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Research Article

Economics Benefit Evaluation of State-owned Forestry Region in China

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Abstract: This study establishes evaluation indicators for sustainable forestry region management referring to a large number of literatures on the previous study and carry out the forestry sustainable development comprehensive evaluation, which has extremely important and practical significance to scientifically determine the region forestry region management, reasonable plan sustainable forest management measures and promote local forestry sustainable development and sustainable management.

Keywords: Evaluation, forestry region, sustainable management

INTRODUCTION

Sustainable development is a major problem which is concerned around the world. Forestry is the important foundation of economic and social sustainable development and is the main part of the ecological construction. Forestry sustainable development has the particular status (Scooner, 2001).

Forestry region is the basic unit of implementation of forestry sustainable management. Since the collective forest right system reform has been implemented in 2003 with national large-scale, state-owned forestry regions plays an increasingly important role in this aspect. But under the market economy, state-owned forestry region is facing more and more problems, such as poor management, unreasonable supporting infrastructure construction and resources structure, etc., which seriously affect the sustainable development of state-owned forestry region. The cause of above problems lies in the lack of an index system which can regularly monitor and evaluate the condition of state-owned forestry region development and it leads to the blindness of state-owned forestry region management activities. Therefore, it is very necessary to establish an index evaluation system to analyze the problems existed in the course of operation and development, which is the necessary request to guide the forest sustainable management and the foundation of forestry sustainable development and safeguard (Zhang and Shang, 2009).

On this basis, this article establishes evaluation indicators for sustainable forestry region management referring to a large number of literatures on the previous study and carry out the forestry sustainable development comprehensive evaluation, which has extremely important and practical significance to scientifically determine the region forestry region management, reasonable plan sustainable forest management measures and promote local forestry sustainable development and sustainable management.

MATERIALS AND METHODS

Analysis of factors for affecting the economy development of state-owned forest region:

Forestry policy: With China's accession to WTO, forest region needs rely on the organization and implementation of macroeconomic policy in order to achieve sustainable economic development, especially the policies of capital, credit, taxes and price, which are the key elements to directly impact on the forestry investment guide and the sustainable development. Purely from the point of price policy, under the general market law, along with the decreased of forest resource and the increased contradictory between supply and demand, forest price will be rising, but its supply and price elasticity is small, which can not reflect the market price changes quickly (Ming, 2005). So the national macro price policy plays an important role on forest economic benefit and sustainable development, while the economic benefits of the forestry region are restricted by forestry policy directly.

Forestry investment: Forestry investment factor is the factor which has the most direct impact on the development of economy no matter whenever it is. Forestry investment directly affects the scale, quality, efficiency of forestry economic. For a long time, the value of forest ecological benefits can not get the corresponding compensation, which leads to the

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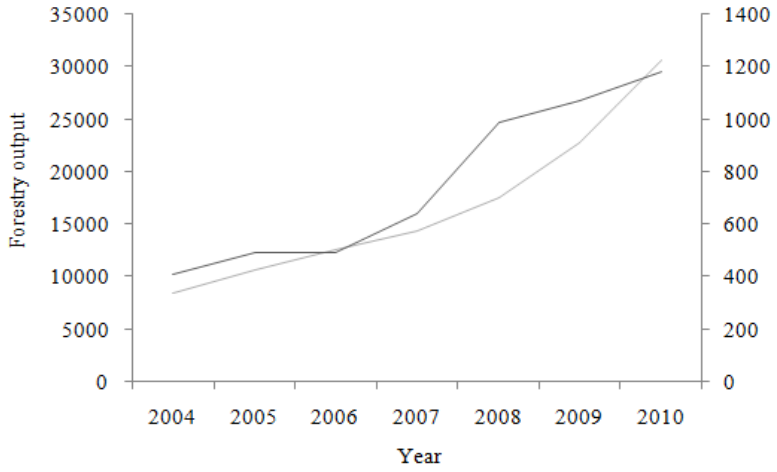

Fig. 1: Comparison figure between forestry investment and forestry economics output

