

The Influence of the Reform of Collective Forest Right System on Farmers' Forestry Income

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Abstract: Increasing the income of forest farmers is an important goal of supporting the reform of collective forest rights system. Based on the survey data of fifty villages in ten counties of Shaanxi Province, this paper empirically analyzes the impact of the supporting reform of collective forest right system on farmers' forestry income through the structural equation model, and obtains the following conclusions: (1) financial subsidy system, operation contracting system, The forest land circulation system has a significant positive impact on household forestry income, and the forest resource harvesting system has a significant negative impact on household forestry income. (2) The standardized path coefficients of the latent variables of financial subsidy system, contracting system, forest resources harvesting system, and forest land circulation system are 0.672, 0.363, -0.234, and 0.553, respectively, indicating that the financial subsidy system has the largest impact on the farmers' forestry income and the forest land circulation. Secondly, the effects of the contracting system and resource removal are small. It also provided reference for the reform of supporting the deepening of the collective forest rights system in Shaanxi Province and put forward policy recommendations for the government.

Keywords: collective forest rights system supporting reform policy, farmer's forestry income, structural equation model.

1. INTRODUCTION

Woodland resources have both production functions and ecological functions and are of great significance to the development of the country. According to the Fourth National Forest Resources Survey, China's current forest area and forest stock volumes are 134 million hm² and 10.1 billion m³ respectively, ranking sixth in the world. The forest coverage rate has reached 13.9%, but the per capita amount is far lower. World per capita. In order to further

liberate and develop the productivity of forestry, develop modern forestry, increase the income of peasants, and build an ecological civilization, the state will comprehensively promote the reform of the collective forest right system. In June 2003, the "Decision on Strengthening Forestry Development" established the objective of the reform of the forestry rights system. After undergoing major reforms to clarify the subject of the forestry property rights and issuing certificates of property rights, forest farmers have become the main business entities with forestry property rights. The "Opinions on Comprehensively Promoting the Reform of Collective Forest Rights System" in 2008 pointed out that the policies and measures to improve forestry reforms mainly include the contracting system for operations, the harvesting system for forest resources, the circulation system for forest land, and the forestry financial subsidy system.

Shaanxi Province started the forest reform work in 2007. By 2012, the main reform of the forestry reform has been completed. The property rights of the collective forest land in the province have been clarified, and the main reforms have achieved remarkable results. The counties and districts have confirmed the right to contract the collective forest land within the jurisdiction and actively introduced the forest land. Corresponding supporting measures. According to the report on reform of the collective forest tenure system in Shaanxi in 2014, the main reform of the forestry reform has been basically completed, and the rate of confirming the right and the right to forest right certificate have all reached close to saturation levels; the investment in forestry by the government and peasant households has increased. The household income of rural households has increased.

Reliving the forest management, activating the forest management intention, and increasing the income of forest farmers in the farmer households are the key contents of the reform of the forest ownership system. Therefore, it is of great significance to pay attention to the impact of the reform of the forestry rights system on farmers' forestry revenues: not only can they be used as indicators to evaluate the performance of collective forestry reform, but also can enrich the research on the performance of collective forest tenure reform and can also compare the performance of different policies. Analyze and explore the specific impact of different policies to provide scientific evidence for deepening the reform of the collective forest rights system.

2. LITERATURE REVIEW

In recent years, the reform of collective forest rights system has attracted widespread attention from scholars at home and abroad. From academic design to institutional performance, from theoretical analysis to empirical analysis, scholars have conducted a lot of scientific research. From the research content, the most research on the forest reform policy is the evaluation of the achievements of collective forestry reform and the research on the performance. Most researchers have discussed the performance of the forestry reform system from many aspects of economic, social and ecological benefits. According to whether or not the mathematical model is used in the research, the existing researches on the performance of forestry reform can be divided into two aspects: quantitative empirical analysis and subjective description analysis.

