
An Empirical Analysis of the Environmental Impact of Wildlife Conflict on Farmers' Psychological Trauma – A Case of Yunnan Baimaxueshan National Nature Reserve

Pan Tan ¹, Jiangdi Bai ¹, Wenhui Chen ¹, Junchang Liu ^{1*}

¹ School of Economic and Management, Beijing Forestry University, Beijing 100083, CHINA

* Corresponding author: innerpeace2017@163.com

Abstract

Human-wildlife conflict (HWC) has far reaching environmental impacts. Along with the increasing wildlife populations, the frequency and range of wildlife-human conflict increases, which brings the farmers psychological trauma. Thus, psychological trauma has become an important problem of building the harmonious relationship between human and wildlife. In this article, we try to find the key factors and its influence degree in order to give some proposal to wildlife departments. Based on the survey questionnaire of 230 farmer households in dimension of two counties, 13 villages of Baima Snow Mountain National Nature Reserve. On the basis of theoretical analysis, 12 variables were selected from stressor factors, group factors, mediator factors, the Logistic regression model was used to analyze the impact of wildlife conflict on farmers' psychological trauma. The results showed that variables of the wildlife conflict type, losses of production and life, social economic losses from stressor factors, compensation type from mediator factors, age, family income ratio from group factors have significant effects on farmers' psychological; However, the variables of economic loss degree, gender, education, health, family population and location have no significant effects on their psychological trauma. According to the result of research, some policy suggestions were put forward.

Keywords: wildlife, human-wildlife conflict, psychological trauma, psychological impact, Baima Snow Mountain National Nature Reserve, environmental impact

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INTRODUCTION

Harmonious coexistence between human and wildlife is an important part of ecological civilization construction. With the strict enforcement of wildlife protection law, the number of wildlife population is increasing. At the same time, the sustained expansion of human economic activities makes the relationship between wildlife and human more competitive in living space and food sources, and the conflict between human and wildlife is becoming more and more serious. Human-Wildlife conflicts will cause agricultural crops damage, poultry and livestock arrest, and even threaten personal safety. From the anthropocentric point of view, we can define wildlife conflict as wildlife accident (or wildlife damage), wildlife conflict will not only threaten people's physical life, but also damage people's psychological trauma seriously. Traumatic psychology can make people disgusted and exclusive to wildlife. It may eventually lead to the attitude of suspicion and hostility to wildlife conservation policy (Redpath et al. 2004). On the other hand, wildlife is mainly distributed

in remote areas with small population and relatively backward economy. The frequent occurrence of wildlife conflicts aggravates the fragile livelihood of the local residents, and the lack of livelihood security will further aggravate their psychological trauma undoubtedly, it eventually leads to the local residents' fear and hostility towards wildlife and appears the phenomenon of opposition to wildlife protection. Studies have shown that the effectiveness of wildlife conservation is closely related to the support of local communities (Haro et al. 2005). Therefore, in order to promote the progress of wildlife protection, it is necessary to study the impact of wildlife conflicts on the psychological trauma of local residents, analyze the main factors of their psychological trauma, and find out the ways to alleviate their psychological trauma. The paper's aim is to find measures to change the hostile attitude of the victim peasant households towards wildlife, improve their support for wildlife protection, and provide some ideas for the harmonious relationship between human and wildlife in the future.

