Analysis on the Relationship between Farmers' Ecological Protection Behavior and Well-being in Qinling Region

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Abstract. How to arouse the enthusiasm of farmers for ecological protection is an important issue to coordinate protection and development. Therefore, it is necessary to explore the interactive relationship between farmers’ well-being and cognition, attitude, and behavior of ecological protection. Based on 618 data collected in a survey in The Qinling Mountains in 2018, this study establishes a structural equation model, puts forward and validates theoretical hypotheses about the interaction between farmers’ well-being, protection cognition, protection attitude and protection behavior. The results show that: protection cognition and attitude have a significant positive effect on protection behavior; protective attitude plays a limited mediating role in the path of cognitive influence on behavior, while well-being plays an important role in the path of attitudinal influence on behavior; "living conditions" and "health status" have the greatest impact on the well-being effect. The conclusion is that the well-being effect of farmers with a positive attitude towards protection is usually stronger, and the higher well-being effect has an incentive effect on the ecological protection behavior of farmers.

1.Introduction

As the life support system of the earth, the natural ecosystem is the basis for the survival and development of human economy and society. It not only plays an important role in maintaining the balance of species and protecting biodiversity, but also creates various service functions and well-being for human beings. Ecosystem services are closely linked to human well-being. The natural capital composed of ecosystem services is the resource and environmental foundation for human development, from which human beings can obtain income satisfaction and then improve their well-being. Therefore, 350 million people around the world are heavily dependent on natural resources obtained from ecosystems at present [1]. The decline and imbalance of ecosystem services pose a serious threat to sustainable economic and social development and the continuation of this trend will seriously affect human well-being and long-term interests.

The problems of ecological protection and development also appear in China. Over the past few decades, the impact of human activities on ecosystems has increased rapidly, most of which are beneficial to human well-being, but there is now increasing evidence of adverse effects arising from the overuse of ecosystems. Under the background of ecological civilization construction, how to coordinate the relationship between ecological environment protection and community development, and how to deeply explore the relationship between ecological system and human well-being, so as to better realize the well-being of residents while protecting the ecosystem, has become an urgent problem to be solved.
in the development process of natural reserve in China. The surrounding farmers of the natural reserve are not only the direct beneficiaries of ecosystem services, but also the direct implementers of ecological protection. The material and non-material benefits obtained from the ecosystem constitute farmers’ well-being, and the cognition of well-being will affect their behavioral intention of ecological protection. Therefore, it is of great reference value to explore the interaction between farmers' well-being level and ecological protection behavior for mobilizing farmers' intention for ecological protection, solving the internal contradiction between protection and development, and exploring the sustainable development of ecosystem and the realization of well-being.

In recent years, human well-being and ecological protection have become the core concepts of sustainable science, and many scholars at home and abroad have studied the relationship between them. It mainly focuses on two aspects: firstly, it focuses on the impact of ecological environment on human well-being, that is to explore the impact of ecological environment changes on human well-being from an objective perspective. For instance: Verhooestadt conducted an empirical analysis on the relationship between ecological footprint and subjective well-being in Flanders, Belgium by using a questionnaire survey. Liu Dongqing et al. empirically studied the spatio-temporal tradeoff and synergy between land use intensity-ecosystem services-human well-being in Anding District. Zhang Jifei et al. conducted an empirical analysis on the spatial relationship between ecosystem services and residents' well-being in the upper reaches of the Minjiang River and its changes by using the equivalent evaluation method of ecosystem services value. Secondly, the relationship between environmental cognition and level of well-being is explored from the perspective of residents' cognition. For example, Wang Guoping discussed the community mechanism of environmental protection in rural areas and believed that community residents should be aware of the importance of ecological environmental protection for their own well-being, so as to become a common project for the whole society to participate in the construction. Qiao Xuning et al. studied the spatial spillover of ecosystem services and the changes of residents' well-being in the Weigan River Basin. Tang Qiong et al. used the multi-indicator comprehensive evaluation method to measure the well-being level of regional residents and their cognition of ecological environment at multiple levels. Thirdly, well-being is introduced when exploring farmers' cognition of ecological protection. For example, Wang Changhai used multiple linear regression model to analyze the attitude and influencing factors of ecological protection of farmers in the national nature reserve of Crested Ibis in Shaanxi province and surrounding communities, providing a basis for the realization of ecological protection and farmers' well-being. Yu Zhongyuan mentioned in his research that with the improvement of the concept of well-being and the enhancement of the cognition of protection, people will attach great importance to the ecological system, and their willingness to ecological protection will also increase accordingly.