In terms of subjective description analysis, Runsheng Yin believes that due to differences in the stability of policy environment in different regions, the benefits from forestry reform are also different. Li Zhou made an international perspective on the forest tenure reform and proposed that the forest tenure reform in collective forest areas aroused the enthusiasm of farmers to cultivate forests [2]. Chen Xingliang and others based on the research data of Fujian Shaowu, through the analytic hierarchy process, concluded that the forest reform is an important factor affecting the income of forest farmers [3]. Peter believes that China's forestry reform system is excessively intervened by the government, and it is difficult for farmers to fully acquire forestry rights. The system of forest cutting quotas, etc., will create obstacles to increasing farmers' income [4]. Horst Weyerhaeuser believes that the forest reform system that is equally distributed to households can promote economic growth in China's forest areas and improve the ecology [5]. Wang Wencan, from the perspective of the changes in the sales income of farmers' forest products, through the survey data, the impact of the reform of the collective forest right system on the sales income of farmers' forest assets is not significant [6]. Li Ya et al. found through research on three case villages in Jiangxi province that forestry reform can increase rural household income [7].

In terms of quantitative empirical analysis, Liu Xiaoqiang used the dual difference model to study the ecological performance of forestry reform. The empirical results show that the increase in forest area and forest reserves by the forestry reform system is not significant, and ecological benefits are not reflected [8]. Juan Chen and John L. Inners believe that the related policies of forestry reform have achieved the expected goals and that the elimination of timber revenues and the adoption of other market mechanisms to increase forest farmers' income will help eliminate poverty [9]. Kang Xiaolan et al established an evaluation system including social, ecological, and economic aspects to analyze the performance of the forestry reform and concluded that the performance of the forest reform in three aspects was inconsistent [10].

The research on forestry reform in China has been more in-depth, but the existing research still has room for development: First, at the current stage, there is relatively little research on supporting policies, and most of them are still focused on research on subject reform; The research of the literature on the performance of forestry reform is based on descriptive statistics, lacks empirical analysis, and lacks an interpretive study of the status quo. Third, most of the studies consider the forest reform supporting reform policy as a whole and the overall policy. The performance was studied without a specific policy in the reform.

In summary, this paper selects data from 50 villages in 10 counties of Shaanxi Province and establishes a structural equation model to focus on the impact of individual policies in the reform of the collective forest tenure system on farmers' forestry income.

3. RESEARCH HYPOTHESES

The operating contracting system is to implement the forest land to the farmers through family contracting, and to establish the principal position of the farmers as the right holders of forest land contractual management. In previous studies on the relationship between property rights

and economic benefits, the predecessors have pointed out that private property rights have incentive functions that have a direct and direct impact on property owner expectations and decisions [10]. The management contracting system fully and clearly defines the property rights and will encourage farmers to increase investment in forestry, fully mobilize the forest farmers' production enthusiasm, and thus increase their forestry income. Based on this, this paper proposes the following hypotheses:

3.1 Hypothesis 1: Operational contracting system will positively affect farmers' forestry income.

The current forest resource harvesting system is based on the "simulated calculation method" to measure a reasonable amount of annual cutting, and according to the forest management plan prepared quotas. However, due to the lack of investment in forestry funds in various regions, the basic data on forest resources are often not promptly updated. As a result, basic resource data for compiling cutting quotas cannot be reliably and effectively protected [12]. For non-state-owned family forestry operators, their primary business objective is to pursue immediate economic benefits and recover investment costs. They rarely consider or even consider ecological benefits. Under the current quota system, forest farmers are bound by cutting quotas and cannot exercise their ownership in accordance with their own will. This objectively impedes the enthusiasm of farmers for investing in forestry and will have a negative impact on farmers' forestry revenues. Based on this, this paper proposes the following hypotheses:

3.2 Hypothesis 2: The forest resource harvesting system will negatively affect the forestry income of farmers.

The transfer of forestland management rights means that, without preserving the ownership of forest land and the use of forest land, the contractor of forest land contractors will, in the form of joint-stock cooperation, subcontracting, and leasing, use the forest land management rights and the ownership and use rights of forest trees in whole or in part. Acts transferred to citizens, legal persons or other organizations [12]. Through the issuance of the Forest Land Operation Transfer Permit, it can effectively protect the legitimate rights and interests of the actual operators of forest land, eliminate the concerns of forest land operators, increase the production investment after forest land circulation, and improve the forest land management level. At the same time, Lin Quan also has a mortgage loan financing function, which can fully eliminate farmers' concerns and increase farmers' enthusiasm in the development of forestry production. Based on this, this paper proposes the following hypotheses:

3.3 Hypothesis 3: Forest rights circulation system will positively affect farmers' forestry income.

Since 2009, China's government has successively implemented a series of central government forestry subsidy policies (referred to as "forestry subsidy policies"), such as afforestation subsidies, forest sustenance subsidies, national forest tree seed subsidies, forest insurance premium subsidies, and forest ecological benefits compensation. Based on the Tobit model study, Shu Bin and others based on pilot counties in Zhejiang Province found that the forestry

subsidy policy can significantly encourage farmers to increase forestry investment [14]. Qu Shuting believes that the forest insurance subsidy is conducive to improving the ability of the business entity to prevent and mitigate disasters through the AHP [15]. The increase in forestry input will increase its returns correspondingly, and the improvement of disaster prevention and reduction capabilities will also ensure the stable development of forestry to a certain extent. In summary, we propose the following assumptions:

3.4 Hypothesis 4: Forestry subsidy policies will positively affect farmers' forestry income.

4. DATA AND VARIABLES

4.1 (I) Sample selection

The total number of questionnaires for peasant households was 530, and 500 valid questionnaires. A total of 50 Villages in Ten Counties, including Danfeng, Ningshan, Huxian, Jiaxian, Ansai, Huangling, Dingbian, Chengcheng, Xixiang and Taibai, were investigated.

4.2 (II) Statistical description

The demographic characteristics of the effective household questionnaire are shown in Table 1. Sample farmers individual basic characteristics. Among sample farmers, 96.6% are males and 3.4% are females. Samples of rural households are 46-60 years old, accounting for 55.80% of the total. It is precisely because young and middle-aged people are out working and working, the rural labor force is ageing; The level of education generally showed a relatively low level, in which primary school education accounted for 36%, junior high school accounted for 46.4%, high school accounted for 16.2%, and bachelor degree or above was only 1.4%.

Table 1. Demographic characteristics of survey samples

Variable	Variable meaning	Sample size	%	Variable	Variable meaning	Sample size	%
Gender	Male	483	96.6	Education	Primary and below	180	36
	Female	17	3.4		Junior	232	46.4
Age	30-45 years old	84	16.8		High	81	16.2
	45-60 years old	279	55.8	Bachelor and above	7	1.4	
	60 years old and above	137	27.4	Planting area of farmers	100 mu below	325	65
Social experience	Cadres	94	18.8		100-500 mu	128	25.6
	Ordinary Villagers	406	81.2		500 mu above	47	9.4

4.3 (III) Variable measurement

Table 2. Variables

Variable definition	Latent variable		Observation variables		
	symbol	Meaning	Symbol	Indicators	Definition
Exogenous Potential Variable	C	Woodland Circulation Policy	C1	The degree of willingness to transfer forest land	1 ~ 3 represent unwilling, general, willing
			C2	Difficulty in obtaining information of forestland circulation	1 ~ 3 represent difficult, general, easy
	D	Resources Logging Policy	D1	Satisfaction with logging management policies	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
			D2	Satisfaction degree of stopping felling of natural forest	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
	E	Financial Policy	E1	Satisfaction with forestry subsidies	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
			E2	Satisfaction degree of ecological benefit compensation	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
			E3	The satisfaction of the village ventilation construction	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
	F	Contract Business System	F1	The degree of understanding of forestland Arbitration	1 ~ 3 represent not understanding, general, understanding
			F2	Satisfaction of Ling Contract	1 ~ 3 To represent dissatisfaction, general, and satisfaction, respectively
	Endogenous Potential Variable	G	Farmers Family Forestry Income	F1	Total income of household forestry

5. EMPIRICAL ANALYSIS AND RESULTS

5.1 (I) Model setting

The collective reform of forest tenure right in this paper has the basic characteristics that it is difficult to measure directly and difficult to avoid subjective measurement errors. Structural equations provide an analytical tool that can be observed and processed for latent variables that are difficult to directly observe, and that can incorporate unavoidable errors into the model. To this end, this paper applied SEM to develop a study on the impact of collective forestry rights reform policies on farmers' forestry income.