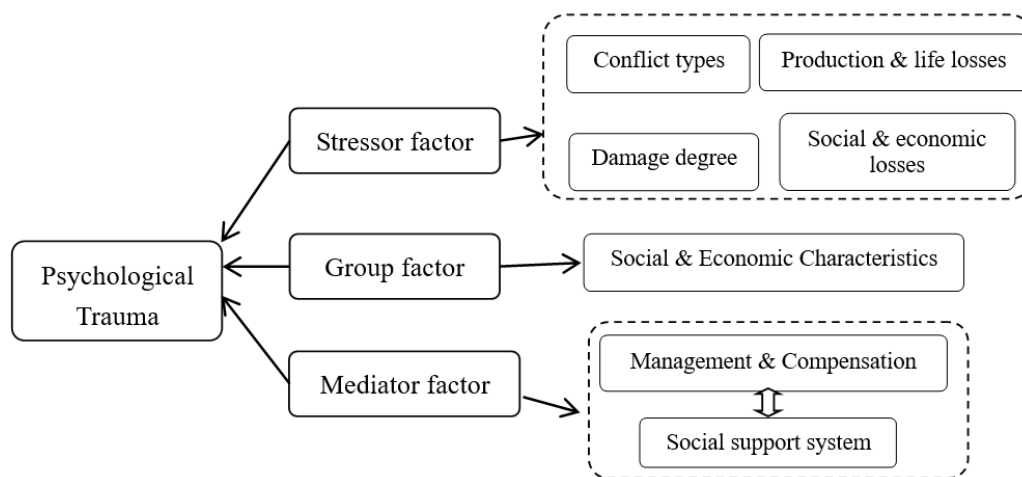


Fig. 1. The Theory Mechanism of influence factors of Psychological trauma

Studies on Human-Wildlife Conflict mainly focused on the verification and evaluation of wildlife conflict loss before 2000, and began to focus on the feasibility of wildlife conflict mitigation and its possible impact on Wildlife Behavior after 2000 (Bradley et al. 2005, Bulte and Rondeau 2005, Fall and Jackson 2002). Studies on wildlife conflict in China mainly focus on the status quo of conflict (He and Wu 2010, Zhou et al. 2010), the causes of conflict (Guo et al. 2012, Li 2008), conflict compensation (Chen et al. 2017, Li 2018), conflict prevention and policy recommendations for conflict. The above studies mainly focus on macro-analysis, while the research on micro-empirical analysis is few. However, based on the discipline of forestry economic management and the relevant theories of wildlife management and psychology, using the micro-empirical data of typical areas to analyze the influencing factors of the psychological trauma caused by wildlife conflicts is still in the exploratory field.

MATERIALS AND METHODS

Basic Situation of Survey Area

Baima Snow Mountain National Nature Reserve is located in Deqin and Weixi counties of Diqing Tibetan Autonomous Prefecture, Yunnan Province, with a total area of 2821.06 square kilometers. The main ethnic minorities are Tibetan, Lisu and Naxi. As the largest national reserve of Yunnan golden monkey in China, the reserve is rich in wildlife resources. There are 15 species of key protected animals, including Yunnan golden monkey, snow leopard, golden leopard, clouded leopard, and 36 species of black bear, macaque, jackal, small panda and great civet.

Human-Wildlife Conflict is more and more serious in Baima Snow Mountain Nature Reserve, specially the damage of crops and the attack of poultry and livestock.

The total economic losses were nearly 5 million yuan in 2002-2007. The main species involved in wildlife Conflict were black bears, rhesus monkeys and wild boars. While the Deqin and Weixi counties, located in the alpine mountains, are classified as national poverty counties in China, and wildlife conflicts have a tremendous impact on local people's production and life.

Data Sources

By means of questionnaire, 230 households from 13 villages in Weixi and Deqin counties of Baima Snow Mountain National Nature Reserve were investigated. The setting of questionnaire and the implementation of investigation were jointly planned by the School of Economics and Management of Beijing Forestry University and the Chinese Wildlife Conservation Association. The distribution of the questionnaire and the selection of the interviewees were carried out with the assistance of the local forestry bureau. The farmers were selected by the method of combining random sampling with typical sampling, and the household heads were investigated in the form of one-to-one interviews, and other adult family members were supplemented. Local village cadres or forest station workers in the reserve were employed to help ensure the quality of the questionnaire. The questionnaire was distributed in October 2017, and 230 questionnaires were received, 206 valid questionnaires, with an effective rate of 89.57%.

Theoretical Framework

Referring to the theory and literature of psychology, human psychological trauma is theoretically affected by three factors: stress factor (event factor), group factor and mediator factor. The theoretical mechanism of psychological trauma factors in wildlife conflict events is shown in **Fig. 1**.

Variable Setting and Research Hypothesis

According to the theoretical mechanism of human psychological trauma factors, combined with the actual investigation, the related variables were set and research hypothesis were put forward from three aspects: stress factors, group factors and mediator factors.