There is a complex two-way influence relationship between farmers' ecological protection behavior and their well-being, and their behavioral intention is often influenced by both external factors (system, economy, culture, etc.) and internal factors (cognition, motivation, attitude, etc.). At present, the research on ecological protection behavior only discusses the influencing factors of cognition, attitude, well-being or behavioral intention, and there is still a lack of research on the influencing paths between ecological protection cognition, attitude and behavior and ecological well-being. Based on it, this study, from the perspective of well-being cognition and the theory of Planned Behavior, explores the correlation between the four factors by constructing the structural equation which contains farmers’ ecological well-being and protection cognition, attitude and behavior, so as to provide theoretical support for improving farmers' well-being and realizing ecological protection.

2. Material and methods

2.1. Sample selection and distribution

The data was obtained by a questionnaire survey. In August 2018, the research team conducted a survey in 20 administrative villages around seven nature reserves in Qinling Region. Using the method of random sampling by chance, the semi-structured interview and questionnaire survey were conducted
among 25-30 households in each village, and the respondents were family members aged 18-70. The questionnaire included basic information about family members and cognitive behavioral problems related to ecological protection. A total of 618 valid samples were collected, and the questionnaire efficiency reached more than 95%.

The descriptive statistical analysis of the survey data is shown in Table 1.

| Basic indicators                  | Attribute          | Frequency | Ratio (%) | Cumulative percentage (%) |
|----------------------------------|--------------------|-----------|-----------|---------------------------|
| Gender                           | Male               | 567       | 91.75     | 92.00                     |
|                                  | Female             | 51        | 8.25      | 100.00                    |
| Age                              | 18-29              | 9         | 1.46      | 1.46                      |
|                                  | 30-41              | 98        | 15.86     | 17.31                     |
|                                  | 42-53              | 234       | 37.86     | 55.18                     |
|                                  | 54-65              | 175       | 28.32     | 83.50                     |
|                                  | More than 65       | 102       | 16.50     | 100.00                    |
| Educational level of householder | Primary school     | 90        | 14.56     | 14.56                     |
|                                  | Junior high school | 317       | 51.29     | 65.86                     |
|                                  | High School        | 163       | 26.38     | 92.23                     |
|                                  | Undergraduate      | 40        | 6.47      | 98.71                     |
|                                  | A master's degree  | 8         | 1.29      | 100.00                    |
| Physical condition               | Good               | 412       | 66.67     | 66.67                     |
|                                  | General            | 115       | 18.61     | 85.28                     |
|                                  | Mild disease       | 75        | 12.14     | 97.41                     |
|                                  | Major disease      | 16        | 2.59      | 100.00                    |
| Per capita net income (ten thousand yuan) | < 1              | 383       | 61.97     | 61.97                     |
|                                  | 1 ~ 2              | 154       | 24.92     | 86.89                     |
|                                  | 2 ~ 3              | 36        | 5.83      | 92.72                     |
|                                  | > 3                | 45        | 7.28      | 100.00                    |
| Residential location             | Inside natural reserve | 184   | 29.77     | 29.77                     |
|                                  | Outside  | natural | 434       | 70.23                     |

Most of the samples are male, middle-aged and elderly, with middle and high school education or below people, and most of them are in good health. Their per capita net income is less than 20,000 yuan, which generally conforms to the current situation of low education level and high proportion of middle- and lower-income groups in rural areas. In terms of residential areas, 29.77% of the interviewed farmers lived in the natural reserve and 70.23% of them lived outside. The survey sample distribution is relatively balanced, with a wide coverage and certain representation.

