BILINGUAL PUBLISHING GROUP

Research in Ecology

https://journals.bilpubgroup.com/index.php/re

ARTICLE

Analysis of Ecological Compensation Willingness and Influencing Factors of Public Welfare Forest—Take Yulong County, Lijiang City as an Example

Falin Ding , ***Chong Zhou*** *

College of Humanities and Law, Southwest Forestry University, Kunming 650224, China

ABSTRACT

The construction of ecological public welfare forests is an important ccomponent and foundation of building a beautiful China and plays an important role in the construction of ecological civilization. As an important barrier to maintaining ecological balance and ensuring ecological security, ecological public welfare forests play an extremely important role in human survival and development. The construction and management of ecological public welfare forests can bring many ecological benefits to the local area; Yulong County has effectively improved the ecological environment after years of ecological public welfare forest construction. Therefore, promoting the healthy development of ecological public welfare forests is of great significance. Based on the data from the field questionnaire survey in Yulong County, this paper employs a binary regression model to analyze the influencing factors of willingness to pay for ecological compensation. It identifies the existing problems in the ecological compensation of public welfare forests in Yulong County and puts forward corresponding recommendations. These include improving the compensation policies for public welfare forests, strengthening system construction, adjusting the rural industrial structure, and increasing the income levels of farmers. The aim is to provide a reference for improving the management level and scientific management of ecological public welfare forests in Lijiang City and to achieve the management goal of continuously and stably exerting various ecological and social benefits of ecological public welfare forests.

Keywords: Yulong County; Ecological Compensation for Public Welfare Forests; Willingness of Forest Farmers; Influencing

*CORRESPONDING AUTHOR:

Chong Zhou, College of Humanities and Law, Southwest Forestry University, Kunming 650224, China; Email: 2322362631@qq.com

ARTICLE INFO

Received: 7 January 2025 | Revised: 18 March 2025 | Accepted: 25 March 2025 | Published Online: 7 May 2025
DOI: https://doi.org/10.30564/re.v7i2.8685

CITATION

Ding, F., Zhou, C., 2025. Analysis of Ecological Compensation Willingness and Influencing Factors of Public Welfare Forest—Take Yulong County, Lijiang City as an Example. Research in Ecology. 7(2): 19–31. DOI: https://doi.org/10.30564/re.v7i2.8685

Factor Analysis

1. Introduction

At present, building ecological civilization has become a strategic task of modernization, and maintaining ecological security has become a major issue facing the whole world. Forestry has an important place in the sustainable development strategy and a prime position in ecological progress. Ecological public welfare forest refers to forests, trees and forest lands designated in areas with important ecological locations or fragile ecological statuses, which play an important role in land ecological security, biodiversity conservation, and sustainable economic and social development. This includes shelterbelts, special purpose trees, forest lands and suitable forest lands included in the zoning scope of ecological public welfare forests [1]. Ecological public welfare forest is a forest type with the main purpose of soil and water conservation, wind prevention and sand fixation, water conservation, land security and providing environmental support for social stability and coordinated development. How to maximize its ecological benefits, properly solve the compensation problem in the construction of ecological public welfare forests, and maintain the living standards of mountain forest farmers is related to the success or failure of ecological public welfare forest construction and the stability and development of mountain society and economy. With the development of the economy and society and the progress of human civilization, how to meet the growing demand of society for forestry diversification, protect and strengthen the construction of ecological public welfare forests, and improve their ecological function has become an urgent problem to be studied and solved.

However, due to the strict restriction of logging in ecological public welfare forests, their business units and individuals cannot get direct benefits from long-term operation must pay necessary manpower, financial resources, and material resources for the protection and management of ecological public welfare forests. Without appropriate compensation, this kind of public welfare operation is unsustainable [2]. In order to make the management of ecological public welfare forests sustainable and develop, it is necessary for the society to give reasonable compensation for the economic interests of the operators of ecological public welfare forests, so as to improve the optimal allocation of forest land resources, realize the unity of forestry ecological, social and economic benefits, and promote the establishment of a complete forest ecosystem towards sustainable forestry development.

According to the data from a field questionnaire survey in Yulong County, this paper analyzes the influencing factors of ecological compensation willingness using a binary regression model, points out the problems existing in the ecological compensation of public welfare forests in Yulong County, and puts forward construction countermeasures for ecological public welfare forests. This research is of great significance in mobilizing farmers to participate in the construction of public welfare forests and promoting the healthy development of ecological public welfare forests in Yulong County, Lijiang City, Yunnan Province and even all parts of the country.