Stressor Factors

Stressor factors are the characteristics and severity of wildlife conflict events. For stressor factors, four variables were selected: the types of wildlife conflict, the degree of damage, the losses of production and life and social and economic losses. The types of wildlife conflict refer to the forms of wildlife conflicts, which can be divided into property losses and personal injuries. Property losses can be divided into crop damage, poultry and livestock attack, house damage or other forms. Different types of wildlife conflict have different psychological effects on the victims. Compared with other types, personal injuries may effect the most. The degree of damage mainly refers to the proportion of damage amount in the income of agriculture and forestry. When the farmers suffer huge damage from wildlife, they tend to have more serious psychological trauma; The losses of production and life refer to the negative impacts on the daily production and life of local residents caused by wildlife conflict, such as land abandonment, grazing or non-woody forest products collection limited, life safety index decline, etc. Social and economic losses refer to the direct loss of local social and economic systems and the indirect cost of development constraints caused by wildlife conflicts. The greater impact on social and economic systems, the more serious psychological effects is. Based on the above analysis, we have made the following research hypotheses:

H1a: Compared with other wildlife conflict types, personal injuries are more likely to cause psychological trauma.

H1b: The higher the degree of wildlife conflict damage is, the more serious the farmer' psychological trauma is.

H1c: The higher the losses of production and life are, the more serious the farmer' psychological trauma is.

H1d: The higher the losses of social and economic are, the more serious the farmer' psychological trauma is.

Group Factors

Group factors refer to the socio-economic characteristics of victims and families. Different individuals and groups will have different psychological effects when encountering emergencies. When the endowment of individual or family is high, the ability to deal with emergencies is strong, so the degree of psychological trauma will be smaller. Group factors can be divided into two categories: personal characteristic variables and family characteristic variables. Personal characteristic variables are reflected by gender, age, education level and health status. In terms of gender, studies have shown that women are more vulnerable and less able to endure wildlife conflicts than men, so women may suffer psychological trauma more seriously; In terms of age, the psychological endurance is worse as they grow older, that is, older people are more vulnerable to wildlife conflicts than younger people. In terms of education, the higher educational level of the victims, the stronger their ability to prevent and control wildlife conflicts and protect themselves, the stronger their ability to apply to the relevant departments to safeguard their own interests when encountering wildlife conflicts, so the less seriously psychological trauma will be. In terms of health, the worse physical condition of the victim, the greater psychological trauma after wildlife conflict. Based on the above analysis, we have made the following research hypotheses:

H2a: Compared with men, wildlife conflict brings more psychological trauma to women.

H2b: Wildlife conflict brings more psychological trauma to older farmers.

H2c: Wildlife conflict brings more psychological trauma to less educated farmers.

H2d: Wildlife conflict brings more psychological trauma to farmers with worse physical condition.

In terms of family characteristics variables of group factors, three indicators were selected: family population, the income ratio from agricultural and forestry, family position. In terms of family population, the larger family population is, the ability of the family to resist wildlife is stronger, so the less psychological trauma will be. In terms of the income ratio from agricultural and forestry, as the damage of wildlife conflicts is mainly concentrated in agriculture and forestry, the higher proportion of family income from agriculture and forestry, the greater impact of wildlife conflicts on their families, so the greater psychological

Table 1. The descriptive statistics of variables

Variable type	Variable	Code	Variable assignment	Mean	Standard deviation	
Dependent variable	Psychological trauma	Y	The impact of conflict on farmers' psychological trauma; 1= not serious; 2= general; 3= serious; 4= very serious.	2.23	0.88	
Independent variable	Stressor factors	Conflict type	X ₁	1=crop damage; 2= poultry & livestock attack; 3= casualties; 4= house damage; 5= others	1.86	1.31
		Damage degree	X ₂	The damage ratio of output 1=below 25% ; 2=25%-50% ; 3=50%-75% ; 4=75%-100%	1.32	0.60
		Production & life losses	X ₃	1= not serious; 2= general; 3= serious; 4= very serious	2.17	0.83
		Social & economic losses	X ₄	1= not serious; 2= general; 3= serious; 4= very serious	2.14	0.80
	Group factors	Gender	Z ₁	0= male; 1= female	0.17	0.38
		Age	Z ₂	1=below 18 years old; 2=18-25 years old; 3=25-40 years old; 4=40-50 years old; 5=above 50 years old	3.49	0.91
		Education	Z ₃	1= primary or below; 2= junior school; 3= high school; 4= university or college; 5= graduates or above.	1.34	0.71
		Health	Z ₄	1= healthy; 2= good; 3= general; 4= poor.	1.80	0.91
		Family population	Z ₅	1= 3 members or below; 2= 3-5 members; 3= 5-10 members; 4= above 10 members.	2.08	0.62
		Family income ratio from agriculture	Z ₆	1=below 25% ; 2=25%-50% ; 3=50%-75% ; 4=75%-100%	1.96	0.96
Mediator factors	Family location	Z ₇	1= buffer area; 2= experimental area; 3= outside reserve	2.31	0.69	
	Compensation form	X ₅	1=financial compensation; 2=physical compensation; 3=preferential policies;4=prevention techniques;5=others	1.30	0.82	

