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Analyze on the Performance on Forestry Reform and the Farmer's Will of Forestry Management

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Abstract: This article embarks from the perspective of farmers and takes FuJian Yongan as the research object, combined with the previous research to management willingness of farmers and forest reform performance, based on a large number of literature reference. This study mainly discusses the performance of collective forestry reform .Through making the performance evaluation index of collective forest reform; AHP is carried out to do performance comprehensive evaluation. According to the analysis results, the comprehensive score on the performance evaluation of collective forest reform is 0.844 which shows that Yongan has an obvious performance. The research results will provide scientific and theoretical guidance to the implementation of collective forest reform which is helpful to stabilize the existing results and the sustainable development of collective forest reform policy.

Key words: Performance, forestry management, will, yongan

INTRODUCTION

In recent years, the reform of collective forestry property right system has become a hot topic for the forestry industry in China. Many experts and scholars have carried out relevant qualitative and quantitative researches which mainly focus on the economic development (Lei, 2010) and sustainability (Tan, 2010; Yang, 2013) in areas reforming its forestry systems as well as the impact of reform on the farmers' economic behaviors. Some experts focus on the forestry performance (Chen and Wu, 2010) and satisfaction on forestry reform (Zhang and Lan, 2013; Hao, 2013), however, it is lack of enough attention on regional parts.t Based on a field survey on 232 forest farmers involved in the reform of collective forest property right system in Yongan County, Sanming City of Fujian Province, we had made a detailed analysis on the performance analysis of collective forest reform. The research results will provide scientific and theoretical guidance to the implementation of collective forest reform which is helpful to stabilize the existing results and the sustainable development of collective forest reform policy.

PERFORMANCE EVALUATION OF COLLECTIVE FOREST RIGHT FEFORM

Indicators building: Priority of satisfaction evaluation of collective forest right reform is to establish a satisfaction evaluation index. Building the evaluation index system should follow the following principles: Scientific principle, operational principle, regional representative principle.

The satisfaction index system building is very complex and the gradation and complexity should be given full consideration, so using AHP evaluation index system is a relatively ideal method (Cai and Luo, 2011). Official sources believe that the collective forest system reform has achieved obvious economic performance, social performance and ecological performance which are obviously shown from improving the wages of farmers, village and country level ,the enthusiasm of the broad masses of farmers forestry production is greatly stimulated and the farmers living environment has been improved. In view of this, this article takes 7 indicators, such as income of forest farmers, the village collective income, county economy, the condition of forest resources and ecological impact, as the criterion layer for building indicators. Then under the previous study and research literature of collective forest reform performance at home and abroad, through on-the-spot investigation, relevant indicators are determined. Moreover, after the choosing of 8 famous ecology, management and economics experts, finally 17 indicators are decided as index layer. Index systems of the specific content are shown in Table 1.

Using AHP to determine the subjective weight: AHP is a kind of decision-making method which is to break the elements related to the decision into some layers, such as objectives, principles, scheme and

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Table 1: The index system building of collective forest reform performance

Target layer	State layer	Index layer	Calculation
A index system of collective forest reform performance	B1: Farmers Wages	C1: Change rate of average Farmers Wages per year	(Report period-basic period)/basic period×100%
		C2: Change rate of forestry Wages	(Report period-basic period)/basic period×100%
		C3: Change rate of investment fee per hm²	(Report period-basic period)/basic period×100%
		C4: Price change rate of main forestry products	(Report period-basic period)/basic period×100%
		C5: Change rate of taxes	(Report period-basic period)/basic period×100%(negative value,calculated through logarithm process)
	B2: Village total wages	C6: Change rate of village total wages	(Report period-basic period)/basic period×100%
	B3: Country economics	C7: Increase rate of regional product output	(Report period-basic period)/basic period×100%
		C8: Increase rate of regional finance wages	(Report period-basic period)/basic period×100%
		C9: Change rate of forestry output	(Report period-basic period)/basic period×100%
	B4: Living standard	C10: Change rate of poor people	(Report period-basic period)/basic period×100%
		C11: Change rate of the number of working for others	(Report period-basic period)/basic period×100%
		C12: Change rate of forestry labor	(Report period-basic period)/basic period×100%
	B5: Forest farm order	C13: Change rate of forest farm criminal	(Report period-basic period)/basic period×100%(negative value,calculated through logarithm process)
		C14: Change rate of forest farm disease	(Report period-basic period)/basic period×100%(negative value,calculated through logarithm process)
	B6: Changes of forestry resource	C15: Change rate of forestry coverage	(Report period-basic period)/basic period×100%
		C16: Change rate of forestry volume	(Report period-basic period)/basic period×100%
	B7: Ecological effect	C17: Change rate of resist of water and soil	(Report period-basic period)/basic period×100%