2.2. Research methods and hypotheses

Structural Equation Model (SEM) is a kind of quantitative research technology that integrates measurement and analysis into one. It is mainly used to analyze and observe the complex relationship between variables. Due to the complex relationship between farmers’ ecological well-being, ecological protection cognition, attitude and behavior intention, the cognition, attitude and behavior variables are subjective and difficult to measure directly. Besides, the Structural Equation Model (SEM) can well analyze the complex relationship between multiple variables. Therefore, the study uses the construction of a Structural Equation Model to analyze the internal mechanism of farmers’ ecological protection cognition, attitude, well-being, and behavior, and explore the relationship between various latent variables.

The Structural Equation Model includes two sets of theoretical models. Firstly, the Structural Equation Model defines the linear relationship between the potential independent variables (ecological protection cognition, ecological protection attitude and well-being) and the potential dependent
variables (ecological protection behavior). The second is the Measurement Model, which defines the linear relationship between potential variables and observed variables. Each model equation is shown as follows:

Structural equation:

\[ \eta = y + \beta \eta + \varepsilon (1) \]

Outside the development (independent variables) measurement equation:

\[ X = \lambda \xi + \delta (2) \]

Endogenous variable (dependent variable) measurement equation:

\[ Y = \lambda \eta + \varepsilon (3) \]

In equations (1) to (3), \( \eta \) and \( \xi \) are vector types, \( \gamma \) and \( \beta \) are regression types; \( \lambda \) and \( \varepsilon \) are endogenous and exogenous variables respectively, \( \lambda \) are regressive types, \( \xi \) and \( \delta \) are variance/covariance types.

Farmers in the surrounding villages of nature reserves have the particularity of geographical location, and they have a deeper understanding of ecological protection. That is, they are more cognizant of the importance of ecological protection, and their attitude towards ecological protection will be more positive. The special geographical location around the nature reserve enhances the accessibility of farmers’ ecological protection attitude and behavior. With deep cognition and positive protective attitude, farmers tend to make positive ecological protection behavior, thus improving their ecological well-being. The higher the ecological well-being of farmers, the deeper their cognition of the importance of ecological protection, and the more willing they are to do behaviors conducive to ecological protection.

Based on this, the following hypotheses are proposed:

Hypothesis 1: Farmers' cognition of ecological protection will have a positive impact on their attitude towards ecological protection.

Hypothesis 2: Farmers' ecological protection cognition has a positive impact on their ecological protection behavior.

Hypothesis 3: Farmers' attitude towards ecological protection will have a positive impact on their ecological protection behavior.

Hypothesis 4: Farmers' attitude towards ecological protection will have a positive impact on their well-being.

Hypothesis 5: The well-being of farmers will have a positive impact on ecological protection behavior.

The impact path diagram is shown in Figure 1.

![Figure 1 Path diagram influenced by structural equation theory](image-url)

2.3. Variable selection

Based on the research hypotheses, four kinds of exogenous potential variables were identified, namely, ecological protection cognition, ecological protective attitude, well-being, and ecological protection behavior. The selection of farmers’ well-being indicators is mainly based on the Millennium Ecological Assessment and passive research. Ecological protection cognition, attitude and behavior index selection of reference from Duan Wei[10], Ma Ben [11] the ecological protection of farmers cognition contains two parts: cognition of ecological protection and cognition of nature reserves; ecological protective...
attitude includes the ideas that the concept of man and nature and the activeness of ecological protection; ecological protection behavior including resource utilization behavior, protective management behavior and directive behavior. Concrete observation variables are shown in table 2. We divide each index into 5 levels of "strongly disagree/ disagree/generally/ agree/strongly agree" according to the Likert scale method, and assigned values corresponding to 1 ~ 5 points respectively.

