁ _WIFE]	=1 if wife, =0 if other
Dummy spouse	[D ₁ _SPOUSE]	=1 if spouse, =0 if other
Number Dependence (Person)	[DEPEND]	number dependence
Education Level (never=0)		
Dummy elementary	[D ₂ _ELMNT]	=1 if Elementary, = 0 if other
Dummy junior high school	[D ₂ _JUNIOR]	=1 if Junior High Sch. ,= 0 if other
Dummy senior high school	[D ₂ _SENIOR]	=1 if Senior High Sch.,= 0 if other
Dummy university	[D ₂ _UNIV]	=1 if University, =0 if other
Livelihood (Odd jobber=0)		
Dummy labor	[D ₃ _LABOR]	=1 if labor, = 0 if other
Dummy peasant	[D ₃ _PEASNT]	=1 if peasant = 0 if other
Dummy merchant	[D ₃ _MERCT]	=1 if merchant, = 0 if other
Cultivation Pattern Applied (not specific=0)		
Dummy annual crop	[D ₄ _MNCLT]	=1 if seasonal crop, =0 if other
Dummy agroforestry	[D ₄ _AGFR]	=1 if agroforestry, =0 if other
II. Economic and Accessibility Variables		
Rice Field Acreage	[RICE]	ha
Up Land Acreage	[UP LAND]	ha
HP Ownership (has=1)	[HP]	1= if has HP, =0 if other
Distance to park's boundary	[FAR_THR]	minute by motorbike
Distance to market place	[FAR_MRT]	minute by motorbike
Distance to village office	[FAR_TVILG]	minute by motorbike
III. Ethnicity (Javanese=0)		
Dummy Sundanese	[D ₅ _SUNDA]	=1 if Sundanese, =0 if other
Dummy Lampungese	[D ₅ _LAMPG]	=1 if Lampungese, =0 if other
IV. Social Capital Performance		
Norm effectiveness [§]	[NORM]	=0, 1, 2 (low, medium, high)
Trust performance ^{§§}	[TRUST]	=0, 1, 2 (low, medium, high)
Network	[FRIEND]	number closed friends (people)
V. Social Gathering (never=0)		
Dummy Arisan Meeting	[D ₆ _ARSN]	=1 if participate, =0 if other
Dummy Neighborhood Meeting	[D ₆ _NBGH]	=1 if participate, =0 if other
Dummy Qur'an Recitation Event	[D ₆ _QUR]	=1 if participate, =0 if other
Dummy Multievent	[D ₆ _MULTI]	=1 if participate, =0 if other
VI. Participation in Extension (never=0)		
Dummy Agriculture Extension	[D ₇ _AGREXT]	=1 if participate in agriculture extension =0 if other
Dummy Miscellaneous Extension	[D ₇ _MISCEXT]	=1 if participation miscellaneous exten.= 0 if other

Note ^{§)} Measuring the Norm Performance variable so to every respondent asked to the question: “If there is a neighbor who misbehaved with you and then he is experiencing in disaster such as a house fire etc. What will you do for him? Please choose one”: (1) Let it be, or (2) Depend on the situation, or (3) It will definitely help him. The choice order corresponds to weak, medium, strong norms performance respectively (Please see Bakri et al, 2021).

^{§§)}To measure the trust performance variable, to the question: “If there is no choice, suppose you have to entrust your toddler to someone who is not a relative relationship?”: (1) Never, (2) Think twice, (3) Dare, it is OK no problem. The answer choices are in the order of trust performance: low, medium, high respectively (Please see Bakri et al, 2021).

Additionally in Table 1 also accompanied with symbols in the model, scoring, unit and method of acquisition in the field survey. As for the postulate model employed and hypothesis testing, some researchers generally use regression models to make predictions about an event in the future. Daskin and Pringle (2018), for example, use the multiple regression model postulate to explain the decline in wildlife populations as a result of war in African conservation areas from 1946 to 2010. Buya et al (2020) use a binary logistic regression model to determine land cover changes in Thailand. This research applied the ordinary least square regression model as the postulate. By using all the predictor variables as listed in Table 1, the hypothetical model can be expressed as in Equation {1}.

$$\begin{aligned}
 [\text{PRO}]_i = & \beta_0 + \beta_1 [\text{KNOW}]_i + \beta_2 [\text{AGE}]_i + \beta_3 [\text{D}_1\text{-WIFE}]_i + \beta_4 [\text{D}_1\text{-SPOUSE}]_i + \beta_5 [\text{DEPEND}]_i + \\
 & \beta_6 [\text{D}_2\text{-ELMNT}]_i + \beta_7 [\text{D}_2\text{-JUNIOR}]_i + \beta_8 [\text{D}_2\text{-SENIOR}]_i + \beta_9 [\text{D}_2\text{-UNIVST}]_i + \beta_{10} [\text{D}_3\text{-MERCHT}]_i + \\
 & \beta_{11} [\text{D}_3\text{-LABOR}]_i + \beta_{12} [\text{PESANT}]_i + \beta_{13} [\text{D}_4\text{-MNCLT}]_i + \beta_{14} [\text{D}_4\text{-MNCLT}]_i + \beta_{15} [\text{AGRF}]_i + \\
 & \beta_{16} [\text{D}_4\text{-RICE}]_i + \beta_{17} [\text{UPLAND}]_i + \beta_{18} [\text{HP}]_i + \beta_{19} [\text{FAR_MRT}]_i + \beta_{20} [\text{FAR_VILG}]_i + \beta_{21} [\text{FAR_THRA}]_i \\
 & \beta_{22} [\text{D}_5\text{-SUNDA}]_i + \beta_{23} [\text{D}_5\text{-LAMPG}]_i + \beta_{24} [\text{D}_5\text{-MIXED}]_i + \beta_{25} [\text{NORM}]_i + \beta_{26} [\text{TRUST}]_i + \beta_{27} [\text{NTWK}]_i \\
 & + \beta_{28} [\text{D}_6\text{-ARSN}]_i + \beta_{30} [\text{D}_6\text{-QUR}]_i + \beta_{31} [\text{D}_6\text{-MULTI}]_i + \beta_{32} [\text{D}_6\text{-AGREXT}]_i + \beta_{33} [\text{D}_6\text{-OTHEXT}]_i + \xi_i
 \end{aligned}$$