The structural equation model includes: 1 measurement model: reflect the relationship between latent variables and measurable variables; 2 structural models: reflect the structural

relationship between latent variables. The SEM is represented by the matrix equation as follows:

$$\eta = \beta\eta + \phi\xi + \lambda \tag{1}$$

$$X = \Lambda_x\xi + \delta \tag{2}$$

$$Y = \Lambda_y\eta + \varepsilon \tag{3}$$

Equation (1) is a structural model, which is an endogenous latent variable, is an exogenous latent variable, and connects an endogenous latent variable with an exogenous latent variable through a sum matrix and an error vector.

Equations (2) and (3) are measurement models, are measurable variables of exogenous latent variables, are measurable variables of endogenous latent variables, are correlation coefficient matrix of exogenous latent variables and their measurable variables and are endogenous potentials. The correlation coefficient matrix of variables and their measurable variables, through the measurement model, latent variables can be reflected by measurable variables.

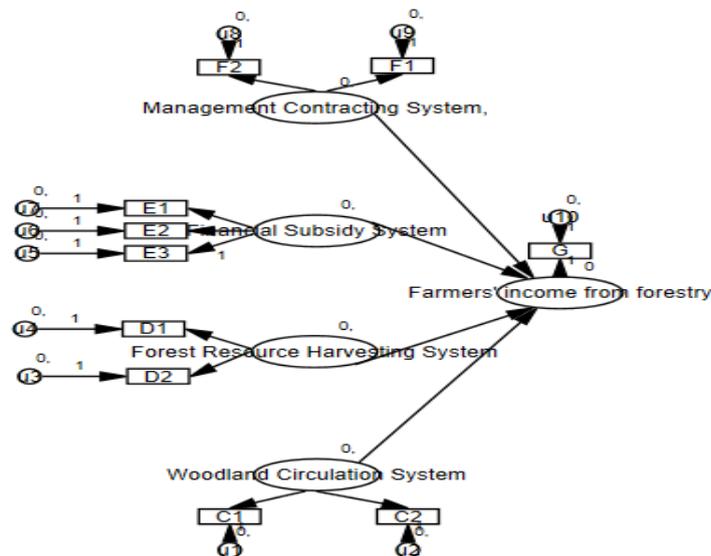


Fig.1. structural equation model

5.2 (II) Scientific test of the sample

Reliability Test.

Reliability refers to the consistency, stability, and reliability of the test results. In this paper, Cronbach's alpha or Cronbach's α and Guttman split-half coefficient are used as indicators for the reliability test. When Cronbach's α coefficient value is greater than or equal to 0.7, between 0.35 and 0.7, and less than 0.35, the corresponding confidence levels are high reliability, general reliability, and low reliability. The half-reliability factor usually meets the criteria of more than 0.5.

Table 3. The reliability factor of the questionnaire for collective forest reform policies

Latent variable	Krambacha coefficient	Binary Reliability coefficient
Operating Contract System	0.682	0.564
Financial Policy	0.731	0.682
Resource harvesting	0.752	0.730
Forest land circulation	0.763	0.636

As shown in Table 3, the Cronbach's α coefficients of the operating contracting system, fiscal system, resource harvesting, and woodland circulation latent variables are all greater than 0.7, and the half-reliability coefficient is greater than 0.5, indicating that the four latent variables have correspondingly good questionnaire items. And stable reliability.

Validity test.

In order to measure whether the intrinsic structure of the questionnaire is reasonable, it is usually necessary to analyze the validity of the questionnaire. Exploratory factor analysis results show that the KMO value is $0.742 > 0.7$, and Bartlett's sphericity test is $0.000 < 0.005$, indicating that the validity of the questionnaire is very good.

5.3 (III) Model fitting

Using Amos22.0 software to fit the model, according to the application of the structural equation model, before assessing the overall fit of the model for each modified model, it should first test whether the model produces violating estimates (Wu, 2009). The inspection results did not find any violation of the estimation, but the fitting results of the overall fitness of the model were not satisfactory. Therefore, the model needs to be revised, and the correction indices greater than 7.301 are corrected, and u3 and u6 are added. For the covariation relationship between u7, u1 and u5, the overall degree of fit of the final model is shown in Table 4 below.