Above indicators,base period represents 2012, report period represents 2003

Table 2: Judgment matrix A-B value

A	B1	B2	B3	B4	B5	B6	B7	Wi
B1	1	5	5	5	5	5	1	0.2346
B2	1/5	1	5	5	5	5	5	0.2109
B3	1/5	1/5	1	1/4	1	1	1	0.0975
B4	1/5	1/5	4	1	4	5	1	0.1297
B5	1/5	1/5	1	1/4	1	1	1/4	0.0895
B6	1/5	1/5	1	1/2	1	1	1/4	0.0947
B7	1	1/5	1	1	4	4	1	0.1413

make qualitative and quantitative analysis (Thompson and Strictland, 2001).

This research uses expert scoring method for the assignment. Experts include workers in forestry authorities counties and department or workers who engaged in the forestry work. According to AHP, indexes importance degree of the criterion layer and index layer is respectively assigned (Wang, 2011). In the end ,getting 15 relative importance form filled by experts and getting average value, the concrete numerical value shown in Table 2. Then according to AHP method, use "deposition method" to calculate the corresponding weight and then do the consistency check, finally the index system of the relative weight of each layer is obtained.

Detailed process to calculate: The specific process of relative weigh (Table 2) is shown as 1-5 (calculation process of B1-C,B2-C,B3-C,B4-C,B5-C,B6-Cis same,abbreviation):

- Standardization of judgment matrix:

$$\begin{bmatrix} 0.3333 & 0.7143 & 0.2778 & 0.3846 & 0.2381 & 0.2273 & 0.1052 \\ 0.0667 & 0.1428 & 0.2778 & 0.3846 & 0.2381 & 0.2273 & 0.5263 \\ 0.0667 & 0.0286 & 0.0556 & 0.0192 & 0.0476 & 0.0455 & 0.1052 \\ 0.0667 & 0.0286 & 0.2222 & 0.0769 & 0.1905 & 0.2273 & 0.1052 \\ 0.0667 & 0.0286 & 0.0556 & 0.0192 & 0.0476 & 0.0455 & 0.0263 \\ 0.0667 & 0.0286 & 0.0556 & 0.0384 & 0.0476 & 0.0455 & 0.0263 \\ 0.3333 & 0.0286 & 0.0556 & 0.0769 & 0.1905 & 0.1818 & 0.1053 \end{bmatrix}$$

- Add the standardized matrix according to line:

$$\overline{w}_1 = \sum_{i=1}^{n} \overline{w}_{ij} = 0.3333 + 0.7143 + 0.2778 + 0.3846 +$$
$$0.2381 + 0.2273 + 0.1052 = 1.6548$$

Using the same method:

$$\overline{w}_2 = 1.4763, \overline{w}_3 = 0.6825, \overline{w}_4 = 0.9079,$$
$$\overline{w}_5 = 0.6265, \overline{w}_6 = 0.6629, \overline{w}_7 = 0.9891$$

- Standardized the matrix $\overline{w}$:

$$\overline{w} = (1.6548, 1.4763, 0.6825,$$
$$0.9079, 0.6265, 0.6629, 0.9891)^T$$

Using the formular:

$$W_i = \frac{\overline{W_i}}{\sum_{j=1}^{n} \overline{W_{ij}}}$$

$$W1 = 1.6548/7 = 0.2364$$
$$W2 = 1.4763/7 = 0.2109$$
$$W3 = 0.6825/7 = 0.0975$$
$$W4 = 0.9079/7 = 0.1297$$
$$W5 = 0.6265/7 = 0.0895$$
$$W6 = 0.6629/7 = 0.0947$$
$$W7 = 0.9891/7 = 0.1413$$

Then characteristic vector is gotten, namely the weight of 7 indexes.