trauma will be. In terms of family location, as wildlife is mainly distributed in the reserve inside, so the frequency and severity of wildlife conflicts outside the reserve is relatively light, the degree of psychological trauma outside the reserve is relatively smaller. Based on the above analysis, we have made the following research hypotheses:

H2e: Wildlife conflict brings more psychological trauma to farmers with less family members.

H2f: Wildlife conflict brings more psychological trauma to farmers with high family income ratio from agriculture and forestry.

H2g: Compared with reserve outside, wildlife conflict brings more psychological trauma to farmers with family location inside of the reserve.

Mediator Factors

Mediator factors, namely social support system, is the possibility of obtaining material help, and are important factors of traumatic psychological relief for disaster groups. The newly revised Wildlife Protection Law stipulates that local governments are responsible for compensating wildlife losses and preventing wildlife hazards. Therefore, the government's management and compensation for wildlife conflict are important factors for the psychological relief. The forms of wildlife conflict management and compensation can be divided into financial compensation, physical compensation, preferential policies, prevention techniques and so on. Studies have shown that the adoption of prevention

measures can greatly reduce or even avoid wildlife conflict, increase safety psychological index, and reduce the negative psychological impact. Based on the above analysis, we have made the following research hypothesis:

H3a: Compared with traditional financial compensation, prevention technology can alleviate psychological trauma more effectively in the wildlife conflict.

Descriptive Analysis

The dependent variable of this study is the degree of farmers' psychological trauma from wildlife conflict. The independent variable can be divided into three aspects: stressor factors, group factors and mediator factors. Stressor factors and mediator factors are the key variables, and group factors are the control variables, including individual characteristics of household head and his family characteristics. The basic statistics of samples as shown in **Table 1**. The characteristics of the respondents mainly concentrated in men, 25-50 years old, primary and junior high school education, good health, family size of 3-5 members, low proportion of agricultural and forestry income and the location of outside reserve, so the selected samples have typical characteristics, it can reflect the basic situation in the survey area. While the main types of wildlife conflict are farmland destroyed, poultry and livestock damaged, and the proportion of damage amount is mainly less than 25%, the losses of production and living and the degree of social and economic damage is mainly general, and

Table 2. The correlation analysis of independent variables and dependent variables

	Pearson chi2	P value		Pearson chi2	P value
Conflict type	23.025	0.028	Age	9.4042	0.068
Damage degree	22.6008	0.007	Education	11.3944	0.250
Production & Life losses	150.3021	0.000	Health	15.0389	0.090
Social & Economic losses	145.3068	0.000	Family population	4.0629	0.907
Compensation form	32.5241	0.001	Income ratio from agriculture	33.3561	0.000
Gender	7.4211	0.060	Family location	16.1556	0.013

Table 3. The correlation analysis between the independent variables

	X ₁	X ₂	X ₃	X ₄	X ₅	Z ₁	Z ₂	Z ₃	Z ₄	Z ₅	Z ₆	Z ₇
X ₁	1											
X ₂	0.03	1										
X ₃	-0.00	0.26	1									
X ₄	-0.02	0.29	0.49	1								
X ₅	-0.01	0.09	-0.12	-0.08	1							
Z ₁	-0.06	0.00	-0.20	-0.20	0.03	1						
Z ₂	-0.01	-0.05	-0.01	-0.00	-0.11	0.13	1					
Z ₃	-0.13	-0.07	-0.10	-0.04	0.10	0.00	-0.23	1				
Z ₄	0.19	0.13	0.12	0.10	0.03	-0.02	0.25	-0.25	1			
Z ₅	-0.08	0.05	0.10	0.16	0.10	0.07	0.09	0.12	-0.12	1		
Z ₆	-0.08	0.05	0.12	0.07	0.05	0.06	0.07	-0.06	-0.02	0.06	1	
Z ₇	-0.11	0.07	0.04	0.09	-0.22	-0.06	0.04	0.01	-0.03	-0.14	0.13	1