Table 4. Model global fit metric

Fit Index	Judging criteria	Actual fitting value	Suitability evaluation
Absolute Fitting Index			
Chi-Square	$p > 0.05$	0.063	Is
GFI	$gfi > 0.90$	0.926	Is
RMR	$rmr < 0.05$	0.033	Is
Rmsea	$rmsea < 0.1$	0.04	Is
Value Added fitting index			
TLI	$tli > 0.90$	0.963	Is
NFI	Closer 1 Better model suitability	0.884	Close
CFI	Closer 1 Better model suitability	0.978	Close
IFI	Closer 1 model suitability is better	0.961	Close
Simple Fit Index			
Pcfi	$pcfi > 0.50$	0.684	Is
Pnfi	$pnfi > 0.50$	0.597	Is
CN	$cn > 200$	298	Is
Chi-Square degree of freedom ratio	< 2	1.635	Is

5.4 (IV) Model path analysis and main conclusions

After the modified model's overall fitting index passes the test, the model enters the path analysis stage. The results are shown in Table 5. The default estimation method of Amos

analysis software is the maximum likelihood (ML) method. The research confirms that the ML method has better parameter estimates in most situations than other methods, but the premise of parameter estimation using ML method the assumption is that the data must conform to the assumption of multivariate normality. The multivariate indicator of this model shows that the critical ratio value $c.r.=1.46 < 1.96$ indicates that the observation variable data basically meets the SEM requirements.

Table 5. Structure Model

	Path	Parameter estimate	Critical ratio Value	is significant
Structure model	Farm Household Forestry income <--- Operating Contract System	0.363	2.690	Significant
	Farm Household Forestry income <--- Fiscal System	0.672	2.731	Significant
	Farm Household Forestry income <--- Resource Logging Policy	-0.234	3.022	Significant
	Farm Household Forestry income <--- Woodland Transfer Policy	0.553	3.825	Significant

Structural models reflect the interrelationships among latent variables. The results show that the fiscal system has a significant positive impact on household household forestry income, and the impact is most significant. The standardized path coefficient is 0.672, which satisfies the model assumptions; the operating contracting system and forest land circulation have a significant positive impact on household household forestry income. Satisfy the model assumptions; resource harvesting has a significant negative impact on farmer household forestry income and satisfies model assumptions. At the same time, the standardized path coefficients for operating the contracting system, resource harvesting, and latent variables of forest land circulation were 0.363, -0.234, and 0.553, respectively, indicating that the influence of forest land circulation was the second in the supporting reform policies, and the impact of operating contracting system and resource harvesting was small.

6. POLICY RECOMMENDATIONS

From the above results, we can see that in the collective forest tenure reform policy, the fiscal system has the greatest impact on household household forestry income, followed by the impact of forest land circulation, and the impact of operating contracting system and resource harvesting is small. The government should give full play to the enthusiasm and enthusiasm of the peasant households through the collective reform of forestry rights supporting policy, and allow forest farmers to actively participate in forestry construction. This can not only increase

the forestry peasants' economic income, but also change the single passive situation in which the department grasps forestry. Therefore, the following suggestions are proposed:

The government should increase the implementation of the financial system and seek more income for farmers. At the same time, in order to build a harmonious forest area under the new situation, a county-level forest rights arbitration agency composed of departments of land, agriculture, forestry, civil affairs, and judiciary shall be established to carry out forestry rights dispute arbitration to maintain social stability in the forest area and give full play to the operation. The role of the contracting system.

The Forestry Department should strengthen the propaganda of forestry industry development Policy, strengthen the service and guidance of technology, strengthen the guidance of forest farmers' thought, strengthen the construction of infrastructure, earnestly fulfill the basic tenet of "serving the farmers wholeheartedly", fully carry out the function, and truly get through the "last kilometer" of serving the masses, to ensure the farmers' continued income enrichment, Let the livelihood of forestry, ecological forestry and the construction of modern forestry to implement.

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