

Researches on Cultural Construction and Coupling Coordination Evaluation Model

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Abstract:

The regional ecological environment was treated as a dynamic system in this article, in accordance with its systematic, structural and unique features, as well as other corresponding research methods. The coupling evaluation model covers nearly every aspect of China's industry, i.e. culture, ecology, life, etc. With the coordinate reorientation of the ecological development way, the natural ecological system and coupling coordination evaluation mechanism research have been under progress. In the end, the mechanism of ecological protection and development suggestions were proposed.

Keywords: *Ecology, Natural information system, Coupling coordination model.*

I. INTRODUCTION

Rural ecology revitalization is the key and inner power to rural revitalization. In response to the new expectations of farmers, it is conducive to solve the problem of unbalanced and inadequate development in China. Fig1 has shown the plant resources distribution in the World and China. It can be seen that each province, city or county should pay attention to ecological construction. China should give priority to agriculture and rural development. Meanwhile, the institutional mechanisms and policy systems to integrate urban and rural development should be established and improved. Besides, following the overall requirements of the industrial boom, regional civilization, ecological livability, effective governance and common prosperity, China should accelerate the modernization of agriculture and rural areas [1].

The overall requirements of Rural Revitalization are "industrial boom, regional civilization, ecological livability, effective governance and common prosperity" [2, 3]. Industrial prosperity is the core of economic construction, ecological livability is the focus of ecological construction, local civilization is the main line of cultural construction, affluent life is the foundation of political construction, and effective governance is the cornerstone of social construction. The most fundamental and the most urgent contradictions and problems to be solved in Rural ecology revitalization is the key and inner power to rural revitalization [4].



Fig1: The Plant Resources Distribution in the World and China

It is necessary to construct an evaluation index system based on new rural construction.

II. MATERIALS AND METHODS

China's urbanization is consistent with its five thousand years' civilization, and the fundamental goal of rural development is to achieve agricultural and rural modernization. Rural development is an integrated system, covering a rural economy, politics, ecology, education, farmers, etc. [5,6]. Thus the paper puts forward countermeasures and suggestions to promote cultural protection and development in China rural areas.

III. RESULTS

By constructing a hierarchical model of the industry-ecology-ecology-life-organization, the method of entropy and coupling coordination degree could be applied to analyze the level of rural development and cultural construction dynamically.

Apply Entropy Method

To measure rural development level and its changes of n indexes in a certain region in year m , an observation data matrix $X = (x_{ij})_{m \times n}$ is established. Based on data standardization, dimensionless and standardization of X , the standardized matrix is obtained as $Y = (y_{ij})_{m \times n}$. The information entropy of the j index, $e_j = -K \sum_{i=1}^m y_{ij} \ln y_{ij}$ $K = 1/\ln m$ $0 \leq e_j \leq 1$ and the information utility value of the index x_j is $d_j = 1 - e_j$. The value coefficient (also known as weight) of the index x_j is $\omega_j = d_j / \sum_{j=1}^n d_j$. According to the additivity of information entropy, the weight of subsystem can be determined proportionally for the system with multilayer structure [7].

In the comprehensive evaluation of entropy method, the observed value of index is dimensionless, benefit index $x_{ij} = \frac{x_{ij} - (x_j)_{\min}}{(x_j)_{\max} - (x_j)_{\min}}$, cost index $x_{ij} = \frac{(x_j)_{\max} - x_{ij}}{(x_j)_{\max} - (x_j)_{\min}}$. x_{ij} is under coordinate transformation and normalization. In this paper $y_{ij} = x_{ij} + A$, the better the evaluation effect is

when the transformation amplitude A is as close as possible to and greater than $(x_{ij})_{\min}$. Normalize according to $P_{ij} = y_{ij} / \sum_{i=1}^m y_{ij}$ to get the normalized matrix $(P_{ij})_{m \times n}$. The standardized matrix and index weight are used for comprehensive evaluation. The weight of index x_j is $\omega_j = d_j / \sum_{i=1}^n d_j$, the comprehensive evaluation value of the level of rural modernization development in the region in year i is $\sum_{j=1}^n (\omega_j \times P_{ij})$.

The capacity coupling coefficient model in physics and the existing research results are used for reference. For multi-system U with n interacting subsystems, the coupling degree of system U is $C = (n \cdot \sqrt{U_1 \cdot U_2 \cdots U_n}) / \sum_{i=1}^n U_i$. U_1, U_2, \dots, U_n are the scores for each subsystem. The rural area in this paper includes five subsystems, including industry, ecology, ecology, life and organization, that is $n = 5$. Although the coupling degree can measure the interaction degree of subsystem, which reflects the coupling degree of each subsystem. However, it cannot reflect the coordination between subsystems and the overall level of system U , so using coupling coordination degree to reflect the coupling and coordination degree between subsystems and the overall development level of rural areas is essential.