Equation Model I {1}

The working hypothesis can be expressed as follows:

H₀: There would be none variable that specified in the model that significantly affect the probability to PRO ($\beta_1 = \beta_2 = \beta_3 = \dots = \beta_{33} = 0$).

H₁: There would be at least one variable that specified in the model the model that affect the probability to PRO ($\beta_1 \neq \beta_2 \neq \beta_3 \neq \dots \neq \beta_{33} \neq 0$).

The optimization of model parameters was carried out by using Minitab 16 software. Hypothesis and Goodness fit test for models were employed the Fisher statistical test and whereas the significancy each parameter using T Student test at 90 and 95% confidence levels.

Results and Discussion

In order to describe general information contain in the data collected, firstly we need to depict the statistic descriptive of the respondents. This kind of statistic is important to encircle the inferential statistic of research result as the OLS model achieved from this research.

Respondent's Description

Among the 75 respondents data there were 10 data considered as outliers. This clue is revealed as doing optimization to obtain the optimized model parameters. However very firstly it is necessary to observe the descriptive data pattern (Table 2 or else Figure 3) before discussing parameter model obtained (Table 4).

As depicted in Table 2 or else in Figure 3, the status of respondents in their family are husband (69.2%), the couple (21.5%) and the rest are wives (9.2%). The oldest one is 70 years and the youngest 22 years (mean 45, SE= 11.5) years. Most respondents' livelihood are peasant (33.8%) followed by permanent workers (30.8%), odd jobs (15.4%), merchant (9.2%) and the remaining 9.2% are workers in the industrial or service sector (such as workshops, carpentry, private companies) and the service sector such as teachers, private employees, teachers, and civil servants. Most of the respondents' education was elementary school (47.7%) followed by senior high school (20.0%) then junior high school (16.9%), never schooling (9.2%) and the rest by university graduates (4.6%).

Tabel 2. The descriptive statistic of respondents

No.	Variable	Unit	Maximum	Minimum	Average	Standart Error
1.	Pro-conservation Attitude (PRO)	%	100.0	0.0	49.2	7.1
2.	Knowledge about EDS		100.0	0.0	33.4	27.1
3.	Age	year	70.0	22.0	45.0	11.5
4.	Rice Field Ownership	ha	6.5	0.0	0.1	0.8
5.	Up Land Ownership		2.0	0.0	0.4	0.2
6.	Income per capita/day	USD	4.53	0.23	0.82	0.06
7.	Distance to Park's Boundary	minutes	60.0	1.0	21.0	20.1
8.	Distance to Village Centre	on foot	45.0	1.0	11.1	10.2
9.	Distance to Market Place		60.0	1.0	21.5	15.6

Source: Research result (2020).