Table 1: State-owned forestry region economics evaluation indicators

Target value		Index value	Calculation
State-owned	X1	Total assets contribution rate	(Total profit+total tax+cost)/average asset *100%
Forestry region	X2	Asset value contribution rate	Owner's equity in beginning of one year/owner's equity in the end of one year*100 %
Economics	X3	Asset-liability ratio	Total debt/total asset*100%
Benefit	X4	Current assets turnover rate	Net revenue of main business/average flow asset*100%
Evaluation	X5	Profit margins.	Total profit/total cost-expense*100%
Indicators	X6	Labor output rate	Added-value of industry/average workers number*100%
	X7	Products sale rate	Total products sale/total asset*100% rate

shortage of investment in forestry economic development. Forest area production input mainly includes: land, labor, forestry science and technology, capital, etc.

The first element is land. Land is a kind of scarce and important elements of the forestry production, but because woodland input number is relatively stable during a certain period, so the forest land has a little influence on the economic benefits of the forest region in a certain period.

Among forestry production inputs elements, labor element is very important and the investment is mainly affected by forest forestry economic scale, especially in all logging enterprises, so labor change has the minimum effect on the economic benefits of the forest region.

In addition, forestry science and technology factor is extremely important. Science and technology is the first productive force, which is the most direct productivity. But due to the characteristics of forestry production, conversion rate of forestry science and technology achievements is low, in addition to the high-tech achievements, forestry science and technology achievement needs a longer time to realize the impact on forestry economic development. So the low conversion rate of forestry science and technology achievements have become one of the important factors that affect forest economic benefit.

Investment of forestry production capital plays a decision in the industry development of forestry production forestry. Capital factor is one of the biggest one on the development of forest economic benefit. It can be seen from Fig. 1 that there has a close relationship between forestry economic development and national investment in forestry; it can be said that capital investment is one of the most important factors for economic benefits.

Table 2: KMO and Bartlett's test

KMO test	0.5860
Approx. chi-square	49.249
Variance value	21.000
Sig.	0.0000

Indicators building:

Principles of building indicators: Priority of doing evaluation to state-owned forestry region is to establish an economics benefit evaluation index. Building the evaluation index system should follow the following principles: scientific principle, operational principle, regional representative principle.

Indicators choosing: There are a lot of factors which should be considered during indicators choosing. Among all the research of forestry region economics benefits, most of them are qualitative studies and quantitative studies do not start, which leads to the difficulties to do indicators choosing. Enterprise economics benefit indicators are treated as the reference for building the forestry region economics evaluation (Gao and Zu, 2012). The indicators are shown as follows in Table 1.

Empirical study: Data from <<China Forestry Statistic Yearbook 2010>> and forestry official website.

Table 3: Main components list

	Original characteristic value			Loading characteristic value		
Components	Characteristic value	Variance contribution rate %	Cumulative contribution rate %	Characteristic value	Variance contribution rate %	Cumulative contribution rate %
1	2.715	38.779	38.7790	2.715	38.779	38.779
2	2.101	30.013	68.7920	2.101	30.013	68.792
3	1.108	15.829	84.6200	1.108	15.829	84.620
4	0.632	9.023	93.6440			
5	0.279	3.988	97.6320			
6	0.112	1.606	99.2380			
7	0.053	0.762	100.000			