2. Research Status of Ecological Compensation for Public Welfare Forests

Yunnan is one of the four major forest areas in China, with a vast forest area. Forestry land accounts for 60.4% of the province's land area, ranking second in China, and the forest coverage rate has reached over 50% [3]. Yunnan forests and their whole ecosystem not only play a huge economic benefit, but also play an important role in maintaining ecological balance and improving climatic conditions in major river basins such as the Yangtze River, Pearl River and Lancang River. However, due to the complexity and diversity of topography, geomorphology and environment, three-dimensional topography and three-dimensional climate are very prominent, forming the characteristics of uneven spatial and temporal distribution of natural resources such as light, heat and gas, great differences in ecological environment, and unreasonable ways of resource development and utilization. The ecological environment in Yunnan Province is very fragile [4].

At present, scholars have made certain achievements in the research on ecological compensation for public welfare

forests. The hottest topic in the study of ecological public welfare forests by scholars is the ecological compensation of public welfare forests, with 64 such documents, ranking first[5]. Researchers have had a heated discussion on the theoretical basis of compensation for ecological public welfare forests, compensation standards, sources of compensation funds, compensation objects and management of compensation funds.

The academic community has basically reached a consensus on the compensation of ecological benefits of public welfare forests. Hong Shangqun and others believe that the importance of the public welfare forest compensation system is determined by the externality of environmental resources, the particularity of ecological construction and the urgency of environmental protection[6]. By analyzing the connotation and zoning status of ecological public welfare forests, Thaung Myint and Luo Zezhen found that in practice, due to the lack of understanding of the definition and types of public welfare forests, and the different ecological benefits pursued by the government and the interests of forest farmers, there is great randomness and neglect of the protection of farmers' interests when zoning public welfare forests[7]. Zhu et al. investigated and analyzed the relevant farmers in 10 case villages in Changxing County, Zhejiang Province, and proposed that in the construction of ecological public welfare forests, farmers' non-agricultural income sources should be expanded to improve farmers' willingness to participate in the construction of ecological public welfare forests[8]. Hao, Yang and Wen analyzed the interests, needs, and purposes of various stakeholders under the reform of the collective forest right system of ecological public welfare forests by constructing a game model, and argued that exploring a management and protection model to guide stakeholders to participate in the management and protection of ecological public welfare forests is key to solving the dilemma of ecological public welfare forest management and protection[9]. According to a questionnaire survey of 173 ecological forest farmers in Yichun City, Jiangxi Province, Zhang and Leng pointed out that farmers' management willingness is significantly related to age, education level, political background, forest land management mode, policies, and other factors in ecological forest construction[10]. Based on the field survey data of 18 villages in 6 counties of Guangxi, Hunan and Henan provinces, Jiang Bo used multi-classification logistic regression analysis to analyze the influencing factors of farmers' willingness to participate in the construction of ecological public welfare forests. The results showed that farmers generally supported the construction of ecological public welfare forests; however, they considered that the current ecological compensation standard is too low and the compensation mechanism is imperfect[11]. As forest farmers are the beneficiaries of ecological public welfare forest compensation and bear the main responsibility for ecological public welfare forest management and protection, identifying the problems existing in the current ecological public welfare forest compensation system based on farmers' willingness to compensate and analyzing the main factors affecting farmers' willingness to compensate of great significance to the development and construction of ecological public welfare forests in Yulong County, Lijiang City[12]. In view of this, based on the field investigation of 95 farmers in Yulong County, Lijiang City, this paper tries to quantitatively analyze farmers' willingness to compensate for public welfare forests, discuss their influencing factors, and deeply analyze the problems existing in the compensation of ecological public welfare forests in Yulong County, Lijiang City. It puts forward corresponding policy suggestions to consolidate the achievements of ecological public welfare forest management and protection and improve the enthusiasm of forest farmers to participate in ecological construction.

3. Development of Public Welfare Forest in Yulong County

Yulong County covers an area of 6,392.6 square kilometers. Among them, the forestry land area is 7.4 million mu. After the provincial public welfare forest zoning in December 2008 and the national public welfare forest grading zoning in March 2010, the county-level implementation plan of ecological public welfare forest was revised in 2011 to determine that the public welfare forest area in Yulong County was 4,449,600 mu. Among them, the national public welfare forest covers an area of 3.456 million mu; the provincial public welfare forest area is 97.35 mu; and 20,100 mu of mother forest in natural forest protection project is classified as municipal public welfare forest. The proportion of public welfare forests in the county is 60.1%. In 2011, the second phase of the Tianbao Project started, and all the national

public welfare forests and provincial public welfare forests in Tianbao District of Yulong County were included in the scope of ecological compensation. In 2011, compensation of 30.316 million yuan was issued, including 2,590,100 mu at the national level. The compensation standard was 10 yuan RMB per mu, and the compensation funds in place were 25.2535 million yuan; The provincial compensation area is 675,000 mu, the compensation standard is 7.5 yuan RMB per mu, and the in-place funds are 5,062,500 yuan. In 2012, compensation of 31,834,725 yuan was issued, including 2,590,100 mu at the national level and 25,253,500 yuan of funds; the provincial compensation area is 675,000 mu and the capital is 6,581,300 yuan. As the compensation standard per mu of provincial public welfare forests was raised to 10 yuan in 2012, after Yulong County allocated funds according to the ratio of 5:4:1, the labor cost of management and protection increased by 607,475.00 yuan compared with 2011. In 2013, the provincial public welfare forest ecological compensation funds had not yet been put in place. In order not to affect the progress of national demarcation and compensation fulfillment, it was decided to issue part of the compensation fee for forest owners of the national public welfare forest ecological benefit compensation fund in 2013 to villages and towns. Each township timely organized full-time staff of public welfare forests to complete the demarcation work of national public welfare forests, and then cashed the compensation fee of the fund into the forest farm card according to the demarcation decomposition of ownership area.