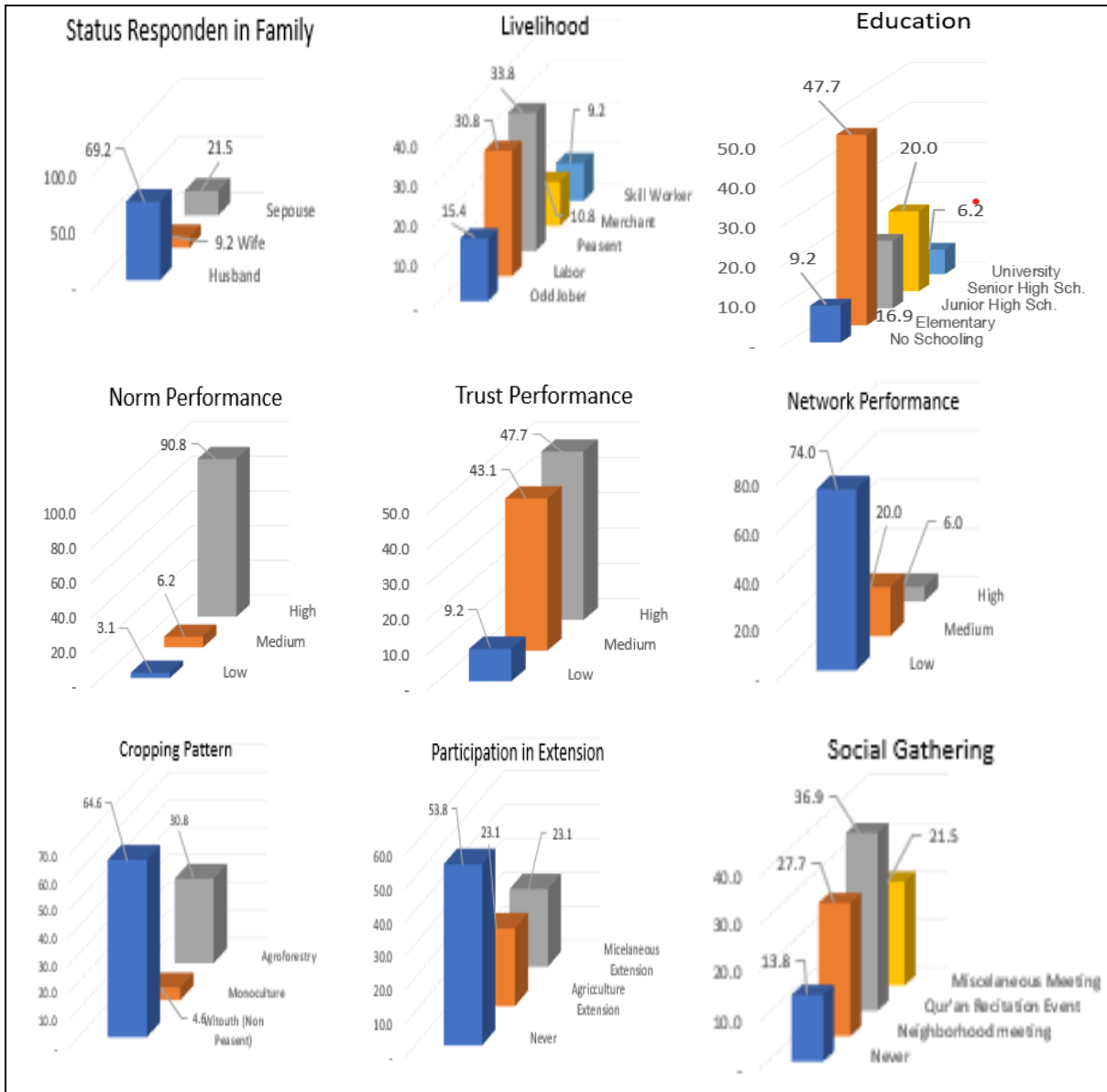


Figure 3. The descriptive statistic of respondent (Source: Research result)

In line with the majority education level, their knowledge upon the protected wildlife is quite low, namely an average of 33.4% (SE = 27.1%) of the total 24 EDS studied. The average of their PRO attitude (PRO) is 49.2% (SE=7.1%). Based on both the SE, it is hopefully to rise up their PRO attitude through extension program or campaigns on the wild life (EDS). The positive attitude towards PRO program is an important asset to endeavor the conservation of the 24 EDS. In this regard, extension program or campaigns on the wild life is a strategic program that needs to be continuously promoted at whole buffer zone encircled by the suburban areas. As can be examined in Figure 3, the level of community participation in agricultural extension and other kinds extension (carpentry, family planning, workshop, carpentry etc.) is around 46.2%, while the remaining 53.8% has never been involved in extension yet. The group should be the first main target in order to increase their attitude of PRO effectively. This optimism is supported by highly interest in community participation voluntarily such as in the neighborhood meeting (Indonesia called rukun warga),

Qur'an recitation event as well as the arisan meeting. The last mention is a kind gathering periodically (weekly or monthly) to collect the same amount of money then draws a lottery to decide whose the right take the collected money first, second, third and so on until all member have the turn on taking the same amount of money. As depicted in Table 2, the respondent participation in neighborhood or meeting of around 27.7%, the Qur'an recitation 36.9%, those who take part in both 21.5% and only did 13.8% who never involved in any kind of social gathering.

Although various types of extension activities are very important programs to increase positive attitudes, but the most important one is the gathering is motivated from themselves. Developing attitude toward PRO is believed will become more effective if conducted under voluntary. So the the neighborhood, arisan, and Qur'an recitation events can be expected to be best media to educate or campaign on PRO beside the extension program its self. The types of variables that are relevant to this participation in this study also examine the cropping patterns applied by the community. A strong relevance is the need for efforts to increase the attitude of PRO towards EDS. According to Nurhaida et al (2011) and Nyhus at al. (2008) that the conservation of wildlife in the buffer zone will be greatly supported by the cropping pattern applied in the buffer zone. The biodiversity performance at buffer zone that applied with agroforestry will be higher than that of monoculture cropping pattern, this performance correspond to lower in human-elephant conflict.

Even though the villages surrounding Tahura WAR are in the sub-urban area of the Capital City of Bandar Lampung, but there are enough house hold who applied agroforestry pattern namely 30.8%, followed by 64.6% sub urban land utilization, and the rest of 4,6% whose apply seasonal cropping patterns such as corn, cassava, and low land rice. The high performance of land utilization's biodiversity from the agroforestry cropping pattern in the buffer zone serves as a barrier for biodiversity gap between the inside versus outside areas or buffer zone of Tahura. The low gab in biodiversity certainly will support for wildlife conservation efforts. In this context, the implementation of extension, therefore, needs to take advantage. If the extension activities conducted by utilizing comfortable nuance such as neighborhood meeting, Qur'an recitation event, and arisan meeting, the people readiness to accept ideas of EDS conservation enhancement will be supported. A quite large the proportion land without any cropping pattern (64.6%) belong to community group who owe very narrow land for rice field or else as off farm workers sector namely laborers and odd jobber. As depicted in Table 2, the average of land utilization types of rice, up land, and namely 0.1 ha on average (SE = 0.8 ha). Meanwhile, the control of up land is also relatively narrow, namely on average 0.4 (SE = 0.2) ha. This finding is an irony where the main livelihood of the community has not been able to shift to the industrial or service sectors under the pressure of narrow land ownership. The odd jobbers (Figure 3) becomes a valve for workers to accommodate the hidden unemployment.