The descriptions of latent variables and observed variables are shown in Table 2.

Table 2 Description of latent variables and observed variables

| Latent variables | Observation variable                                      | Mean   | Standard deviation |
|------------------|----------------------------------------------------------|--------|--------------------|
| Ecological       | Know the importance of ecological protection             | 3.26   | 1.06               |
| cognition        | Know the main work in the reserve                        | 3.29   | 1.10               |
|                  | Know the protected species                               | 3.54   | 1.04               |
|                  | Know the laws and regulations in the natural reserves    | 3.29   | 1.01               |
| Ecological       | Ecological protection is the responsibility of people     | 3.64   | 1.07               |
| attitude         | Willing to participate in ecological protection           | 3.75   | 1.09               |
|                  | Support the work of natural reserves                     | 3.19   | 1.08               |
|                  | Ecological protection is more important than economic development | 3.00   | 1.19               |
|                  | Man and ecology should coexist harmoniously               | 3.79   | 1.09               |
|                  | Living conditions                                        | 2.65   | 0.89               |
|                  | Healthy status                                           | 1.54   | 0.90               |
|                  | Social relationships                                      | 1.72   | 0.92               |
|                  | Security level                                           | 1.70   | 0.62               |
| Ecological       | Participate in conservation management activities         | 2.56   | 1.21               |
| behavior         | Reduce firewood use                                      | 3.05   | 1.20               |
|                  | Reduce picking wild herbs                                | 3.49   | 1.17               |
|                  | Participate in wildlife rescues                          | 2.07   | 0.93               |
|                  | Reduce the use of fertilizers and pesticides              | 3.28   | 1.06               |

3. Results
The descriptive statistics and exploratory factor analysis results of latent variables and observed variables are shown in Table 3.

Table 3 Results of exploratory factor analysis

| Latent variables | Observation variable                                      | Factor loading | KMO  |
|------------------|----------------------------------------------------------|----------------|------|
| Ecological       | Know the importance of ecological protection             | 0.76           | 0.75 |
| cognition        | Know the main work in the reserve                        | 0.82           |      |
|                  | Know the protected species                               | 0.77           |      |
|                  | Know the laws and regulations in the natural reserves    | 0.76           |      |
| Ecological       | Ecological protection is the responsibility of people     | 0.79           | 0.83 |
| attitude         | Willing to participate in ecological protection           | 0.89           |      |
|                  | Support the work of natural reserves                     | 0.71           |      |
|                  | Ecological protection is more important than economic development | 0.48           |      |
| Well-being       | Man and ecology should coexist harmoniously               | 0.86           |      |
|                  | Living conditions                                        | 0.89           | 0.80 |
|                  | Healthy status                                           | 0.90           |      |
|                  | Social relationships                                      | 0.92           |      |
|                  | Security level                                           | 0.62           |      |
| Ecological       | Participate in conservation management activities         | 0.52           |      |
| behavior         | Reduce firewood use                                      | 0.63           |      |
|                  | Reduce picking wild herbs                                | 0.73           |      |
|                  | Participate in wildlife rescues                          | 0.33           |      |
Reduced the use of fertilizers and pesticides 0.71

The KMO values of latent variables are all above 0.72 and passed Bartlett spherical test, indicating that the scale has high validity and is more suitable for factor analysis. Exploratory factor analysis is carried out on the scale, and the results are shown in Table 3. Eliminate factors with factor loadings less than 0.5, and retain factors that meet the analysis requirements.