4. Description and Analysis of the Basic Situation of Sample Farmers in Yulong County

4.1. Data Sources

To study the ecological compensation willingness of public welfare forests and analyze the main influencing factors affecting forest farmers' participation in the construction of public welfare forests, in August 2013, this research group conducted a field investigation in four townships in Yulong County of Lijiang City: Fengke, Lashi, Longpan and Ludian. During the investigation, 3 villages were selected from each township, and 3 to 4 villagers' groups were randomly selected from each village to conduct a household questionnaire survey[13]. In this survey, the basic situation of public welfare forest construction in Yulong County and the family characteristics, income and economic activities of sample forest farmers were comprehensively investigated, focusing on the forest farmers' willingness to compensate for public welfare forests and compensation policies for a more detailed investigation. By random sampling, 95 forest farmers were selected from different villages in the 4 sample townships for the questionnaire survey. A total of 95 questionnaires were collected, and after data collation, 95 valid questionnaires were obtained, with a recovery rate of 100%.

4.2. Basic Situation of Farmers' Families in Public Welfare Forest Samples

In the field investigation, the research group mainly selected household heads who have a comprehensive understanding of family production and living conditions for random interviews. Through the survey, out of 95 valid samples, there were 87 males, or 92% of the total sample, and 8 females, or 8% of the total sample. The main age groups of respondents are between 40 and 50 years old, with a total of 40 people, accounting for 42.1% of the total sample. Respondents aged 30–40 and 50–60 account for 20% and 26.3% of the total sample, respectively, and the group over 60 years old is the least, at 11.6% of the total sample. The average family population of respondents is 3.25, most of which are concentrated in 3 people and 4 people, accounting for 35.43% and 28.12% of the total sample respectively. In the sample area, 48.4% of the interviewees had lower secondary education and a relatively high level of education, 32% had primary education, 12% had upper secondary education and above, and only 5.3% were illiterate. See **Table 1** and **Figure 1** for details.

The questionnaire survey of 95 households shows the family income structure of forest farmers as shown in **Figure 1**. It is preliminarily believed that the family income sources of farmers mainly consist of planting, forestry and grass, aquaculture, working, returning farmland to forests, ecological compensation, and other incomes. It can be seen from the graphic structure that farmers' income mainly depends on the income from planting, aquaculture and migrant workers, accounting for 49%, 15%, and 26%, respectively. Income from forestry accounts for a very small proportion,

Table 1. Basic conditions of the sample forest farmers.

Age			Degree of Education		
Group	**Effective Percentage**	**Accumulative Percentage**		**Effective Percentage**	**Accumulative Percentage**
30–40	20	20	An illiterate person	5.3	5.3
40–50	42.1	62.1	Primary school	33.7	38.9
50–60	26.3	88.4	Junior middle school	48.4	87.4
More than 60	11.6	100	High school and above	12.6	100
Total	100			100	100

at 5%. The higher the annual income from forestry, the more interested the farmer will be in the management of woodland. However, among the 95 households analyzed in this paper, the annual forestry income of most households is very low in absolute and relative terms. According to questionnaire statistics, 87.36% of farmers in the household have an annual forestry income below 1,000 yuan.

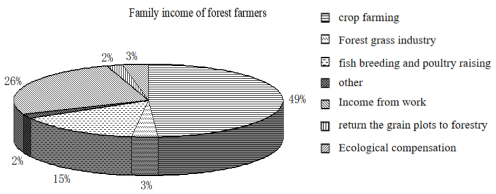

Figure 1. Family income of forest farmers.

5. Descriptive Analysis of the Problems Related to the Questionnaire of Farmers with Ecological Compensation in Public Welfare Forests

5.1. Analysis of Farmers' Awareness of Public Welfare Forests

The analysis of awareness of public welfare forests is the basis of studying the ecological compensation willingness of public welfare forests, and it is the standard to measure farmers' understanding of the connotation and value of public welfare forests. In the sample survey, 73 households know about public welfare forests, accounting for 76.8%; there are 78 households with public welfare forests in their homes, accounting for 82.1%. It shows that most farmers have a comprehensive understanding of public welfare forests, which lays a good foundation for the construction and management of public welfare forests. See **Table 2** for details.