As can be examined in Table 2, the average daily income was around USD 0.82 (SE=0.06) per capita. Although this average income is equals to the provincial minimum wages, but the SE is very large that connotes a severe disparity among the households. The disparity income among the community at the buffer zone may stimulate forest encroachment, and moreover driving by the price attractiveness of some wildlife enlisted CITES that belong to the Tahura WAR. The duty of income disparity eradication is not only the obligation Tahura WAR manager, but rather than to intersection of central authority of Indonesia that supported by local governments.

The ethnicity variable commonly influence on the behavior or individual attitudes, which are developed by day by day as the values accumulation process under the surrounding biophysical condition and social environment. Table 2 shows that in the buffer zone of the Tahura WAR dwell dominantly Sundanese ethnic (44.6%), followed by Javanese (33.8%), Lampungese (16.9%) and the other is mixed tribe (4.6%) include Padangese, Palembangese and Bugise. The social interactions among these compound tribes have accumulated huge social capital. The three elements of social capital for norm, trust, network in which the proportion of high category are 90.7%, 47.7%, and 6.2% respectively (Figure 3). According to Bakri et al (2021) social capital actually is a production factor in every economic system which is also valuable resource endowment in community that developed day by day under social interaction process. At very first time, when anyone believed there is any general rule (norm) as the moral reference in a community, everyone else will dare to ignore the risk (to plant trust) to build any relationship with other party who has no reference to his reputation for honesty. If the relationship is going well for the first time and neither party better off, even productive, it means that the network begins to form. In this process the trust element is also starting to be tested. With the strengthening of the trust, efforts to develop further relationships with various parties, the network will also increase again and become more intensively in the social or economic motives relation. With such a process, the norm elements are also being maintained stronger and stronger. And so on, the process of strengthening social capital takes place. But on the other hand, if one party makes distrust such as lies, rent seeking, free riding, parasitism or betrayal to others, social capital will be ruined and collapse drastically and very will be difficult to be amended. The role of the social performance on the PRO will be examined vividly using model regression analysis result.

The Roles of Sociodemographic variables on PRO Idea

For the sake of claiming the roles sociodemographic variables on [PRO] validly, we firstly have to examine the goodness-fits of the model and then followed the optimized parameters model achieved from inferential statistic tests employed, as elucidated in the following.

The Goodness-fits of Model Resulted

As mention before the F(isher) Statistic employed for testing the goodness-fits of sought model at significant level more than 90%. The result is depicted in Table 3.

Table 3. The goodness-fits of predictor model for PRO predictor

Source	Degree of Freedom	Sum Square	Mean Sum Square	F Statistic	P
Regression	34	36585.1	1076.0	3.08	0.001
Residual Error	30	10466,7	348,9		
Total	64	47051,8			
R-Sq = 85.14%		R-Sq(adj) = 68.16%			

Based on the its P number (=0.001) depicted in Table 2 we can claim that the model achieved is valid and robust. In other word that the model is good and fits as the tool for predicting PRO based on the 33

sociodemographic variables (as listed in Table 1). The $P=0.001$ also tell us that the model provides a highly guaranties as good predictor based on those 33 variables as whole. There will only be one person's attitude that will be miss predicted if the model applied for 1,000 people live the buffer zone of Tahura WAR. The model robustness provides a confidence level at more than 90.00% even more than 99.98%. For the sake of showing to which ones of the individual variable among those 33 that plays role significantly in determining the [PRO], we need to examine the result of optimizing model parameters (β_1 to β_{33}). This step is also known as drawing conclusions on hypothesis testing at once.

Hypothesis Testing Results

Table 4 provides the optimized model parameters from 33 socio-demographics as predictors to determine PRO. We are starting discussion with the first group of variables to the fourth respectively.

Knowledge and Demographic Variables

Among the variables in this group whose hypotheses are accepted (reject H_0) namely the level of knowledge about EDS, dummy respondent status in family, monthly family income, number of dependence, occupation, and cropping pattern applied. On the other hand, the hypotheses on age and education level variables are rejected (accepted H_0).

The level of knowledge, about an object, idea, or entity commonly affects person's response to a stimulus as found in this study. The attitude towards an idea of wildlife conservation strengthening, (PRO), can increase very significantly ($P=0.018$) by 0.42% for every one percent enhancement in knowledge about the names EDS animals existed at Tahura WAR. In line with this finding, Angwenyi et al (2021) reported that households' knowledge about the role of reserves has contribute positive attitude wildlife in nature conservation. As an information provider in an intellectual processing to respond every stimulus the knowledge will play an important role in deeming something about the dichotomous values about good against bad, benefits against loss, fun against up sad, pleasure against pain, in short positive against negative. According to Castillo-Huitron et al (2020) large predators such as bears, wolves, coyotes, and reptiles, such as geckos and snakes, promote mainly anger, fear, and disgust.