The fitness of the model refers to the consistency between the hypothesis theoretical model and the actual data, that is, the implicit covariance matrix of the hypothesis model should be as close to the sample covariance matrix S as possible. The closer the $\Sigma$ matrix is to the S matrix, the better the model fitness will be. It is generally believed that three aspects should be considered: absolute fitting degree index, incremental fitting degree index and simplified fitting degree index. The scale is tested for fitness in three aspects, and the results were shown in Table 4. The test results of indicators of the model are all in line with the evaluation criteria, indicating that the theoretical assumptions of the model are more in line with the reality and have good fitness.

| Fitness index                              | Evaluation standard | The actual value |
|--------------------------------------------|---------------------|-----------------|
| Absolute fitting index                     | Approximate error square root of RAMSEA, Square root RMR of the squared mean residual, Goodness of fit index GFI | < 0.5 | 0.04 |
| Index of incremental fit                   | Modified fitting index AGFI, Bentler - Bonet Gauge index NFI, Compare the fitting index CFI | > 0.9 | 0.960 |
| Simplified fitting degree index            | Value-added adaptation index IFI, Compact fitness index PGFI, Rule adaptation index PNFI, Streamline adjustment adaptor index PCFI | < 0.5 | 0.799 |

After the reliability, validity and fitness tests of the model are all passed, Amos17.0 software is used to estimate the parameters of the structural equation model according to the maximum likelihood method and the least square method. The results are shown in Table 5.

| Hypothesis | Influence path | Influence direction | Standardized coefficient | Nonstandardized coefficient | P       | The verification results |
|------------|----------------|---------------------|--------------------------|-------------------------------|---------|-------------------------|
| Hypothesis 1 | Ecological protection attitude→Ecological protection cognition | +                     | 0.151                    | 0.166                          | ***     | verified                |
| Hypothesis 2 | Ecological protection behavior→Ecological protection cognition | +                     | 0.146                    | 0.137                          | ***     | verified                |
| Hypothesis 3 | Ecological protection behavior→Ecological protection attitude | +                     | 0.077                    | 0.080                          | 0.065   | verified                |
| Hypothesis 4 | Farmers well-being→Ecological protection attitude | +                     | 0.244                    | 0.272                          | ***     | verified                |
| Hypothesis 5 | Ecological protection behavior→Farmers well-being | +                     | 0.340                    | 0.286                          | ***     | verified                |

Note: *** represents a significance level of 1%.
From the perspective of ecological protection cognition, hypothesis 1 and hypothesis 2 have been verified. The standardization coefficient of the ecological protection cognition and the ecological protection attitude is positive, which indicates that the stronger the ecological protection cognition is, the more positive the farmers' ecological protection attitude is. There is a significant positive correlation between the cognition of ecological protection and the behavior of ecological protection, which indicates that strengthening the cognition of ecological protection can promote the occurrence of the behavior of ecological protection.

From the perspective of ecological protection attitude, hypothesis 3 and hypothesis 4 have been verified. It shows that the protection attitude of farmers has a significant positive effect on the level of well-being and protection behavior. The difference is that the positive correlation between the ecological protection attitude and the ecological protection behavior is significant at the level of 1%, while the positive correlation between the ecological protection attitude and the well-being of farmers is significant at the level of 10%.

From the perspective of farmers' well-being, hypothesis 5 has also been verified. The higher the perceived level of farmers' well-being, the more likely they are to have ecological protection behaviors, and the two are significantly positively correlated.

The results of the model show that the relationship between protection attitude, protection cognition, well-being and protection behavior is not only a direct one-to-one relationship, but also an intermediary factor that significantly affects farmers' ecological protection behavior. The influence paths found in the study are as follows:

1. Ecological protection cognition → Ecological protection behavior. The cognition of ecological protection can directly influence the ecological protection behavior, and the coefficient is 0.146, which is significant at 1% level, which verifies hypothesis 2.

2. Ecological protection cognition → Ecological protection attitude → Ecological protection behavior. In addition to the direct impact of ecological protection cognition on ecological protection behavior, ecological protection cognition can also exert indirect influence on ecological protection behavior through ecological protection attitude. The indirect coefficient is 0.012, which is smaller than the direct effect of ecological protection cognition, indicating that ecological protection attitude plays a very limited role between cognition and behavior.