5.2. Analysis of Farmers' Willingness to Manage and Compensate Public Welfare Forests

5.2.1. Analysis of Willingness to Classify Forest Land into Ecological Public Welfare Forest

Farmers' willingness to classify public welfare forests is conducive to improving their enthusiasm for managing public welfare forests. Therefore, the data of sample areas show the willingness of farmers to classify public welfare forests. 89 households are willing to classify forest land into ecological public welfare forests, accounting for 93.7% of the total sample, while 6 households are unwilling, accounting for only 6.3%. Farmers are willing to classify forest land into ecological public welfare forests, which promotes the construction of public welfare forests to a great extent. See **Table 3** for details.

5.2.2. Analysis of Ecological Compensation Fulfillment Degree and Fulfillment Satisfaction of Public Welfare Forest

The compensation standard is the core content of the compensation mechanism of ecological public welfare forests, which directly affects the stability and sustainability of public welfare forest construction. If the compensation standard is too high, first, national finance will face pressure; second, the social cost will be greater than the private cost, which cannot optimize the ecological efficiency and social efficiency of public welfare forests. On the contrary, if the compensation standard is too low, it is difficult to attract public welfare forest operators and affect their enthusiasm, which is not conducive to the long-term construction of public welfare forests. See **Table 4** for the specific compensation of sample farmers in Yulong County.

Table 2. The cognition of forest farmers on public welfare forests.

	Do You Know Anything about the Public Welfare Forest?		Is There a Public Welfare Forest?	
	Frequency	**Effective Percentage**	**Frequency**	**Effective Percentage**
Yes	73	76.8	78	82.1
No	22	23.2	17	17.9
Amount to	95	100	95	100
Total	100		100	

Table 3. Classifying woodland into public welfare forest.

	Frequency	**Percentage**	**Effective Percentage**	**Accumulative Perception**
Be willing	89	89	93.7	93.7
Under protest	6	6	6.3	100
Total	95	95	100	
	100	100		

Table 4. Compensation situation of farmers and cash satisfaction degree.

Content		**Whether It Is Satisfied with the Cash Policy (Household)**		
		Satisfied	Dissatisfied	Sum
Whether to receive compensation	Yes	45	38	83
	No	12	0	12
Total		57	38	95

According to the survey, 83% of farmers have received ecological compensation for public welfare forests, and 57% of forest farmers are satisfied with the fulfillment policy of compensation. According to the local actual situation, according to the compensation standards of 9.75 yuan per mu for national key public welfare forests and 4.75 yuan per mu for provincial public welfare forests, except for some areas with disputes and contradictions, the funds have been deposited into farmers' one-card accounts. Most farmers feel that the standard of compensation is too low, and the area of public welfare forest allocated to each household is limited and the amount is too small, which cannot improve farmers' enthusiasm for management and protection.

5.2.3. Satisfaction Analysis of Farmers' Public Welfare Forest Compensation Policy

The compensation policy mainly involves the compensation standard. It is a prerequisite for the sustainable operation of public welfare forests to establish an ecological compensation system for public welfare forests and ensure the sources of compensation funds needed for public welfare forest management. Vertical compensation is an important part of ecological compensation mechanism of public welfare forests[13, 14]. The ecological compensation fund of public welfare forests is the main capital investment to maintain general and regular business activities in the process of public welfare forest management, and it is the material basis for maintaining the production cycle in the process of public welfare forest management[15]. While constantly improving compensation standards, we should also actively explore policies and measures for public welfare forests. Sample data are therefore analysed from the policy level. It can be seen from the data in **Table 5**.

83% of farmers know the compensation policy for public welfare forests, while only 12% do not know it. However, 46% of farmers are dissatisfied with the compensation policy, which is almost equal to their satisfaction. It shows that in the process of compensation for ecological public welfare forests, we should strengthen system construction and improve policy mechanism.

Table 5. Compensation policies for public welfare forests and farmers' satisfaction degree.

Group	Content	Whether You Know the Public Welfare Forest Compensation Policy		Sum
		Yes	No	
Satisfied group	Total	39	10	49
	Satisfaction with the compensation policy %	79.60%	20.40%	100.00%
	Do you know the public welfare forest compensation policy %	47.00%	83.30%	51.60%
Dissatisfied group	Total	44	2	46
	Satisfaction with the compensation policy %	95.70%	4.30%	100.00%
	Do you know the public welfare forest compensation policy %	53.00%	16.70%	48.40%
Total	Total	83	12	95
	Satisfaction with the compensation policy %	87.40%	12.60%	100.00%
	Do you know the public welfare forest compensation policy %	100.00%	100.00%	100.00%

6. Measurement and Analysis of Ecological Compensation Willingness and Influencing Factors of Public Welfare Forest (Binary Logistic Regression Analysis)

6.1. Method, Variable Selection and Model Selection

To analyse the influencing factors of farmers' willingness to compensate for ecological public welfare forests and further clarify their influence degree and significance, this paper establishes a measurement model on farmers' willingness to compensate for public welfare forests[16]. The intention of compensation willingness analysis is to study the degree of determination of various variables in the decision-making process of farmers' willingness to compensate for public welfare forests.

