

An Analysis of the Comprehensive Measurements of the Rural Revitalization Level and the Associated Influencing Factors in Gansu Province

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Abstract: This paper measures comprehensively the rural revitalization level of all 85 counties in Gansu Province by establishing a comprehensive evaluation index system. The entropy method is used hereby to calculate the rural revitalization level index of each county while the Tobit regression model is introduced to explore the influencing factors of rural revitalization level in Gansu Province. The relevant conclusions are as follows: The development of rural revitalization levels in each county in Gansu Province is unbalanced. The areas with high comprehensive evaluation index of rural revitalization level in Gansu Province are mostly concentrated in Longzhong area and Hexi area. The rural revitalization index of the five areas of Longzhong, Hexi, Longdong, Southwest area, and Longnan, showed a decreasing trend. The economic development, financial investment, public transportation and medical resources have a significant positive effect on the improvement of rural revitalization level in Gansu Province; the fixed asset investment and compulsory education resources have an insignificant positive relationship with the rural revitalization level.

Keywords: Rural Revitalization Levels; Entropy Method, Tobit Regression Model, Comprehensive Measurements, Gansu Province.

1. Introduction

Being a big traditional agricultural country for a long time, the field of agriculture, forestry, animal husbandry and fishery has been playing a vital role in our national economy; its development trend has direct and key impact on the development and balance of our economy and society. Since the reform and opening-up movement in the early 1980s, the rapid development of the rural areas in China has made great contributions to China's urbanization and the creation of the economic miracle among the nations in the world. The countryside supports the cities in that the agriculture supports the industry --- actually the rural areas and farmers had significantly contributed a lot to the industrialization and socialist construction in our country [1]. Primarily, the successful reform of our country started from that of the economic system, and this measure had also made an important breakthrough in the rural areas. Subsequently, our country's township and village enterprises have sprung up by then, gradually becoming the leading power in the development of rural areas and prompting urban areas to embark on reform accordingly. In the 21st century, in order to deal with the unbalanced development problems existed between the industry and the agriculture, the uncoordinated resource tendencies, as well as the contradictions caused by the rapid industrialization and urbanization in the unbalanced development levels between the urban area and the rural area, the central government has successively implemented such policies as the "Five Overall Plans", the "Socialist New Rural Construction", the "Integration of Urban and Rural Area Development", new urbanization plans, as well as other more strategies [2]. However, such problems as the weak agricultural foundation and increasingly serious rural diseases have occurred frequently. These factors have become the practical problems that need to be addressed positively in the

course of the development and transformation of the rural areas in the 21st century. In October 2017, the 19th National Congress of the Communist Party of China was held successfully in Beijing. At the meeting, Xi Jinping proposed firstly the implementation of the rural revitalization strategy. The theme report of the congress pointed out the key strategy of "insisting on giving top priority to the development of agriculture and rural areas, establishing and improving the urban-rural integrated development system, mechanism and policy system, as well as accelerating the modernization of agriculture and rural areas [3]." In February 2018, the Central Government of China, the State Council, issued the "Opinions of the Central Committee of the Communist Party of China and the State Council on the Implementation of the Rural Revitalization Strategy", also referred to as the 2018 Central Document No. 1 [4]. The No. 1 Document proposes to promote rural economic development and to revitalize rural areas in accordance with the general requirements of thriving businesses, pleasant living surroundings, social etiquette and civility, effective governance and prosperity. On January 26, 2022, The State Council issued the "Opinions on Supporting Guizhou Province to Break a New Road in the Western Development in the New Era", namely the Document No. 2 of the Central Committee in 2022. The Document No. 2 proposed to comprehensively promote rural revitalization and new urbanization, and push forward the effective connection between the achievements of poverty alleviation and rural revitalization [5]. Located in northwest China, Gansu Province is one of the major agricultural provinces in the western regions. The latest government working report of Gansu Province also calls for the comprehensive implementation of the rural revitalization strategy, the promotion of stable agricultural development and the increase of farmers' income, the promotion of economic development in poverty-stricken areas, and the improvement of working and living conditions in the rural areas [6]. By mid-October

2020, all 75 poverty-stricken counties in Gansu Province had been lifted out of poverty list finally.