Those emotions connote that the perceptions, believe, and experience that communities have evolved and built historically surround them. However, in some social groups, however, those animals have promoted communities' emotions such as the happiness due to their values for people. Likewise sadness is an emotion reflected in the threatening situation of that is currently facing. We, furthermore, need to relate the conservation status of the wildlife species identified in this study to emotional situations to understand their emerging conservation relevance for emerging conservation strategies, particularly focused on endangered species promoting ambiguous emotions in different social groups. Therefore, we propose to highlight the ecological role of dangerous or disgusting species as a potential way to mitigate negative emotions toward them. Those emotion indeed will ultimately control attitude including toward the idea of EDS conservation strengthening.

In case an EDS is responded to be pro to conservation, it indicates that the animal has induced imagination as something can bring something pleasure for a respondent. Such an imagination may arise from positive experience with the animals through directly interaction. Besides, the good or bad experience also can also be achieved through indirectly interacting with the animals such as from public

communication, or via printed media as well electronic media. Both sources of experience are accumulated as knowledge that can drive decision to pro when the knowledge bring some positive values in respondent’s mind. This mechanism can be proposed as an explanation about the role of knowledge in enhancing the level of PRO as founded in this research. In line with this argument, Woinarski at al (2017) proved that adequate of knowledge and knowledgeable community were the main resource in decision making to rescue and voiding EDS extinctions as in Australia. We, therefore, proposed for policy maker to enhance the PRO of the people dwells in the 33 villages encircle the Tahura WAR’s buffer zone particularly through extension activities as discuss below.

Variable respondent’s age did not any effect on the idea to strengthen conservation (PRO). It is important to note that this finding must be limited in the range 22-70 year of age, as for beyond of this range be investigated in further research. This finding is different from those reported by Prokop and Fancovicov (2013), that the age range of 10 - 20 years is the most preferred age group for bird species with colorful feathers. This affection on the various bird species, therefore, is then used as the basis for planning conservation programs. In the contrary to the age, the variables of respondents’ status in family has affected very significantly on PRO. In line this finding it is interesting in having research result of gender bias phenomenon, as reflected in Table 4 of variable D₁-WIFE. The PRO, will be reduced significantly by 20.72% (P=0.001) if the respondent is the wife than that of husband. This gender bias also augmented by the spouse respondents (D₁_SPOUSE), there is no significant difference (P=0.698) compare to the husband’s respond. It also tells us that wife’s role will be lost in decision making when accompanied by their husband in replying the question about PRO. This finding is in line Hariohay et al (2018) report that there is gender bias on the conservation attitude, men commonly have more positive emotion to the worst performance of wildlife animal the women. Moreover to Prokop et al., (2016) proved that women emotion commonly afraid, fear, and disgust to some the wildlife animals that attributed have a fierce and savage character of the animals. According to Castillo-Huitron et al (2020) in line with the female gender’s role argued that since the early of human evolutionary history, the men have developed skills naturally for both hunting, protecting and escaping from predators. Our research finding, therefore, imply that the extension activities about wildlife conservation should be separate women from men.

Table 4. Parameter model for the 33 predictor variables for determining PRO attitude

Groups of Variable and Variable Predictors	Symbol in Model	Coefficient =β _n	Std. Error Coefficien t	T	P-value
Constant		27.9910=β ₀	39.6020	0.70700	0.4585
I. Knowledge and Demographic					
Knowledge about EDS	[KNOW]	0.4236=β ₁	0.1699	2.49276	0.018
Respondent Age	[AGE]	0.1422=β ₂	0.3265	0.43560	0.666
Status in Family (Husband=0)					
Dummy Wife	[D ₁ _WIFE]	-	5.5269	-	0.001
		20.7190=β ₃		3.74875	
Dummy Spouse	[D ₁ _SPOUSE]	-1.8044=β ₄	4.6101	-	0.698
				0.39140	

Number Dependence (Person)	[DEPEND]	-3.0097= β_5	1.7210	-	0.090
				1.61422	
Income (USD/day/capita)	[INCM]	11.9184= β_6	8.9046	1.33847	0.190
Education Level (never schooling=0)					
Dummy Elementary School	[D ₂ _ELMNT]	3.1357= β_7	5.0746	0.61792	0.541
Dummy Junior High School	[D ₂ _JUNIOR]	-0.8335= β_8	6.7807	-	0.903
				0.12292	
Dummy Senior High School	[D ₂ _SENIOR]	3.9372= β_9	7.2413	0.54372	0.591
Dummy University	[D ₂ _UNIVST]	-2.8554= β_{10}	9.8793	-	0.774
				0.39037	
Occupation (Un employment=0)					
Dummy Merchant	[D ₃ _MERCH]	-	8.9986	-	0.050
		18.3562= β_1		2.03989	
		1			
Dummy Labor	[D ₃ _LABOR]	-3.9527= β_{12}	10.12565	0.00708	0.699
Dummy Peasant	[D ₃ _PEASNT]	0.0727= β_{13}	10.12565	0.00771	0.994
Pattern of Cultivation (not specific=0)					
Dummy Annual Crop	[D ₄ _MNCLT]	-	7.4902	-	0.117
		12.0909= β_1		1.61422	
		4			
Dummy Agroforestry	[D ₄ _AGRF]	-	5.1408	-	0.032
		11.5726= β_1		2.25113	
		5			
II. Physical Asset and Accessibility					
Rice Field Acreage (ha)	[RICE]	-7.4812= β_{16}	6.3220	-	0.246
				1.18336	
Upland Acreage (ha)	[UP LAND]	3.1681= β_{17}	8.2247	0.38519	0.703
HP Ownership (has=1)	[HP]	6.5481= β_{18}	7.4971	0.87342	0.389
Distance to Local Market (minutes on foot)	[FAR_MRT]	-1.2575= β_{19}	0.2980	-	0.000
				4.22037	
Distance to Village Office (minutes on foot)	[FAR_VILG]	0.5539= β_{20}	0.4970	1.11434	0.274
Distance to Tahura Boundary (min. on foot)	[FAR_THR]	-0.3416= β_{21}	0.1811	-	0.069
				1.88557	
III Ethnicity and Social Capital					
.					
Ethnicity (Javanese=0)					
Dummy Sundanese	[D ₅ _SUNDA]	-	5.0461	-	0.036
		11.0615= β_2		2.19210	
		2			
Dummy Lampungese	[D ₅ _LAMPG]	-2.5221= β_{23}	6.2279	-	0.688
				0.40479	
Dummy Other Tribes	[D ₅ _MIXED]	-9.7992= β_{24}	10.1066	-	0.340