The willingness of farmers to compensate for public welfare forests has two results: willingness and unwillingness. Of the 95 sample farmers, 65 were "willing", 25 "unwilling" and five did not give a clear answer. In this paper, the data of 5 households who did not give clear answers were excluded, and the data of the remaining 90 households were used as analysis objects to quantitatively analyse the determination degree of various factors in the decision-making process of farmers' willingness to compensate for public welfare forests. Referring to relevant documents, it is preliminarily considered that farmers' personal characteristics, family income, understanding of public welfare forests, compensation policies of public welfare forests and other factors have a certain influence on the compensation willingness of public welfare forests[17]. Combined with the specific indicators and data in the questionnaire, this paper sets 10 variables, and the variables and their specific explanations are shown in **Table 6**.

Whether farmers are willing to make ecological compensation for public welfare forests is determined by a series of factors. y is the dependent variable, where 1 = willing, and 0 = unwilling, and xi is the independent variable. A binary logistic regression equation is constructed:

$$\ln\left[\frac{p}{1-p}\right] = \beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_9X_9+\beta_{10}X_{10}+\epsilon \quad (1)$$

where, P is the probability of y = 0 and 1, P is the probability of $y = 1, \beta_0, \beta_1, \beta_2, \ldots, \beta_{10}$ is the parameter to be estimated, ε is the residual error term, and X1, X2, ... , X10 are the various variables in the regression equations. It shows the farmers' own factors: the age of the head of household, the education level of the head of household, and whether they serve as village cadres; farm household factors: total household income, area of family woodland; policy factors: farmers' cognition of public welfare forests, knowledge of the policy channels of public welfare forests, and whether they are satisfied with the fulfillment policies of public welfare forests.

Table 6. Descriptive statistics of variable characteristics of sample farmers.

Variable	Metric	Expected Impact	Average Value	Standard Deviation
y wish	0 = unwilling, and 1 = willing		0.26	0.44
X1 gender	1 = male, and 2 = female	burden	4.36	1.52
X2 household age (years)	continuous variable	burden	46.32	10.38
X3 education level	0 = illiteracy, 1 = primary school, 2 = junior high school and above	burden	0.8	0.68
Whether the X4 is a village cadre not	And 0 = No, and 1 = Yes	burden	0.27	0.44
X5 Woodland area (hm^2)	continuous variable	the first month of the lunar year	4.27	3.48
X6 family annual income (yuan)	continuous variable	the first month of the lunar year	36495.37	20783.15
X7 whether to recognize the public welfare forest	And 0 = No, and 1 = Yes	burden	0.86	0.74
X8 know the public welfare forest compensation policy	And 0 = No, and 1 = Yes	the first month of the lunar year	0.71	0.45
X9 know the public welfare forest compensation policy channels	0 = superior notification, 1 = radio, TV network, 2 = family, friends, or other ways	the first month of the lunar year	2.71	0.71
Whether the X10 is satisfied with the public welfare forest cash policy	0 = not satisfied, and 1 = satisfied	burden	1.37	0.59

6.2. Analysis of Model Results

The SPSS 19.0 software was used to carry out a binary logistic regression analysis on various variables for 95 farm households, taking y as the explanatory variable and X1, X2, ..., X10 as the independent variables. The results of the analysis are given in **Table 7**. From the estimation results, the pseudo-determination coefficient (Nagelkerke R-Square) is 0.627, which means that the model explains more than 62% of the changes in the explained variable, indicating that the model has a good fit for the data.

Table 7 gives the estimated coefficients, standard errors (S.E.), Wald statistic, degrees of freedom (df), significance (Sig) (pvalue), and occurrence ratio (Exp (β)).

As can be seen from **Table 7**, out of 10 variables, 4 variables have a significance below 0.05, namely X3 (educational attainment), X5 (wooded area), X6 (household income of forest farmers), and X8 (compensation policy for public welfare forests). It shows that these four variables have a significant positive correlation with farmers' ecological compensation willingness for public welfare forests. The p-values of the other six variables are all greater than 0.05, so it is considered that they have no significant influence on farmers' willingness to compensate for public welfare forests. The analysis is as follows.

6.2.1. Analysis of Significant Influencing Variables

Table 7 shows that the significance of four variables is below 0.05, namely X3 (education level), X5 (forest land area), X6 (household income of forest farmers) and X8 (compensation policy for public welfare forests), which shows that these four variables have a significant influence on farmers' ecological compensation willingness for public welfare forests.

Firstly, education level has a significant influence on the willingness for ecological compensation for public welfare forests. The higher the educational level of individuals, the stronger the willingness to accept new things. In this paper, it can be considered that the higher the education level of the head of household, the more they can understand the nature and significance of public welfare forests, leading to stronger enthusiasm and a clearer willingness to compensate for public welfare forests, as explained by the analysis results.