Coupling coordination degree $D = \sqrt{C \cdot T}$, $T = \alpha U_1 + \beta U_2 + \gamma U_3 + \theta U_4 + \phi U_5$ T is the evaluation score of industry, ecology, ecology, life and organization. The weight of each subsystem is obtained according to entropy method. After calculating the coupling degree and coordination degree, they are divided into four levels, low degree, medium degree, relatively high degree and high degree by objective quartile method.

To evaluate the rural compound system of industry, ecology, ecology, life and organization, the hierarchical model of compound is built, including the following five subsystems and 40 second-class indexes (TABLE I).

TABLE I. Evaluation index system of rural cultural revitalization

First-Class Index	Weight	Sequence Number	Second-Class Index	Attribute	Unit	Information Entropy	Weight
industry	30%	X1	proportion of per capita non-agricultural industry output value of farmers	Positive	%	e1	ω_1
		X2	participation rate of rural household in cultural industry cooperative economic organization	Positive	%	e2	ω_2
		X3	micro-finance coverage rate of rural households	Positive	%	e3	ω_3

		X4	agricultural land scale management rate	Positive	%	e4	ω_4
		X5	annual growth rate of new fixed asset investment	Positive	%	e5	ω_5
		X6	rural labor non-agricultural employment proportion	Positive	%	e6	ω_6
		X7	commodity rate of featured cultural products	Positive	%	e7	ω_7
		X8	agricultural total factor productivity	Positive	%	e8	ω_8
		X9	contribution rate of rural cultural industry	Positive	%	e9	ω_9
		X10	proportion of technological and cultural products	Positive	%	e10	ω_{10}
		X11	comprehensive level of agricultural ecology industry, such as leisure agriculture	Positive	%	e11	ω_{11}
ecology	15%	X12	garbage disposal rate	Positive	%	e12	ω_{12}
		X13	household hygiene toilet penetration rate of farmers	Positive	%	e13	ω_{13}
		X14	construction of public toilets in village	Positive	piece/ thousands	e14	ω_{14}
		X15	life expectancy in the population	Positive	Year	e15	ω_{15}
		X16	clean energy penetration rate	Positive	%	e16	ω_{16}
		X17	treatment rate of production and domestic sewage	Positive	%	e17	ω_{17}
		X18	river and water cleaning rate	Positive	%	e18	ω_{18}
		X19	low carbon policy improvement rate	Positive	%	e19	ω_{19}
		X20	township enterprises three waste discharge rate	Positive	%	e20	ω_{20}
ecology	15%	X21	proportion of rural population receiving education above senior high school	Positive	%	e21	ω_{21}
		X22	proportion of farmers' expenditure on ecology and entertainment	Positive	%	e22	ω_{22}
		X23	completion rate of protection of cultural heritage projects	Positive	%	e23	ω_{23}
		X24	Internet occupancy rate	Positive	%	e24	ω_{24}
		X25	village cultural facilities (such	Positive	%	e25	ω_{25}

			as cultural centers) coverage rate				
		X26	proportion of civilized households or five-good families	Positive	%	e26	ω 26
		X27	agricultural distance education coverage rate	Positive	%	e27	ω 27
life	30%	X28	rural per capita net income	Positive	Yuan	e28	ω 28
		X29	Engel coefficient	Positive	%	e29	ω 29
		X30	per capita living space	Positive	m ²	e30	ω 30
		X31	new rural cooperative medical care coverage rate	Positive	%	e31	ω 31
		X32	rural basic endowment insurance coverage rate	Positive	%	e32	ω 32
		X33	minimum living allowance coverage rate in rural areas	Positive	%	e33	ω 33
		X34	proportion of low-income households in rural areas	Negative	%	e34	ω 34
		X35	annual expenditure on information consumption	Positive	Yuan	e35	ω 35
		X36	open rate of group discussion on major issues	Positive	%	e36	ω 36
organization	10%	X37	farmers satisfaction on openness of village affairs	Positive	%	e37	ω 37
		X38	control rate of legal autonomy of village committee	Positive	%	e38	ω 38
		X39	party branch construction qualified rate	Positive	%	e39	ω 39
		X40	college-graduate village official ratio	Positive	%	e40	ω 40

IV. DISCUSSION

It is straightforward that the degree of Rural Ecology Revitalization development is unbalanced; the general trend is “the east- high west -low”. District with high degree is more concentrated in the more developed regions, such as the top 4 of Jiangsu, Zhejiang, Beijing and Shanghai. In contrast, a district with the low degree is more concentrated in less developed areas.