Table 4: Component scores

Name	F1	F2	F3	F
Neimenggu Forestry Bureau	6149.327	478.1616	-3827.560	1922.294
Neimenggu Forestry Center	2221.996	503.8735	-1403.230	790.7781
Neimenggu Forestry Office	3462.950	3565.971	-2129.460	2076.080
Jilin Forestry Center	27492.05	865.4172	-17117000	8211.430
Yanbian Forestry Bureau	6019.288	152.4867	-3719.430	1791.237
Jilin Forestry Office	496.6444	1389.664	-281.8820	565.0545
Longjiang Forestry Office	10312.35	807.8602	-6419.540	3225.340
Mudanjiang Forestry Bureau	5673.410	788.3255	-3517.020	1879.983
Hejiang Forestry Bureau	5377.195	1423.751	-3348.740	1982.461
Yichun Forestry Bureau	10416.71	2053.735	-6558.810	3617.689
Songhuajiang Forestry Bureau	15714.24	1443.641	-9775.280	4979.776
Daxinganling Forestry Bureau	10697.44	39.18646	-6649.690	3107.542
Daxinganling Forestry Office	-6.103860	121.3086	56.56471	42.99496
Abazhou Forestry Bureau	12.85830	1262.158	-24.84530	379.8650
Yunan Forestry Bureau	9209.244	166.1008	-5737.080	2712.982
Shanxi Forestry Bureau	403.7381	-85.65680	-228.2260	94.73153
Gansu Forestry Bureau	112.7164	0.000000	613.8516	140.8769

Step 1: Data obtainment. Original data is gotten from China Forestry Statistic Yearbook, forestry region statistic report. Except the indicators which are unable obtained, 7 quantitative indicators from 17 forestry regions are decided.

Step 2: Doing KMO and Bartlett's Test to all 17 indicators, we can know that Sig. = 0.00 and it shows that each variable is not dependent, which can be seen that there is a huge connection between indicators, it also can be seen that these indicators have repetitive description to forestry region economics benefits. Moreover, KMO test result is 0.586, which is larger than 0.5, which shows that this indicator system is reasonable, principal component analysis can be done. It can be shown from Table 2.

Step 3: Using SPSS to do the principal component analysis and the largest orthogonal study is used to extract the main component of variance. Characteristic value, variance contribution rate gravel figure, rotating component matrix and component score coefficient matrix are processed separately.

Table 5: Rotating component matrix

	Components		
Index	1	2	3
X6	0.939	-0.099	-0.216
X4	0.887	-0.069	0.235
X1	0.793	0.040	0.559
X7	-0.086	0.903	-0.177
X3	-0.081	0.728	0.152
X2	0.113	0.688	0.589
X5	0.084	0.029	0.970

Table 6: Component score coefficient matrix

	Components		
Index	1	2	3
X1	0.283	0.000	0.221
X2	0.006	0.317	0.259
X3	-0.003	0.398	-0.006
X4	0.379	-0.001	0.005
X5	-0.137	-0.139	0.631
X6	0.486	0.061	-0.303
X7	0.072	0.556	-0.255

It can be seen from Table 3 that, the accumulation variance contribution rate of the first three principal components has reached 84.62%, the contribution rate of the first one is 38.779%, the second one is 30.013% and the third one is 15.829%. It shows that the three factors contain 84.62% of all the information and it is enough to represent other ingredients and three factors can be extracted to replace the original seven indexes of forest economic benefit evaluation.

From the contribution rate of each principal component and characteristic vector of each principal component, the first principal component (F1) has the biggest influence on the economic benefits of the forestry region and a single contribution rate has reached 38.779%. The most important factors of F1are X6 labor productivity, X4 current assets turnover rate,

Table 7: Evaluation score and ranks of all forestry regions

Name	X1	X2	X3	X	Rank
Neimenggu Forestry Bureau	22.3677 0	13.40900	39.15550	20.6494	10
Neimenggu Forestry Center	8.0823 00	14.13010	14.35490	11.0614	14
Neimenggu Forestry Office	12.5962 0	100.0000	21.78410	47.1022	4
Jilin Forestry Center	100.0000	24.26880	175.1050	78.6193	1
Yanbian Forestry Bureau	21.8947 0	4.276200	38.04930	16.7687	11
Jilin Forestry Office	1.8065 00	38.97010	2.883600	16.1784	12
Longjiang Forestry Office	37.51030	22.65470	65.67120	34.6946	5
Mudanjiang Forestry Bureau	20.63660	22.10690	35.97870	22.7681	9
Hejiang Forestry Bureau	19.55910	39.92600	34.25720	28.8934	6
Yichun Forestry Bureau	37.88990	57.59260	67.09590	48.5010	3
Songhuajiang Forestry Bureau	57.15920	40.48380	100.0000	55.1476	2
Daxinganling Forestry Bureau	38.91100	1.098900	68.02560	27.3685	7
Daxinganling Forestry Office	-0.022200	3.401800	-0.578700	1.20540	15
Abazhou Forestry Bureau	0.046800	35.39450	0.254200	13.6574	13
Yunan Forestry Bureau	33.49780	4.6579 00	58.68970	25.0074	8
Shanxi Forestry Bureau	1.4686 00	-2.402100	2.334700	0.05710	16
Gansu Forestry Bureau	0.410000	0.000000	-6.279600	-0.83240	17