Secondly, the area of forest land has a significant influence on the ecological compensation of public welfare forests. As can be seen from the output results, the p-value of woodland area is 0.042, which is less than the significance level, which indicates that woodland area has a significant influence on the ecological compensation of public welfare

Table 7. The variables in the equation.

Variable	B	S.E.	Wals	df	Sig.	Exp (B)
X1	–10.781	0.389	0.370	1.000	0.533	0.980
X2	–9.253	0.498	0.059	1.000	0.809	2.336
X3	0.703	0.033	5.421	1.000	0.021	2.020
X4	–0.137	0.694	1.637	1.000	0.074	0.872
X5	0.967	0.007	3.182	1.000	0.042	0.470
X6	0.808	0.537	4.155	1.000	0.020	0.360
X7	–4.242	0.732	2.164	1.000	0.096	0.999
X8	0.857	0.038	8.412	1.000	0.021	1.000
X9	–0.169	0.418	5.301	1.000	0.075	1.032
X10	–11.672	0.529	2.765	1.000	0.998	0.999
constant	40.481	2.975	4.121	1.000	0.046	1,075.520

forests. Under the condition that commercial forest management is controlled, if there are more public welfare forests in the forest land area, the more ecological compensation for public welfare forests farmers will receive. This improves the enthusiasm of forest farmers. Most forest farmers prefer to divide their forest land into national key public welfare forests to receive more compensation and ensure better management and protection.

Third, annual family income has a significant impact on the compensation willingness for public welfare forests. Under normal circumstances, the higher the annual income, the higher the living standard. After meeting basic material needs, they will pursue immaterial or spiritual life. After the forest land is zoned as a public welfare forest, it can continuously conserve water and soil, purify the air, and beautify the environment. Therefore, farmers with high family income are more likely to prefer their own forest land to be zoned as public welfare forest, thus obtaining compensation for public welfare forest. Farmers with lower incomes are unwilling to turn economic forests into public welfare forests to maintain normal living expenses. The income from ecological compensation for public welfare forests is too small for them to solve the problem at all.

Fourthly, the compensation policy for public welfare forests has a significant impact on the ecological compensation of public welfare forests. The p-value of the compensation policy for public welfare forests is 0.021, which is significantly less than the significance level. It shows that the compensation policy for public welfare forests has a significant impact on the ecological compensation of public welfare forests. Through this field investigation, it is known that the current ecological compensation amount is far lower than farmers' expectations, and it is far from enough to invest this part of funds in ecological forest management and protection. Its role in ecological forest protection does not show a greater effect, so the compensation standard for ecological forest should be raised. Therefore, it is necessary to improve the ecological compensation policy and improve the enthusiasm of farmers for management and protection.

6.2.2. Analysis of Non-Significant Influencing Variables

Table 7 shows that except for X3 (education level), X5 (forest land area), X6 (household income of forest farmers) and X8 (compensation policy for public welfare forests), the P values of the other six variables are greater than the significance level. Therefore, it is considered that they have no significant influence on farmers' willingness to compensate for public welfare forests. The analysis is as follows.

First, family political background characteristics have no positive significant influence on willingness to compensate. The output results show that the P value of whether to serve as a village cadre is 0.074, and the occurrence ratio Exp (β) is 0.872, indicating that whether to serve as a village cadre has no significant influence on the willingness to compensate for public welfare forests. Farmers who have or have had cadres or party members in their families have no direct relationship with their willingness to compensate for public welfare forests. Although rural cadres have more knowledge of ecological forest construction and easier access to policy information than farmers, this does not mean that farmers with family backgrounds are willing to participate in the construction of ecological public welfare forests.

Second, the construction and publicity of the local eco-

logical forest system have no significant influence on the willingness to compensate. The compensation policy sources variable coefficient is 0.075, which is not significant at the 0.05 level. We would generally expect that the wider the sources and channels of compensation policies for public welfare forests, the stronger the willingness of forest farmers to participate. The survey results are just the opposite. It is necessary to establish and improve the local ecological public welfare forest system and strengthen publicity to improve farmers' willingness to participate in public welfare forest management.

Third, the age of the head of household has no significant effect on the willingness to compensate. The coefficient of the age variable is not significant at the 5% level, which indicates that age has no influence on farmers' willingness to compensate for public welfare forests. There is no direct influence from age, forestry production experience, or forestry income. The output results also prove that the forester's personal situation has no significant influence on the willingness to compensate.

Fourth, the gender of the head of household has no significant influence on the willingness to compensate for public welfare forests. The coefficient of the gender variable is 0.533, which is not significant at the level of 5%, indicating that gender has no influence on farmers' willingness to compensate for public welfare forests. Gender had no significant effect on willingness to compensate, in line with expectations for the variable and confirmed by the survey data.