TABLEII. Evaluation index and rank of rural ecology revitalization of China

District	A. Rural Ecology Revitalization		A1. industry		A2.life		A3.ecology		A4. organization	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Jiangsu	65.38	1	17.32	2	0.30	25	25.14	5	22.63	3
Zhejiang	62.74	2	16.40	3	1.39	6	25.25	4	19.70	13
Beijing	62.41	3	19.42	1	0.73	19	28.43	1	13.84	24
Shanghai	61.43	4	14.79	4	0.16	30	26.92	3	19.56	15
Shan dong	59.55	5	11.47	10	0.30	26	24.57	7	23.22	2
Fu jian	59.39	6	13.24	6	1.67	2	24.10	9	20.38	7
Hu nan	58.89	7	9.95	17	1.16	10	24.21	8	23.58	1
Guangdong	57.75	8	11.50	9	1.17	9	23.08	15	21.99	4
Shanxi	56.32	9	13.99	5	0.95	14	21.76	20	19.61	14
Tianjin	55.41	10	10.92	15	0.13	31	28.20	2	16.16	19
Inner Mongolia	53.87	11	12.40	7	0.83	17	20.33	23	20.31	9
He bei	53.71	12	11.76	8	0.45	22	21.38	22	20.12	10
Liaoning	53.65	13	9.04	22	0.83	18	23.66	12	20.12	11
Chong qing	53.58	14	11.26	12	0.88	16	23.96	10	17.48	18
Sichuan	53.56	15	8.97	23	0.96	12	23.62	13	20.00	12
Hu bei	53.46	16	11.02	13	0.89	15	23.70	11	17.86	17
Anhui	52.27	17	9.37	20	0.62	20	21.96	16	20.32	8
Tibet	51.31	18	10.87	16	10.03	1	24.68	6	5.74	31
Guizhou	50.86	19	9.06	21	0.96	13	20.07	24	20.77	6
Yunnan	50.61	20	7.74	29	1.46	5	19.89	26	21.52	5
Henan	50.42	21	8.81	25	0.42	23	21.87	19	19.33	16
Heilongjiang	49.24	22	11.42	11	1.26	8	21.88	18	14.68	21
Jilin	46.94	23	8.81	24	1.09	11	23.36	14	13.68	25
Jiangxi	45.85	24	8.29	27	1.54	3	21.65	21	14.38	22
Guangxi	41.49	25	6.87	30	1.50	4	19.91	25	13.21	27

Hainan	41.04	26	8.23	28	1.33	7	21.92	17	9.56	28
shanxi	40.39	27	8.41	26	0.34	24	16.56	28	15.07	20
Xinjiang	34.14	28	10.93	14	0.28	27	9.02	30	13.92	23
Qinghai	33.59	29	9.66	18	0.55	21	14.73	29	8.65	29
Ningxia	31.56	30	9.42	19	0.19	29	8.51	31	13.44	26
Gansu	29.51	31	3.97	31	0.24	28	17.43	27	7.87	30

V. CONCLUSION AND SUGGESTIONS

The degree of Rural Ecology Revitalization development is imbalanced, and the general trend is "the east- high west -low" [8]. District with the highest degree is more concentrated in the more developed regions, while district with a low degree is more concentrated less developed areas. Further, the construction strategy should be adjusted, and the notion of "emphasizing construction over ecology" should be changed. Thus it is suggested that:

1. The top-level design should be done concretely, with strategic planning of protection and development of rural ecology
2. The mechanism should be perfected, i.e. legal system building and government supervision should be strengthened.
3. The market advantages should be given full play, and rural ecology should be industrialized.
4. A new model of PPP multilateral cooperation should be promoted.

ACKNOWLEDGEMENTS

The research was sponsored by the periodical achievements of the project "study on strengthening overseas communication power of Beijing universities" (JGWXCZ2015045).

REFERENCE

- [1] Barry C, Muscarella C, Peavy J, Vetsuypens M (2016) The role of venture capitalists in the creation of public companies: evidence from the going public process. *Journal of Financial Economics* 5(27):447-471
- [2] Barry C (2015) New directions in research on venture capital finance. *Financial Management* 5(3):3-15
- [3] Ernst H, Wittp, Brachtendorf G (2018) Corporate venture capital as a strategy for external innovation: an exploratory empirical study. *R&D management* 35(3):233-242
- [4] Henry Etzkowitz (2010) The renewal of venture capital: towards a counter-cyclical model. *Technology Analysis & Strategic Management* 17(1):73-80
- [5] Norton E, Rourke B H (2015) The effects of venture capitalists on the structure of the venture capital deal. *Journal of Small Business Management* 31(10):32-41
- [6] Paul A. Gompers (2015) Optimal investment monitoring and the staging of venture capital. *The Journal of Finance* 3(5):146-149
- [7] Sahlman W A (2013) The structure and government of venture capital organization. *Journal of Financial Economics* 3(27):473-521.

- [8] Wright M,Robbie K(2010) Venture capitalists,unquoted equity investment appraisaland the role of accounting information.Accounting and Business Research3(26): 153-158
- [9] Xia Han(2016) The impact research on international risk investment to China.Commercial Economics and Management6(8):58-61
- [10] Benjamin Davis (2010)A cross-country comparison of rural income generating activities. World Development 1
- [11] Mine Y (2010) The political element in the works of w.arthur lewis:the1954 lewis modeland african development. Developing Economies 44(3):329-355
- [12] Todaro M P(1989) Economic development in the third world. Longman
- [13] Goldman an (2000) Sustainable livelihoods approaches: origins, applications to aquatic research and future directions. Conference on Practical Strategies for Poverty Targeted Research. Hanoi, Vietnam