					0.96958	
Social Capital Performance						
Norm (0=low, 1=mid, 2=high)	[NORM]	10.2628= β_2	5.9887	1.71422	0.089	
Trust (0=low, 1=mid, 2=high)	[TRUST]	8.6553= β_{26}	10.5488	0.82050	0.419	
Network (0=low, 1=mid, 2=high)	[NTWK]	-2.1760= β_{27}	1.8717	0.87342	0.389	
IV Gathering and Access to Information						
.						
Gathering (never =0)						
Dummy Arisan Meeting	[D ₆ _ARSN]	26.5537= β_2	8.6815	3.05865	0.005	
Dummy Neighborhood Meeting	[D ₆ _NBHN]	9.5379= β_{29}	6.9960	1.36334	0.183	
Dummy Qur'an Recitation Event	[D ₆ _QUR]	0.3924= β_{30}	7.4531	0.05265	0.958	
Dummy Multievent Meeting	[D ₆ _MULTI]	-5.3156= β_{31}	7.1805	-	0.465	
				0.74027		
Extension Enrolment (never=0)						
Dummy Agriculture Extension	[D ₇ _AGREXT]	8.3917= β_{32}	4.6673	1.79799	0.082	
Dummy Miscellaneous Extension	[D ₇ _MSCEXT]	16.8941= β_3	4.4299	3.81367	0.001	
3						
S = 14.8726		R-Sq = 85.14%		R-Sq(adj) = 68.16%		

Note: Bold numbers are significant at confident level of 90 or 95%

The number of dependency (D₁_DEPEND) is also will reduce significantly (P=0.09) the attitude toward strengthening conservation idea. The level [PRO] reduce by 3.01% for every one dependance addition of every family. The burden of responsibility for each family increases with the addition number of children. In term of culture, particularly in Asian culture, children are considered as the most valuable property. Parents will be more willing to sacrifice property other than children when in a trade off situation to have to choose. Meanwhile, some EDS can be a source of income (livelihood) including for direct consumption or by trading EDS or parts of EDS members. Saho et al (2020) reported that the perpetrators of EDS in China to fulfill their child's nutrition on a subsistence basis. This behavior can be ascertained also occurs in various regions in Indonesia, including in Tahura WAR. This fact can support the reason why [PRO] attitude will decreases with increasing number of dependents an sich.

In line with the role of (DEPNP), the variable income (daily per capita) shows an interesting finding. As indicated by P=0.190, the daily income per capital, (INCM), did not affect significantly on PRO. But it is important to note that this marginal enhancement is only working in between the range of USD 0.23 and 4.53 or an average of USD (0.82 ± 0.06) per capital/day as depicted in Table 2. This INCM level is very low, far below the poverty line criteria of minimum of USD 1.90 per capital/day (World Bank, 2020). They are actually under severe poverty. Under this pressure on making life, everyone will always concern with daily livelihood, tend to ignore all matters that not directly to fulfill the subsistence needs. And so does for the matter of EDS conservation which is far beyond their imagination about the urgency for their offspring. The inceracement around one dollar for per day, therefore, will not affect on PRO significantly.

Education Level

The variable of levels education surprisingly did not affect attitudes significantly on the PRO. The education level of colleges, secondary schools, and elementary schools did not make difference to those who never schooling. This finding connote that in general education has not succeeded in awakening public sympathy for the EDS right to life as well as the rights of humans and other creatures to perpetuate the sustainability of their lives. Moreover, education also seems to have not succeeded in building public inquiries to know that the sustainability of EDS is also the ecological sustainability of mankind. The implication of this finding is that education planners need to further strengthen local content which is relevant to the local problems, particularly for primary and secondary schools. If the sympathy for EDS has been instilled in children of these school's age, it is believed that strong moral responsibility will be embedded in children's minds earlier (Nurhaida et al, 2011). This way will be carried over to adulthood period even though their education at university has nothing to do with ecological preservation or EDS conservation. In addition, in the short term, particularly for adult community, the enhancement in understanding of the importance of EDS conservation for human ecological sustainability also needs to be extended through enhancing extension activities as discussed below.