Note: correlation coefficient ≥ 0.8 is highly correlated; 0.5 ≤ correlation coefficient < 0.8 is moderately correlated; 0.3 ≤ correlation coefficient < 0.5 is lowly correlated; correlation coefficient ≤ 0.3 is uncorrelated.

the compensation form concentrated in financial compensation.

Model Selection

The dependent variable of the study is the degree of psychological trauma caused by wildlife conflict, which is measured by “1=not serious; 2=general; 3=serious; 4=very serious”, it belongs to the variable of sequential measurement. Therefore, the sequential logistic model is selected to analyse the impact of wildlife conflict on farmer’s psychological trauma, the model is as follows:

$$\begin{aligned}
 \text{logit}P_j &= \text{logit}[P(y > j|x)] = \ln \frac{P(y > j|x)}{1 - P(y > j|x)} \\
 &= \alpha_j + \sum_{i=1}^5 \beta_i X_i + \sum_{i=1}^7 \gamma_i Z_i + \varepsilon_i, j = 1,2,3
 \end{aligned}$$

P_j in formula indicates the cumulative probability of farmers’ Psychological trauma which is greater than j. X_i indicates the key variables of wildlife conflict, including the type of wildlife conflict (X₁), the degree of damage (X₂), production and life losses (X₃), social and economic losses (X₄), and forms of compensation (X₅). Z_i represents the controlling variables of individuals and families, including gender (Z₁), age (Z₂), education (Z₃), health (Z₄), family population (Z₅), agricultural and forestry income ratio (Z₆), and family location (Z₇). ε_i is a perturbation term, and α, β, γ are the parameters to be estimated. This model represents the logarithm of ratio of cumulative probability greater than j and cumulative probability of the preceding j grades.

Variable Test

Correlation analysis between independent and dependent variables

Before modeling, we need to examine the correlation between independent and dependent variables, as shown in **Table 2**. Among key variables, the degree of damage caused by wildlife conflict, losses of production and life, social and economic losses and compensation forms are highly correlated with the degree of farmers’ psychological trauma, which are significant at 1% level. The type of wildlife conflict was moderately correlated with the degree of psychological trauma, and which is significantly at the 5% level. In the control variables, Family income ratio from agriculture is highly correlated with the degree of farmers’ psychological trauma, which is significant at 1% level; Family position is moderately correlated with the degree of farmers’ psychological trauma, which is significant at 5%; Householders’ gender, age and health are generally correlated with the degree of farmers’ psychological trauma, which is significant at 10%. The selected key variables are significant and model analysis can be carried out.

Correlation analysis between independent variables

In order to avoid collinearity between independent variables, the correlation between independent variables is analyzed, as shown in **Table 3**. The correlation between X₃ and X₄ reached 0.49, indicating a low degree of correlation between the two variables. The highest correlation (0.29) of the remaining independent

Table 4. The results of ologit model of the impact of wildlife conflict on farmers psychological trauma