At present, by combing the domestic and foreign literatures on the level of rural revitalization, we find that it can be divided into three parts. The first part studies the literature on the level of rural development or the level of rural industry development. For example, Tu Shuangshuang et al. used TOPSIS model to evaluate the level of rural development in Guangxi, and described the pattern characteristics of rural reconstruction intensity in this region [7]. Luo Yi constructed the rural development evaluation system in Hukou County, Jiangxi Province, and used the analytic hierarchy process to determine the index weight [8]. Kim et al. evaluated the level and process of rural development in 63 regions of Vietnam by constructing the Rural Development Index (RDI), and gave their relevant development opinions and suggestions [9]. The second part evaluates the literature on rural revitalization index by analyzing the development status of other fields that are closely related to rural revitalization and development. For example, Ding Cuicui et al., conducted the research on coupling and coordinated development, and put forward development opinions and suggestions [10]. Xu Weixiang and Li Lu et al., constructed a comprehensive evaluation index system for rural revitalization and new urbanization, and used the coupling coordination degree model to analyze it, and studied the coupling coordination level of the two at the provincial scale [11]. He Tian et al. studied the coupling relationship between rural revitalization development potential and labor resources in Wangmo County, Guizhou Province, by constructing the evaluation index system of rural revitalization potential and the evaluation level index system of labor resources [12]. Li Zhilong used the coordinated development model of economy and environment to analyze the interaction and mechanism of rural revitalization and rural tourism system in Fenghuang County, Hunan Province [13]. The third part covers the literature that directly measures the level of Rural Revitalization in the research area and puts forward opinions or suggestions on the research results. For example, Yan Zhoufu and others constructed an evaluation index system for the implementation effect of Rural Revitalization Strategy, and used the principal component analysis method and expert scoring method to determine the index weight and calculate China's Rural Revitalization development index [14]. Jia Jin et al. constructed the "Five-in-One" comprehensive evaluation index system of rural revitalization level, and used the entropy weight TOPSIS method to calculate the rural revitalization development index of 30 provinces in China [15]. Zhang Ting et al. combined the two methods of AHP and entropy weight method, used the field research method to obtain the required data, calculated the rural revitalization level of 35 sample villages in our country, and pointed out that the longer the rural revitalization strategy was implemented in the study area, the higher the level of revitalization for the village [16]. Shen Jianbo et al. established a rural revitalization evaluation index system for five townships in Feicheng City, Shandong Province through AHP and Delphi method, and calculated the rural revitalization level index of these five townships [17].

At present, by reviewing the domestic and foreign literature on the factors affecting the level of rural revitalization, we find that this can be divided into two parts. The first part analyzes the single influencing factors that affect the level of rural revitalization. For example, Wu Sufang pointed out that the primary factor for improving rural revitalization in

China's western backward regions is to solve the problem of skilled personnel [18]. Liu Zuyun and Wang Dan pointed out that, in rural areas that have been forgotten by modern technology, if the rural revitalization strategy wants to be implemented, the concept of "technical governance" must be put into practice [19]. Rashid et al. pointed out that the level of regional economic development is an important factor affecting the level of rural revitalization [20]. Riva et al. pointed out that the level of electricity supply and the level of electricity consumption will have a certain impact on the economic development in rural areas [21]. The second part is about the research on the impact of multiple factors on rural revitalization. For example, Wang Ruifeng believes that the high-quality development of rural industries is an inherent requirement for the full implementation of the rural revitalization strategy. Government factors, regional factors, and technological innovation are all factors that affect rural industry high Dominant factor in quality development [22]. Liao Maolin and others pointed out that the transformation of extensive agricultural production methods and the improvement of agricultural production technical efficiency are the key factors affecting rural revitalization and development [23]. Adedeji et al. studied the influencing factors of rural revitalization in Nigeria through field research. The analysis results show that the infrastructure construction and the traffic development are the most important among all factors [24]. Yilmaz et al. determined the important factors affecting rural development in Turkey through the principal component analysis and the regression analysis. The results showed that geographical location, land productivity, land scale and housing comfort were all important factors, and based on these factors, a realistic and feasible rural revitalization strategy was formulated [25].

So far, our research on the rural revitalization has made some certain progress, yet, there are still some shortcomings as well. First of all, due to the difficulty in collecting and obtaining county data, most of the existing studies take province and prefecture-level city as the research scale, or study the rural revitalization level of a certain county and village separately, and relatively, few studies take all 85 counties in Gansu Province as their research area. Secondly, most studies focus on the comprehensive evaluation of the level of rural revitalization and the construction of the index system. Meanwhile, there are relatively few studies on the level of rural revitalization and the influencing factors of the level of rural revitalization. In addition, most of the existing studies to analyze the influencing factors of rural revitalization level use Pearson correlation coefficient, grey correlation degree model, geographic detector, etc., while few studies use Tobit regression model. In this paper, entropy method is used to analyze the development level of rural revitalization in Gansu Province, and Tobit regression model is introduced to analyze the influencing factors of rural revitalization level in Gansu Province, which, of course, can make multi-angle and all-round assessment and analysis on the research object, provide a new research perspective, enrich research methods and contents, and strengthen the existing research results.