The Livelihood Variable

Among the kind of occupation variables, only did the merchants, [D₃_MERCT], showed the lowest on PRO than that of odd jobbers whereas the peasants or laborers were not. Perhaps the D₃_MERCT very rarely involve in wild life affairs or else they regard that some wild life was potential commodity that could generate income as a commodity. Based on the assumption it could be understood if their attitude TO pro was 18.36% below the odd jobbers (Table 4). In line with this finding Lescureux and Linnel, (2010) agree that rural communities where people frequently interact more with wildlife, knowledge of the behavior of culturally relevant species is better developed than in other areas especially urban areas. This facilitates the anthropomorphism of certain animals calling them shy, dangerous, and terrible, among other adjectives, which intensifies fear and rejection of them. Furthermore, if the presence of animals implies economic loss to the inhabitants of a community, their dominant perception will be negative and will generate anger that may end up in lethal management.

Cultivation Applied

The role of cultivation pattern applied by farmers reflect a negative effect on PRO idea. For those do not cultivate actually have a more PRO attitude. Whereas those who cultivate seasonal crops (D₄_MNCLT) were lower in PRO by 12, 09% at the confident level (P=0.117). Even those who apply the agro forestry cropping pattern D₄_AGRF actually give negative significant effect attitude (P= 0.032) which is around 11.57% compared to those who apply seasonal cropping patterns D₄_MNCLT. This finding is still difficult to understand. Respondents who do not cultivate agriculture are synonymous with urban communities, their lives are relatively far from having dealt with wildlife affairs and less direct experience with the wildlife. So that they generally feel less phobic against wildlife, unlike the farmers, especially those who cultivate at Tahura WAR buffer zone. In addition, the attitude of urban communities can be more positive towards wildlife, perhaps because they are more exposure much information about the role of EDS in ecosystem, so that the understanding of environmental sustainability is generally more embedded in their inner mind. In

line with this finding, Castillo-Huitron (2020) argue that in some cases, emotions produce attitudes against conservation of unpopular species. This finding is similar with the report by Nurhaida et al (2011), Therefore, it is normal if we propose to highlight the ecological role of dangerous (predatory, toxic, damaging property including plants, etc.) or arousing on feeling of disgusting as a potential way to reduce negative emotions towards them. Various animals belonging to this category need to be prioritized in efforts to protection for the prevention of their extinction campaign dan extension conservation activities. These findings can be used as an input for the Tahura WAR authorities as well as for extension workers in designing the enhancement program for PRO for communities at Tahura WAR buffer zone.

Physical Assets and Accessibility Variables

From this group of variables that affect significantly the attitude of conservation (accepted H_1) are the distance from the house to the boundary of Tahura WAR and the sub-district market. We, therefore, have to accept the H_1 and reject H_0 at once. But we have to, the variable dry land and paddy field acreages as well as the HP ownership. The variables of the accessibility of the place or domicile of the respondent were also tested for affecting the attitude of strengthening conservation idea (PRO). This type of variable includes three, namely the distance from the house to the Tahura boundary (FAR_THR), to local market, (FAR_MRT) and the distance to the village center FAR_VILG). Only did the first distance variable has a significant negative effect on PRO, which has the parameter $\beta_{19}=-0.34$. This means that if the distance between the respondent's house and the Tahura boundary increases by 1 minute on foot, the [PRO] will decrease by 0.34%. As depicted in Table 4, this decreasing is a significant effect to the PRO as expressed by $P=0.069$ ($<10\%$). These findings indicate that the farther from the Tahura boundary, the lesser caring of respondents to the paramount of wildlife conservation.

Ethnicity and Social Capital Variables

The ethnicity variable affect significantly on (PRO). We, therefore, accept H_1 and reject H_0 at once. On the other hand, only did the norm element of the social capital that has effect on PRO (accepted H_1 and reject H_0 at once). When compared to Javanese ethnicity, the attitude of the Sundanese Ethnic (D_1_SUND) is lower towards the idea of protecting EDS (-11.06%). In other word, the Sundanese is the most inferior among all ethnic group dwell at the buffer zone of the Tahura WAR. This finding is interesting particularly for associated with the Sundanese Ethnic. According to Wulandari et al (2021) Sundanese are the offspring of migrants from West Java through the National Reconstruction Bureau to fill labor demand for cash crop plantation companies along with the nationalization process of various foreign companies in the period 1960 to 1965. Meanwhile the Javanese had been come prior much more before Sundanese, namely the from migrants descendant who moved under the Dutch colonization started at 1905.

The long time difference between the two ethnic groups to adapt from their original land that more urbanized environment in Java Island with lower intensity and frequency of encounters with wild animals to more natural forest ecological area in Lampung or whole Sumatra Island. This has made Ethnic Javanese's offspring are more adaptive in the Tahura WAR buffer zone. The longer adaptation period has made Javanese as if the native tribe dwell in Sumatera Island such as Padangese, Palembangese, and Semendonese that we mention as other tribes or (D_5_MIXED). This claim also supported by the T test result that proved no significantly difference in [PRO] between Javanese (as the reference) and D_5_MIXED with $P=$

0.340 (Table 4). In this regard the Javanese is the same with (D₅_MIXED) as if have become native behavior already. Additionally, Javanese commonly regard EDS as creature created by God that has the same right to life in nature as other creatures as human does. This sympathy confession enable Javanese are more PRO to EDS and more acceptable toward EDS than Sundanese. This finding confirms research's Nurhaida et al (2011) conducted at buffer zone of Way Kambas National Park, about 200 km from Bandar Lampung City, that Javanese offspring's sympathy towards EDS is higher than Sundanese besides Balinese.