X1 total assets contribution rate; The second principal component (F2) has the bigger influence on the economic benefits of the forestry region and a single contribution rate has reached 30.013%. The most important factors of F2 are X7 product sales rate, X3 asset-liability ratio, X2 asset value contribution rate; The third principal component (F3) has the smallest influence on forestry economic benefit and a single contribution rate is 15.829% and the main factor is X^5 profit margins. Component score coefficient matrix can be seen as follows:

$$\begin{cases} F1 = 0.283X1 + 0.006X2 - 0.003X3 + 0.379X4 \\ \quad -0.137X5 + 0.486X6 + 0.072X7 \\ F2 = 0.317X2 + 0.398X3 - 0.001X4 \\ \quad -0.139X5 + 0.061X6 + 0.556X7 \\ F3 = 0.221X1 + 0.259X2 - 0.006X3 + 0.005X4 + \\ \quad 0.631X5 - 0.303X6 - 0.255X7 \end{cases}$$

Step 4: Test result and concrete description. The variance contribution rate of three components are chose as the weight and the overall evaluation model is built as follows:

$$F = 38.779\%F1+30.013\%F2+15.829\%F3$$

Then the main component value of all variables and the overall evaluation value F, it can be seen in Table 4 and the specific calculation process can be seen in Table 5 and 6.

Step 5: F is standardized by 100% method and Xi = max (Fi) is 100, the score of other components is processed through the formula:

$$Xi = \frac{Fi}{\max(Fi)} * 100\%$$

$$X = 38.779\%*X1+30.013\%*X2+15.829\%*X3$$

The final result can be seen in Table 7. Jilin Forestry Center ranks No.1, Songhuajiang Forestry Bureau ranks No.2 and the last three ones are Daxinganling Forestry Center, Shanxi Forestry Bureau, Gansu Forestry Bureau, Shanxi Forestry Bureau.

RESULTS AND CONCLUSION

Overall economic benefit is poor: In general, the overall level of forest economic benefit is low, especially foe Gansu forestry province, Shanxi forestry management hall, Daxinganling forestry bureau, the benefit level is the lowest. The overall labor productivity and product sales rate are extremely low, far lower from the national average value. It shows that there is the problem of low products sales and industrial value-added output, which should be improved as the key direction.

Capital operation ability is poor and capital utilization efficiency is low: Capital shortage is the main difficulty during the long term economic development process in forest region. Improving the operation quality and output efficiency of funds is the basic way to solve this difficult. While in practice, capital operation situation is not good. Working capital turnover ratio is the most important indicator to reflect the cash flow velocity, which is the most direct index to reflect capital operation ability or capital utilization efficiency in enterprise or industry (Wang, 2011). At present, working capital turnover ratio of forestry region is generally not high, which indicates that the capital operation ability of state-owned forestry region is poor and the capital utilization efficiency is low, which is led by long-standing high consumption, low output and high cost, low quality of extensive management.

Forest management is given with primary processing of resources, which restricts the improvement of economic benefits: From the point of product attributes, the main body of forest products

basically is the primary processing of resources. Few deep processing of products and low technical content lead to low added-value of products. Development of forest enterprises, extension of the forest products industry chain, increases the added- value is the key problem for all units in forestry region. The pattern with mainly primary processing of resources not only makes the poor product competition ability and profit ability, also make the situation of enterprise benefit being vulnerable to the changes of raw material price. Once the raw material price is raised, the enterprise is unbearable, which leads that economic benefits drop immediately.

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