		coefficient	Z value	Marginal effect			
				not serious	general	serious	very serious
Conflict type	crop damage						
	livestock attack	-0.1407	-0.35	0.0111	0.0035	-0.0108	-0.0037
	casualties	1.9626**	2.08	-0.1369**	-0.0598*	0.1061***	0.0906
	house damage	0.2909	0.24	-0.0224	-0.0078	0.0215	0.0087
	others	0.2223	0.38	-0.0172	-0.0059	0.0166	0.0065
Damage degree		0.0008	0.00	-0.0001	0.0000	0.0001	0.0000
Production & life losses		1.9611***	6.47	-0.1496***	-0.0558***	0.1487***	0.0567***
Social & economic losses		2.1006***	6.53	-0.1602***	-0.0598***	0.1592***	0.0607***
Compensation form	financial compensation compensation						
	physical compensation compensation	-0.0980	-0.07	0.0079	0.0023	-0.0075	-0.0027
	preferential policies	0.6666	1.02	-0.0514	-0.0175	0.0466	0.0223
	prevention techniques	-3.1817***	-3.15	0.3000***	-0.0061	-0.2489***	-0.0451***
	others	-9.2568	-0.01	0.7151	-0.2908	-0.3719	-0.0524**
Gender		0.4743	0.98	-0.0371	-0.0135	0.0360	0.0137
Age		0.3489*	1.67	-0.0266*	-0.0099	0.0264 *	0.0101
Education		-0.2629	-0.97	0.0201	0.0075	-0.0199	-0.0076
Health		0.0302	0.14	-0.0023	-0.0009	0.0023	0.0009
Family population		-0.3231	-1.09	0.0246	0.0092	-0.0245	-0.0093
income ratio from agriculture		0.7321***	3.73	-0.0558***	-0.0208***	0.0555***	0.0212***
Family location		0.1836	0.67	-0.0140	-0.0052	0.0139	0.0053

variables was no more than 0.3, indicating that the correlation between independent variables was very low. So the possibility of collinearity between independent variables is very low, and the next model estimation can be carried out.

RESULT ANALYSIS

The Stata 13.0 was used to estimate the model. The logistic regression results were shown in **Table 4**, which has coefficients, Z values and marginal effects of each variable. The likelihood ratio test value of Ologit model is 212.54, the probability is 0.000 (less than 1%), indicating that one explanatory variable’s regression coefficient is at least significantly different from 0, the logarithmic likelihood value is -125.23895, and the Pseudo R² value is 0.459, indicating that the explanatory variable can explain 45.90% of the dependent variable.

Result Analysis of Key Variables

Among the key explanatory variables, damage degree had no significant effect on the traumatic psychology of farmers, but the casualties in conflict types, production and life losses, social and economic losses, prevention techniques of compensation forms had significant effect on the traumatic psychology of farmers at the level of 5%, 1%, 1% and 1%.

Stressor Factors

Compared with crop damages, casualties are more likely to cause psychological trauma and is significant at 5%, supporting the hypothesis H1a. According to the

marginal effect coefficient, the probability that casualty has a serious impact on psychological trauma is 10.61% higher than that of crop damages. While the psychological impact of poultry and livestock attack, house damage and other types of conflict is not significant. As these types mainly bring economic losses, but casualties also have physical health losses, so it has significant effect on the traumatic psychology of farmers at the levels of 5%.

The degree of damage caused by wildlife conflict had no significant impact on the traumatic psychology of farmers, and it refuses the hypothesis H1b. The reason may be that the farmers in area mainly live outside of the reserve, and there is not much intersection with wildlife habitat, so the damage of farmers caused by wildlife is not high, Meanwhile, the income sources of local farmers are mainly concentrated in non-agricultural, the damage caused by wildlife is not enough to attack its economic source, so the impact of damage degree on farmers’ traumatic psychology is not obvious.

The losses of production and life caused by wildlife conflict had significant effect on the traumatic psychology of farmers at the level of 1%, and its marginal effects are significant at the level of 1%, supporting the hypothesis H1c. The results show that the more serious the losses of production and life is, the more serious the traumatic psychology will be. According to the marginal effect coefficient, for every additional unit of production and living losses, the

probability of highly severe traumatic psychology is increased by 5.67%, the probability of severe traumatic psychology is increased by 14.87%, the probability of general traumatic psychology is reduced by 5.58%, and the probability of little serious traumatic psychology is reduced by 14.96%. The production and life of farmers is the basic premise to ensure that farmers can live and work in peace. If the production and living environment is threatened, the psychology of farmers is highly prone to change, and it is likely to produce extreme attitudes and behaviors towards wildlife. Therefore, the local government should take active measures to prevent wildlife from entering human production and living areas.