The variables that parallel with the ethnicity is social capital. The accumulation of social capital in every community is very important for developing collective action, particularly for preventing moral hazards, such as the extinction of wildlife by increasing PRO attitude (PRO). According to Claridge (2020) almost 70% cited definition about social capital are the definition provided by Robert Putnam, Pierre Bourdieu, Nan Lin, Janine Nahapiet and Sumantra Ghoshal, and to a lesser extent James Coleman. Almost 70% of definitions used came from publications by these authors. Essentially, social capital is the features of social life such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit (Putnam, 1997) both for individual benefit and collective benefits at once (Rustiadi and Nasution, 2017). Fortunately the norm element in this study significantly affects significantly PRO idea. This effect is in line with the highly performance of norm itself that categorized in high effective (Table 4) in controlling individual behavior at the community of buffer zone of the Tahura WAR. The policy makers must continue to strengthen the performance of social capital in the areas particularly to enhance the trust and the network performance.

Social Gathering and Access to Information

As described in Table 4, the group of variables that received H₁ on PRO included social gathering meetings, agricultural extension, and other extensions. In contrast, neighborhood meetings (citizen meetings), Qur'an recitation events or the involvement of multilevel meetings did not significantly affect the attitude of strengthening EDS conservation (PRO).

At first glance, it is somewhat difficult to understand why respondents who participated in more than one type of participation in extension or miscellaneous extension (D₇_MISCEXT) did not have a significant difference from those who had never involved. Perhaps individual who involve in the two types of group participation have been found difficulty in digest varies information so could not get mutual reinforcement. The more various information that gets into a person's heartstrings, it may cause confusion. This symptom could very possibly occur when considering the relatively low education of the respondents. As can be referred to in Table 4, the average education of respondents is dominated by primary school education below 56.9%. In connection with this low education level, the extension, the extension program is the most strategic medium for promoting PRO.

As can be examined in Table 4, the variable of extension on agriculture and forestry (D₇_EXTAGR) in enhancing the attitude of PRO (PRO) was very positive, compared to who never attended the extension activity. This difference reached 8.39% with P=0.082 compared to those who never one. Even for those who attended more than one extension activities D₇_MISCEXT, the effect was even higher, namely 16.90% with P=0.001. These findings prove the importance of extension programs, both extension related to agriculture, forestry and other extension services in order to improve the PRO for wildlife conservation.

Culture is as a result of human creativity which has been accumulated into persistent behavior that controlled by collective rule in a social system as in an ethnic group. In this study, there were founded eight

ethnic groups, namely Javanese, Sundanese, and Lampungese, Padangese, Palembang, Batak, and Bugis. To compare their role on conservation attitude, Javanese was used as a reference. As can be examined in Table 4, that Javanese was more PRO, significantly higher than Sundanese (D_{5_SND}) of around 11.06%. Meanwhile, [D_{5_SND}] against Lampungese (D_{5_LPG}) or the mix (D_{5_MIXED}) were not significantly different.

Utilizing Model for Targeting PRO Improvement

The Mathematical equation model can be formulated by replacing the coefficients β_0 to β_{33} in Equation {1} with the coefficients successively that have been written in Table 4. This model is very useful for predicting household group who have pioneer characters in adopting new ideas, including the idea of tightening EDS conservation (PRO). According to Rogers (2003); Nurhaida et al (2018), Gonera et al (2021), and Menon et al (2021), there are only a few members of the population of this pioneer group in each community (below 2.5%). But their influence is very essential, can be a reference for other groups. If the attitude of the pioneers towards an idea has increased, there will induce adoption power into less characteristic of pioneering namely, the early adopter (13.5%), the early majority (34.0%), the late majority (34.0%) respectively and left behind the laggard (15.9%).

As presented in Table 4, there are 12 variables with their parameters that can significantly affect PRO. This finding is very useful for predicting other households outside the study sample, even outside the research area. If the probability of this household group is predicted for PRO using Equation {1} (which has been replaced the parameters of β_0 to β_{33} with their respective coefficients), then the group of households that meet these 12 characteristics is a pioneer household group, which means that they have highest rating for PRO. Meanwhile, other household groups that only fulfill 11, 10, 9, 8,7,6,5,4,3, 2, and 1 characteristics are the next ranking order. To be effective, the priority order of extension activities needs to correspond to this ranking. Groups that do not meet all of these 12 characteristics are laggard groups. This group needs to be avoided because it can erode groups with greater probability on PRO.

Conclusion

From the results of this study, two main conclusions can be made, namely that: [1] The respondent's pro-conservation attitude (PRO) is (a) significantly positively influenced by: their knowledge about wildlife animals, their participation in arisan meeting, their participation in agricultural extension or extension events including family planning extension, carpentry, the dangers of drugs abuse, etc.); (b) significantly negative by the sex where women are lower than men, their occupation, where traders are lower than laborers and farmers, the number of dependents, the cropping pattern applied which applies agroforestry rather than mono-cultures or does not plant. We suggest that: [1] conduct research on the attitude of pro-conservation towards EDS in with human emotion, [2] conduct for assessing the PRO enhancement based on the level of probability to accept to PRO idea.

Disclaimer We are not in a conflict of interest with this research result.

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