3. Ecological protection attitude → Well-being → Ecological protection behavior. The direct impact coefficient of ecological protection attitude on ecological protection behavior is 0.077, and the indirect impact coefficient of ecological well-being on ecological protection behavior is 0.083. The absolute value of the indirect impact coefficient is greater than the direct impact coefficient, so the realization of well-being plays an important role in mobilizing the ecological protection behavior of farmers. The more positive the farmers' protection attitude is, the more beneficial it is to the realization of their well-being and the realization of their protection behavior.

In addition, the model path coefficient graph is used to represent the influence path between the latent variables in the structural equation model and the influence degree of observed variables on the latent variables. The results are shown in Figure 2. Where, each label is the observed variable corresponding to the latent variable and the corresponding residual error.
The effects of observational variables on the cognition of ecological protection show that: "Know the laws and regulations in the natural reserves" had the greatest influence (0.870); "Knowing the relevant regulations of the natural reserve" has the least influence degree (0.818), but generally speaking, the influence path coefficient of the four observed variables on ecological protection cognition has little difference, all within the range of 0.8-0.9.

The effect of the observed variables on the attitude of ecological protection is as follows: "Ecological protection is the responsibility of people (0.846)", "Willing to participate in ecological protection (0.857)", and "Support the work of natural reserves (0.774)" on the ecological protection of farmers. The degree of influence of attitude is relatively large, indicating that increasing farmers’ awareness of ecological protection and increasing their support for protected areas can greatly increase their enthusiasm for protection; and the impact of the indicator "people and ecology should coexist in harmony" is relatively low, and the influence coefficient is only 0.681.

The effects of observational variables on the well-being of ecological protection show that: "living conditions (0.906)" and "health status (0.909)" had a large positive influence coefficient on the well-being, followed by "social relationships (0.894)" and "security (0.682)", indicating that to achieve the well-being of farmers, the key is to improve their material living conditions and physical health level.

The effects of observational variables on the behavior of ecological protection show that: "Participate in conservation management activities (0.865)" and "reducing firewood use (0.829)" have the largest influence coefficient, indicating that management activities in the protected area and reducing the use of new firewood are important behaviors to participate in ecological protection.

4. Conclusion

4.1. Affect path

By studying the ecological protection of cognition, attitude, behavior, and the interaction relationship between the well-being, we find that the ecological protection of cognitive behavior significantly affects...
the ecological protection. The reason is that only when farmers know the importance of ecological protection, the scope of protected species and relevant laws and regulations of protection can they actually participate in ecological protection, which is in line with the viewpoint of cognitive behavioral theory.

At the same time, in the path of cognition → attitude → behavior, protective attitude plays a little mediating role, the reason may be that protective attitude is not consistent with the actual behavior often, that is to say, even if some farmers have a more comprehensive cognition on ecological protection, a more positive attitude, but is unsatisfactory in terms of implementation. Because whether farmers can effectively carry out ecological protection behavior is also affected by social relations, benefits and costs and other interest factors.

In addition, in the path of ecological protection attitude → well-being → ecological protection behavior, the intermediary role of well-being is greater than the direct impact of attitude on behavior. The reason may be that when farmers have a positive attitude towards protection and are satisfied with their living conditions and health status, they have more economic strength and physical conditions to participate in ecological protection. Similarly, when farmers are satisfied with their social relations, they will not be oppressed by social relations when participating in ecological protection, so they are more likely to realize ecological protection behaviors. On the contrary, if farmers have a negative attitude towards protection, but their well-being is relatively high, they are more capable of participating in ecological protection under objective conditions.

4.2 Observed variables
For cognitive, "importance" and "work", "protected species", "laws and regulations," the influence degree of the four factors on the protection of cognitive difference is not large, the reason is that the above factors are the basic knowledge of the ecological protection, understand the basic knowledge to protect farmers need for change and promote farmers to protect behavior is necessary. However, the influence coefficient of "laws and regulations" is relatively the smallest, because the language of legal provisions is relatively obscure, so it is difficult for farmers to popularize legal knowledge, so the popularization of legal knowledge has a small impact on their protection cognition.