Fifth, forest farmers' awareness of public welfare forests has no positive and significant impact on compensation willingness. The output results show that the p-value of the cognitive public welfare forest is 0.096 and the occurrence ratio Exp (β) is 0.999, indicating that awareness of public welfare forests has no significant effect on the willingness to compensate. When asked "whether to recognize public welfare forests", most farmers need to have it explained carefully in order to better and comprehensively understand public welfare forests. In the questionnaire survey of farmers, it is known that many farmers blindly follow the awareness of public welfare forests, so we should improve farmers' awareness of public welfare forests, which is conducive to the protection and development of public welfare forests.

Sixth, whether forest farmers are satisfied with the fulfillment policy of public welfare forests has no significant impact on the willingness to compensate. The coefficient of the fulfillment satisfaction variable is 0.998, which is not significant at the level of 0.05. When initially setting variables, we believe that the more farmers are satisfied with the compensation policy for public welfare forests, the more willing they are to participate in the construction and protection of public welfare forests, which shows that the impact on the willingness to compensate for public welfare forests is positive. However, according to our survey data, forest farmers think that compensation is just a little. Although they are satisfied with the compensation policy, it can not solve the current situation of living hardship, so whether they are satisfied with the compensation policy does not affect their willingness to compensate public welfare forests.

7. Countermeasures and Suggestions on Compensation Willingness of Public Welfare Forest

First, improve the compensation policy for public welfare forests and strengthen system construction. At present, the compensation policy for public welfare forests still adopts the "one-size-fits-all" approach, and the compensation amount is far from meeting farmers' expectations. Therefore, it is necessary to start the long-term compensation system as soon as possible and establish a permanent ecological construction guarantee system in key ecological functional areas. It is necessary to fully realize the difference between public welfare forest compensation and general agricultural compensation, and the public welfare forest compensation policy should consider the interests of the obligee in all aspects. The compensation scheme for public welfare forests should address several key issues that farmers face when managing these forests. These include the costs associated with the management and protection of public welfare forests, the opportunity costs incurred due to the inability to run commercial forests because the land is designated as public welfare forests, and the lost opportunity costs of developing related industries in public welfare forest areas. Therefore, it is essential to implement a comprehensive compensation mechanism for public welfare forests to address these challenges and ensure the sustainable management of these forest

resources. From the field investigation of sample farmers, it is found that some farmers know that the state has compensation policies for public welfare forests. Most farmers do not understand the compensation policy of public welfare forests, and there is great blindness.

Second, adjust the rural industrial structure and improve the income level of farmers. In addition to increasing forestry income, we should also pay attention to adjusting the rural industrial structure according to local conditions, and increase farmers' income from planting or aquaculture, sideline industry, commercial drink industry and working, to improve farmers' total household income and per capita income level. With the improvement of the per capita income level of farmers' families, the living standards of farmers will also improve, so that farmers' dependence on public welfare forest compensation will be reduced, and their demand will shift from the demand for material life to the demand for spiritual life, making them more willing to carry out public welfare forest construction activities. This is conducive to the long-term stable development of public welfare forest construction.

Third, strengthen the construction and publicity of the local ecological forest management system. In some places, there are phenomena in ecological forest construction, such as simple working methods and inadequate policy propaganda, which lead to the situation where the masses do not understand or support ecological forest construction. Therefore, it is crucial to enhance the development of local ecological forest management systems and policy promotion efforts, to encourage active participation from farmers in ecological forest construction and enable them to benefit from it. Specifically, two main aspects should be focused on: Firstly, strengthen the system construction. This includes establishing and improving systems such as the ecological forest archives management system, the ecological compensation fund management system, the signing and management system of management and protection contracts, as well as the logging prohibition and restriction agreements, etc. Secondly, vigorously expand the information channels for farmers and intensify the promotion of systems and policies. Towns and villages can utilize slogans and mobile propaganda vehicles to conduct focused publicity campaigns. This will help farmers gain a better understanding of the significance of ecological forest construction, compensation measures, and protection policies.

According to field investigations, many farmers have never heard of the public welfare forest policy, but only know that the forests in their areas are classified as forbidden forests. Forest farmers do not know much about public welfare forests, which is also one of the reasons for adopting a negative attitude towards forest management and indifference to their own forest land and natural growth. Therefore, local governments should adopt various channels and means to increase the publicity of public welfare forest policies, such as rural publicity activities, various TV, newspaper, and other media reports, etc., to promote forest farmers' understanding of public welfare forest policies. Only by strengthening the awareness of ecological protection of public welfare forests and the publicity of relevant laws, regulations and policies can farmers' awareness and consciousness of public welfare forest protection be improved.

8. Conclusions

From the existing research literature, scholars do not have much difference on the theoretical aspects (such as connotation, compensation necessity and theoretical basis) of compensation for ecological benefits of public welfare forests, but pay more attention to the compensation mechanism, that is, how to compensate can realize the sustainable social supply of maintaining ecological benefits of forests. However, an effective compensation mechanism needs to be based on farmers' willingness to compensate, which needs further investigation and study [18].