The social and economic losses caused by wildlife conflict had significant effect on the traumatic psychology of farmers at the level of 1%, and its marginal effects are significant at the level of 1%, supporting the hypothesis H1d. The results show that the greater social and economic losses is, the more serious the traumatic psychology will be. According to the marginal effect coefficient, for every additional unit of social and economic losses, the probability of highly severe traumatic psychology is increased by 6.07%, the probability of severe traumatic psychology is increased by 15.92%, the probability of general traumatic psychology is reduced by 5.98%, and the probability of little serious traumatic psychology is reduced by 16.02%. The farmers are closely related to local social and economic level. It deeply affects the livelihood level and happiness index of farmers. If the local social economy is threatened, the level of livelihood of the farmers will be affected, which will strike their psychology. Therefore, the local government should pay attention to the development of communities surrounding wildlife conservation areas and try to incorporate local community development into wildlife conservation planning.

Mediator Factors

In the form of wildlife conflict compensation, compared with financial compensation, the impact of prevention techniques had significant effect on the traumatic psychology of farmers at the level of 1%, and its marginal effects are significant, supporting the hypothesis H3a. The results show that the prevention technology can effectively alleviate the traumatic psychology of farmers. According to the marginal effect coefficient, prevention technology can reduce the probability of highly severe traumatic psychology by 4.51%, reduce the probability of serious traumatic psychology by 24.89%, and increase the probability of

little serious traumatic psychology by 30.00%. The physical compensation, preferential policies and other types have no significant impact on farmers' psychological trauma. It may be because these types mainly compensate for the existing losses in the perspective of post-compensation. Farmers also need to bear a considerable proportion of losses on their own, and in reality there is a low compensation ratio and some compensation problems such as cumbersome and untimely procedures, the ex-post-compensation can not effectively alleviate the adverse effects of wildlife conflicts on farmers' psychology. However, prevention technology can effectively reduce or even avoid wildlife conflicts, thereby reducing or eliminating conflicts fundamentally. The prevention technology will give farmers a safe production and living environment, which will gradually restore their sense of security psychologically.

Result Analysis of Control Variables

The control variables are the group factors, which are divided into the basic characteristics of household head and family. Among the characteristics of household heads, the impact of age on farmers' traumatic psychology is significant at 10%. The gender, education level and health status have no significant impact on farmers' traumatic psychology. The research supports the hypothesis H2b, and does not support the hypothesis H2a, hypothesis H2c, hypothesis H2d. The older the farmers are, the lower their ability to withstand risks, so the impact of wildlife conflict on their psychological trauma is greater. However, the reasons why gender, education level and physical health have no significant impact on farmers' psychological trauma may be: (1) the selected samples in this study are household heads, the local households are mainly male, and the males account for 82.6% of the survey samples, so they cannot be reflected the impact of gender differences on psychological trauma; (2) According to the actual knowledge of the survey, the education level of the local residents is generally similar, and the education of primary school accounts for nearly 75.65% of the total samples, so it can not show the impact of educational differences on psychological trauma; (3) Local residents mainly live in alpine regions, and the harsh environment has developed a strong body. The physical condition of the subjects is generally healthy, accounting for 80.44% of the sample size, so it is impossible to show the impact of health differences on psychological trauma.

Among the family characteristics, the impact of agricultural and forestry income ratio on the farmers'

psychological trauma is significant at the level of 1%. The family population and family position have no significant impact on the farmers' psychological trauma. Research supports the hypothesis H2f, reject hypothesis H2e, hypothesis H2g. Because wildlife conflicts mainly damage agricultural and forestry, families with high proportion of agricultural and forestry income will have a fatal impact on their livelihoods once they encounter wildlife conflicts, which will have a serious impact on their psychology. However, the reasons why the family population and family position have no significant impact on farmers' psychological trauma maybe: (1) The artificial guards in the prevention of wildlife conflicts are only effective at the beginning. Once the wild animals adapt to humans, they can not function. Therefore, families with more populations do not have practical advantages in the prevention and control of wildlife, and their effects on relieving psychological trauma are not obvious; (2) Families mainly concentrated in the experimental area and outside the reserve. With the increase of wildlife population and the expansion of the distribution scope, wildlife invaded the farmers around the reserve, and the probability of wildlife conflict inside and outside the reserve gradually has no difference. Therefore, family location had no significantly effect on the psychological trauma of farmers after wildlife conflict.