2. Data and Methods

2.1. The Data Source

The data in this paper mainly come from the "2020 Gansu Rural Yearbook", "Gansu Development Yearbook", "China

County Statistical Yearbook”, and the statistical yearbooks of 14 municipalities in Gansu Province. There exist some data-missing problems for some counties. This paper summarizes and supplements the indexes by referring to various news reports, official website materials and forum materials accordingly.

2.2. Research Methods

2.2.1. Entropy Method

In this paper, the entropy method is used to determine the index weights for evaluating the rural revitalization level in Gansu Province. Generally speaking, the higher the information entropy of the research object, the more balanced the system structure of the research object, the smaller the difference value, or the less obvious the change; on the contrary, the lower the information entropy value of the research object. Then, the more unbalanced the system structure of the research object is, the greater the difference value is; in other words, the more obvious the change is. Therefore, the weight can be calculated according to the size of the information entropy and the change level of each index. The main calculation process is as follows:

①Data normalization:

Positive indexes:

$$X'_{ij} = \frac{X_{ij} - \min X_{ij}}{\max X_{ij} - \min X_{ij}} \quad (1)$$

Negative indexes:

$$X'_{ij} = \frac{\max X_{ij} - X_{ij}}{\max X_{ij} - \min X_{ij}} \quad (2)$$

②Scale coefficient:

$$V_{ij} = \frac{P_{ij}}{\sum_{i=1}^m P_{ij}}, 0 \leq V_{ij} \leq 1 \quad (3)$$

③Index information entropy:

$$e_j = -k \sum_{i=1}^m V_{ij} \ln V_{ij}, \quad (4)$$

Among them, $k = \frac{1}{\ln(m)}$, $k \geq 0$, $e_j \geq 0$

④Information entropy redundancy:

$$d_j = 1 - e_j \quad (5)$$

⑤Index weight:

$$W_j = \frac{d_j}{\sum_{j=1}^n d_j} \quad (6)$$

⑥Calculate the composite score:

$$z_i = \sum_{j=1}^m W_j X_{ij} \quad (7)$$

2.2.2. Tobit Regression Model

The Tobit regression model used in this paper can more scientifically and reasonably measure the influencing factors of the rural revitalization level in Gansu Province. The regression model is also called interception regression model and restricted dependent variable model, and its basic expression formula is as follows:

$$y_i^* = X_i \beta + \mu_i \quad \mu_i \sim N(0, \sigma^2) \quad (8)$$

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (9)$$

Among them, β is the scale coefficient, y^* is the latent variable, and X_i is the independent variable vector.

3. Results and Analysis

3.1. Analysis of Rural Vitalization Level in Gansu Province

3.1.1. Index Selection and Index System Construction

According to the “Strategic Plan for Rural Revitalization (2018-2022)” issued by the CPC Central Committee and the State Council, this paper selects 37 indexes covered in five aspects of thriving businesses, pleasant living surroundings, social etiquette and civility, effective governance and prosperity, so as to evaluate the comprehensive development level of Rural Revitalization for all 85 counties in Gansu Province, as shown in the following table.

3.1.2. Measurement Results and Analysis

Based on the comprehensive evaluation index system of rural revitalization level in Gansu Province, this paper calculates the weight of each index and calculates the comprehensive evaluation index of rural revitalization level in Gansu Province from the index weight (Table 2). By using ArcGIS software, the paper uses the natural discontinuous point classification method and the evaluation index is divided into five parts: high-level area, higher-level area, medium-level area, lower-level area and low-level area. A spatial distribution map (Figure 1) is drawn thereafter.