Based on field investigation and reference to many documents, this paper introduces the resource status of ecological public welfare forests in Yulong County, Lijiang City, and analyses the influencing factors of ecological compensation and compensation willingness of public welfare forests. The binary regression model is used to analyse the factors that have a significant influence on farmers' willingness to compensate for public welfare forests, point out the problems existing in ecological compensation of public welfare forests in Yulong County, and put forward the construction countermeasures of ecological public welfare forests. Ecological compensation of public welfare forests has a great influence on the vast rural areas of China. Therefore, the compensation policy of public welfare forests should meet the needs

of farmers and benefit the long-term development between rural areas and regions. All these need to be rooted in rural areas, proceed from reality and farmers, to fundamentally establish a sound compensation mechanism for ecological public welfare forests.

Author Contributions

Conceptualization, methodology, data curation, formal analysis, validation, writing—original draft preparation, F.D.; data curation, formal analysis, validation, writing—original draft preparation, writing—review and editing, C.Z. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

Data will be made available on request.

Acknowledgments

Not applicable.

Conflicts of Interest

All authors declare no conflict of interest.

References

[1] Wang, X., Han, Y., Sun, S., et al., 2012. Thoughts on the present situation and management countermeasures of ecological public welfare forests in Liaoning Province. Liaoning Forestry Science and Technology. 6, 35–36.

[2] Jiang, L., 2010. Study on ecological compensation for public welfare forests in China. Hunan Agricultural Science and Technology. 8, 22–24.

[3] Li, J., 2012. Investigation and analysis of the compensation of ecological effects of public welfare forests in Yunnan Province. College of Management Cadres of the Ministry of Agriculture. 11(8), 88–89.

[4] Du, Z., Luo, M., Cheng, Q., 2011. Discussion on the present situation and countermeasures of compensation for forest ecological benefits of provincial public welfare forests in Yunnan Province. Management of Forestry Resources. 6(3), 20–21.

[5] Qi, L., 2004. A review of the literature on research in ecological public welfare forests. Journal of Agricultural Book Intelligence. 7(7), 97–98.

[6] Hong, S., Ma, P., Guo, H., 2001. Exploration of ecological compensation systems. Environmental Science and Technology. 5, 4–7.

[7] Myint, T., Luo, Z., 2008. Forest zoning for the ecological public good and the maintenance of farmers' interests. Forestry Economic Issues. 28(4), 93–96.

[8] Zhu, Z., Shen, Y., Wu, W., et al., 2010. Empirical analysis of the willingness of farm households to participate in the construction of ecological public welfare forests. Journal of Zhejiang Forestry College. 27(3), 430–436.

[9] Hao, C., Yang, L., Wen, Y., 2010. Analysis of the stakeholder game in the reform of collective forest right system in ecological public welfare forest. Forestry Economy. 7, 26–29.

[10] Zhang, X., Leng, X., 2010. Empirical analysis of factors affecting farmers' willingness to operate in ecological forests—based on an investigation in Yichun City. Jiangxi Province. Journal of Yichun University. 32(6), 47–49.

[11] Jiang, B., 2011. Empirical analysis of factors influencing farmers' willingness to participate in the construction of public welfare forests - based on questionnaires in Guangxi, Hunan and Henan provinces. Forestry Economics. 6, 59–64.

[12] Yang, L., Wen, Y., Zhang, Y., 2013. Analysis of the influence of forest farmers' wishes on the efficiency and mechanism of ecological public welfare forest management and protection - taking the mountainous counties of Beijing as an example. Resource Science. 35(5), 1066–1067.

[13] Qian, L., Zhi, L., Qi, X., et al., 2011. Investigation and analysis of forest farmers' management willingness after collective forest reform in Tianbao District—taking Yulong County as an example. Forestry Economic Problems. 8(4), 325–326.

[14] Li, R., Hu, L., 2006. Discussion on project management of ecological benefit compensation fund for national key public welfare forest in Lancang County. Forestry Survey Planning. 31(2), 85–87.

[15] Wang, Z., 2010. Difficulties and countermeasures of ecological compensation for public welfare forests in the Pearl River Basin—Take Guizhou Province as an

example. Journal of Party School of Guiyang City. 2(111), 49–50.

[16] Zhi, L., Fan, S., Li, Q., et al., 2013. Empirical analysis of farmers public welfare forest zoning willingness—Take Wulong County and Yulong County of Tianbao project area as an example. Forestry Economy. 8, 106–109.

[17] Zhi, L., Wang, S., Li, Q., et al., 2012. Analysis of the influencing factors of farmers willingness to invest in collective public welfare forests after forest reform—Take Wulong County, Huili County and Yulong County of Tianbao Project area as examples. Forestry Economy. 3, 28–31.

[18] Yang, X., Zhou, S., 2010. Summary of research on ecological benefit compensation of public welfare forests. Anhui Agricultural Science. 38(21), 59–61.