CONCLUSION

Through the empirical research on the environmental impact factors of farmers suffering from wildlife conflicts in Baima Snow Mountain National Nature Reserve of Yunnan Province, the following conclusions are drawn: (1) Casualties is more likely to cause psychological trauma than other types of wildlife conflict; (2) The greater losses of production and life caused by wildlife conflict, the more serious the psychological trauma will be; (3) The greater losses of social and economic caused by wildlife conflict, the more serious the psychological trauma will be; (4) Compared with traditional financial compensation, prevention technology can alleviate psychological trauma caused by wild animal conflicts effectively; (5) The older the farmers, the more serious psychological trauma caused by wildlife conflict will be; (6) The larger proportion of farmers' income from agriculture, the more serious the psychological trauma caused by wildlife conflicts will be.

RECOMMENDATIONS

Strengthen Publicity and Education, Raise Awareness of Prevention, and Avoid Casualties

Local governments and relevant departments should organize local people to participate in technical training of wildlife prevention actively so as to make them understand the habits and activities of wildlife, learn the basic knowledge and skills of wildlife prevention, master the emergency measures for dealing with wildlife accidents, and try to avoid entering the core area of the reserve or buffer areas where wildlife activities are frequent, such as reduce the activities of collecting bacteria, digging medicine, grazing and others to avoid casualties.

Pay Attention to Community Development and Make up for the Social and Economic Losses Caused by Wildlife Conflicts

The local government and relevant departments should actively pay attention to the social and economic development of the surrounding communities, so as to compensate for the losses of production & life and social & economy caused by wildlife conflicts. The community conservation model can be used to organically integrate the wildlife protection business with the local community development. The community co-management model specifically supports the community to develop social and economic undertakings, and allows the community to participate in the formulation and implementation of wildlife protection policies to form a two-way mutually beneficial social relationship. In practice, farmers with practical experience can be hired as wildfire inspectors or wildlife conflict warning officers, which not only provide employment opportunities, but also increase the power of wildlife protection. Relevant research shows that when farmers benefit from wildlife protection, they are more likely to accept the fact of wildlife conflict. In Simao of China in Asia has initiated an Asian elephant protection project to develop the community economy. The implementation of the project has played a significant role in raising tolerance for conflict and alleviating the contradiction between people and elephants.

Provide Effective Prevention and Control Means to Reduce the Frequency of Wildlife Conflict

The local government should play an active role in the prevention and control of wildlife conflicts: Firstly, develop modern preventive and control measures, such as behavior adjustment technology, birth control, computer-assisted management, fence technology and surveillance technology, and promote them to farmers;

Secondly, wildlife habitats should be transformed, such as food source bases and ecological corridors; Thirdly, the habitat of wildlife and the living and production areas of human beings should be rationally divided, and the human disturbance and destruction of wildlife habitat should be strictly restricted; Fourthly, the local government should adjust the types and planting areas of agricultural and forestry crops scientifically, explore suitable types of agricultural and forestry crops; Fifthly, the number of wildlife population should be monitored dynamically, that is, the number of wildlife population should be controlled reasonably, and the wildlife entering the human region should be warned in time; Sixthly, reasonable monitoring and controlling of the local population; Seventhly, migration of problem animals or ecological relocation of residents in severely injured areas.

Focus on Relevant Groups and Help them Alleviate Psychological Trauma

The local government should focus on the implementation of wildlife prevention and control measures and compensation policies for older farmers, provide accurate assistance, and use media means to vigorously publicize them so that they can get attention and help from all sectors of society. At the same time, preferential policies, financial and tax incentives, technical assistance and training should be adopted to encourage families with a high proportion of agricultural and forestry to engage in diversified

business and tertiary industry business activities, so as to reduce their dependence on agricultural and forestry income and improve their living standards, alleviate the psychological trauma caused by wildlife conflict finally.

Actively Develop Wildlife-related Industries and Reduce the Economic Dependence of Agriculture and Forestry

To make scientific plan for local social and economic development, adjust the proportion of primary, secondary and tertiary industries rationally, properly develop wildlife related industries, and reduce the dependence of farmers on agriculture and forestry, The specific ways are as follows: Firstly, the wildlife tourism resources of the reserve should be moderately developed, such as wildlife tourism, and local people should be involved through relevant training; Secondly, through scientific research and government approval, the development of large-scale wild animal domestication and breeding, to convert part of the masses into wildlife breeding keepers; Thirdly, carry out economic activities such as the development of wildlife products, and transform some people into production personnel of wildlife products.

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