$$W=(0.2364, 0.2109, 0.0975, 0.1297, 0.0895, 0.0947, 0.1413)T$$

- λ_{max} is:

$$AW = \begin{bmatrix} 1 & 5 & 5 & 5 & 5 & 5 & 1 \\ 1/5 & 1 & 5 & 5 & 5 & 5 & 5 \\ 1/5 & 1/5 & 1 & 1/4 & 1 & 1 & 1 \\ 1/5 & 1/5 & 4 & 1 & 4 & 5 & 1 \\ 1/5 & 1/5 & 1 & 1/4 & 1 & 1 & 1/4 \\ 1/5 & 1/5 & 1 & 1/2 & 1 & 1 & 1/4 \\ 1 & 1/5 & 1 & 1 & 4 & 4 & 1 \end{bmatrix} \cdot \begin{bmatrix} 0.2364 \\ 0.2109 \\ 0.0975 \\ 0.1297 \\ 0.0895 \\ 0.0947 \\ 0.1413 \end{bmatrix}$$

$$\lambda_{max} = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} = 7.2136$$

- Consistency test:

When N = 7, R. I = 1.36

$$C.R = \frac{C.I}{R.I} = \frac{0.0356}{1.36} = 0.0262 < 0.1$$

$$C.I. = \frac{\lambda_{max} - n}{n-1} = \frac{7.2136 - 7}{7-1} = 0.0356$$

Then the judgment matrix has high consistency degree.

According to the survey, the real value of index layer is gotten in Table 3. Then according to the formular:

$$Y = \sum_{i=1}^{m} [\sum_{j=1}^{n} (C_j * P_j)] W_i$$

$$Y1 = \sum_{j=1}^{4} (C_j * P_j)] = 0.31*0.5 + 0.33*0.3 +$$
$$0.2*0.1 + 0.09*0.3 + 0.07*0.3 = 0.332$$

Table 3: The indexes real value of index layer

Contents	Specific meaning of index layer	Value F
C1	Change rate of average Farmers Wages per year	0.5
C2	Change rate of forestry Wages	0.3
C3	Change rate of investment fee per hm^2	0.1
C4	Price change rate of main forestry products	0.3
C5	Change rate of taxes	0.3
C6	Change rate of village total wages	1.1
C7	Increase rate of regional product output	0.9
C8	Increase rate of regional finance wages	1.1
C9	Change rate of forestry output	1
C10	Change rate of poor people	1.55
C11	Change rate of the number of working for others	1
C12	Change rate of forestry labor	0.55
C13	Change rate of forest farm criminal	0.5
C14	Change rate of forest farm disease	1
C15	Change rate of forestry coverage	0.35
C16	Change rate of forestry volume	0.35
C17	Change rate of resist of water and soil	3.3

The same method, you get Y2 = 1.1, Y3 = 0.9756, Y4 = 1.0177, Y5 = 0.7994, Y6 = 0.35, Y7 = 3.3

Finally, the performance value of Yongan is gotten:

$$Y = \sum_{i=1}^{m} [\sum_{j=1}^{n} (C_j * P_j)] W_i = 0.844$$

According to division standard (Chen and Wu, 2010), the performance of Yongan collective forestry reform is obvious.

DISCUSSION

This article embarks from the perspective of farmers and takes Yongan as the research object, combined with the previous research of collective forest reform performance, based on a large number of literature reference, making the performance evaluation index of collective forest reform and using AHP to carry out the collective performance comprehensive evaluation. According to the analysis results, the comprehensive score on the performance evaluation of collective forest reform is 0.844 which shows that Yongan has an obvious reform performance. The result will provide scientific and theoretical guidance to the implementation of collective forest reform which is helpful to stabilize the existing results and the sustainable development of collective forest reform policy.

Since there are so many factors to impact collective forest reform performance and this article only selects the indicators with high use frequency in previous studies, it is difficult to fully and accurately cover all of the indicators for the established index system. In some studies, some indicators to measure farmers' wages changes and living standard changes are suggested to put into the evaluation system, for example, "change rate of poor people". Since these indicators are difficult to

obtain, they are not chooses into this system which will affect the scientific of evaluation value to a certain extent. Therefore, further improve the collective forest reform index system from multiple perspectives will be the next direction to study.

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