For well-being, material conditions score highest, probably because income and material needs are the most prominent manifestations of farmers' well-being. At the same time, the score of social relations is relatively high. The reason is that harmonious family relations and neighborhood relations are the guarantee of a good living environment. A harmonious atmosphere can make people feel happy and improve their happiness. The lowest score of health well-being, on the one hand, may be due to the prominent environmental problems caused by unreasonable resource utilization, which threatens the health of farmers; on the other hand, it may be due to the high proportion of medical expenditure, which brings a great economic burden to farmers.

In terms of behaviors, "Participate in conservation management activities" requires farmers to have relevant professional knowledge. If farmers improve their professional level of ecological protection, their daily behaviors will also be affected and become more ecological, so this has the greatest impact on ecological protection behaviors. "Reducing the use of new wood" can change the local energy structure and is an important factor related to the ecological environment. Therefore, if farmers are aware of this and are willing to reduce the burning of firewood, it indicates that they have a deeper understanding of ecological protection and are more likely to participate in ecological protection. According to the survey, the proportion of collection income in the income source of peasant households is very small, so the restriction on collection has little impact on their economic interests. Therefore, "Reducing picking wild herbs" does not effectively indicate that farmers actually participate in ecological protection. "Reduce the use of fertilizers and pesticides" has the lowest impact coefficient, because local income source is mainly agriculture, so the dependence on chemical fertilizers and pesticides is high, and it seems unlikely to participate in ecological protection by reducing the use of chemical fertilizers and pesticides.
References

[1] WWF. (2007) Sacred Himalayan landscape in Nepal: understanding the changes in livelihoods assets with locals: a case study from Kanchenjunga conservation area project, Nepal. World Wildlife Fund, Kathmandu.

[2] Liu Dongqing, Zhang Jinqian, Gong Jie et al. (2019) Research on the spatio-temporal relationship between land use intensity-ecosystem services-human well-being in the loess hilly region of central Gansu——Taking Anding District as an example[J]. Chinese Journal of Ecology, 39(02):637-648.

[3] Zhang Jifei, Deng Wei, Zhu Changli et al. (2017) The spatial correlation and dynamic characteristics of ecosystem services and residents' well-being in the upper reaches of the Minjiang River[J]. Journal of Mountain Research, 35(03): 388-398.

[4] Wang Guoping. (2010) Research on China's Rural Environmental Protection Community Mechanism [D]. Hunan Agricultural University.

[5] Qiao Xuning, Yang Yongju, Yang Degang. (2011) Evaluation of the spatial transfer of ecological service function value: Taking the Weigan River Basin as an example [J]. China Desert, 31(04): 1008-1014.

[6] Tang Qiong. (2017) The importance of ecosystem services in the oasis-desert interlaced zone and its impact on the well-being of farmers[D]. Lanzhou University.

[7] Wang Changhai, Wen Yali, Shi Jian et al. (2011) Reflections on the relationship between Qinling Nature Reserve and surrounding communities based on the symbiosis theory perspective: Taking Shaanxi Changqing National Nature Reserve as an example [J]. Northwest Forestry College Journal, 26(04): 236-240.

[8] Yu Zhongyuan, Li Bo, Zhang Xinshi. (2014) Analysis of Social Ecosystem and Vulnerability Driving Mechanism[J]. Acta Ecologica Sinica, 34(07): 1870-1879.

[9] Kolimuss A, Agyeman J. (2002) Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? [J]. Environmental education research, 8(3):239-260.

[10] Ma Ben, Shen Jinyu, Ding Huimin et al. (2016) Research on protection attitudes and behaviors of farmers in natural reserves from the perspective of protection perception[J]. Resources Science, 38(11): 2137-2146.

[11] Duan Wei, Ma Ben, Qin Qing et al. (2016) Research on Farmers' Ecological Protection Behavior Based on Livelihood Capital[J]. Ecological Economy, 32(08): 180-185.