Table 1. The comprehensive evaluation index system of rural revitalization level in Gansu Province

Target Layer	Criterion Layer	Index Layer	Unit	Index Attribute	
Comprehensive evaluation index system of rural revitalization level in Gansu Province	thriving businesses	comprehensive mechanization rate of crop cultivation and harvest	%	positive	
		agricultural labor productivity	RMB 10,000/person	positive	
		development rate of agriculture, forestry, animal husbandry and fishery services	%	positive	
		overall grain production capacity	10,000 ton	positive	
		the proportion of the secondary industry in the gross regional product	%	positive	
		proportion of tertiary industry in gross regional product	%	positive	
		the proportion of people employed in wholesale and retail trade	%	positive	
		information transmission computer services and software industry	%	positive	
		number of construction enterprises	number	positive	
		centralized disposal rate of rural garbage	%	positive	
	pleasant living surroundings	rural sewage centralized treatment rate	%	positive	
		rural tap water to households	%	positive	
		application intensity of agricultural chemical fertilizer	ton	negative	
		the proportion of villages with electricity	%	positive	
		pm2.5 emissions	um	negative	
		pm10 emissions	um	negative	
	social etiquette and civility	barren mountains and wasteland afforestation area	10,000 mu	positive	
		the proportion of rural employees with a high school education or above	%	positive	
		proportion of illiterate and semi-literate workers in rural areas	%	negative	
		number of libraries and cultural stations	number	positive	
		education, culture and entertainment account for the proportion of living consumption	%	positive	
		internet coverage	%	positive	
		cable TV coverage	%	positive	
		proportion of employees in sports, culture, arts and radio and television industries	%	positive	
		effective governance	number of farmer cooperatives	number	positive
			number of members of farmer cooperatives	person	positive
	number of village groups		number	positive	
	number of administrative personnel of township economic organizations (township affairs)		person	positive	
	prosperity	Engel coefficient of rural residents	%	negative	
		per capita disposable income of rural residents	10000 RMB	positive	
urban-rural income ratio		/	negative		
basic old-age insurance coverage		%	positive		
basic medical insurance coverage		%	positive		
the proportion of the number of people with the minimum living allowance		person	negative		
number of lodging and catering enterprises		number	positive		
number of supermarkets above 50 square meters		number	positive		
total retail sales of consumer goods in rural areas	RMB	positive			

Table 2. Comprehensive evaluation index of rural revitalization level in Gansu Province

County	Thriving businesses	Pleasant living surroundings	Social etiquette and civility	Effective governance	Prosperity	Composite index	Rank
Qilihe District	0.05	0.03	0.03	0.05	0.18	0.34	43
Xigu District	0.06	0.04	0.03	0.05	0.15	0.33	47
Honggu District	0.07	0.03	0.03	0.05	0.15	0.34	39
Yongdeng County	0.07	0.06	0.08	0.02	0.16	0.40	7
Gaolan County	0.06	0.03	0.02	0.04	0.15	0.30	61
Yuzhong County	0.06	0.08	0.07	0.02	0.15	0.38	16
Jiayuguan City	0.08	0.06	0.03	0.05	0.16	0.39	8
Jinchuan District	0.09	0.04	0.03	0.05	0.14	0.35	31
Yongchang County	0.09	0.03	0.03	0.04	0.18	0.38	17
Baiyin District	0.09	0.04	0.02	0.05	0.13	0.32	53
Pingchuan District	0.05	0.04	0.03	0.03	0.14	0.29	68

Jingyuan County	0.06	0.05	0.09	0.02	0.17	0.39	9
Huining County	0.06	0.04	0.10	0.01	0.16	0.38	10
Jingtai County	0.07	0.04	0.07	0.04	0.14	0.35	27
Qinzhou District	0.06	0.03	0.05	0.02	0.16	0.33	48
Maiji District	0.05	0.03	0.09	0.02	0.15	0.34	38
Qingshui County	0.03	0.04	0.07	0.03	0.13	0.30	64
Qin'an County	0.04	0.04	0.06	0.03	0.16	0.33	50
Gangu County	0.09	0.05	0.05	0.02	0.15	0.37	18
Wushan County	0.04	0.03	0.07	0.02	0.14	0.30	60
Zhangjiachuan County	0.03	0.03	0.04	0.02	0.10	0.23	84
Liangzhou District	0.09	0.03	0.10	0.03	0.18	0.43	2
Minqin County	0.06	0.06	0.08	0.04	0.14	0.38	14
Gulang County	0.09	0.05	0.08	0.03	0.16	0.41	4
Tianzhu County	0.04	0.05	0.04	0.04	0.15	0.32	54
Ganzhou District	0.12	0.06	0.06	0.02	0.20	0.47	1
Sunan County	0.07	0.05	0.02	0.04	0.16	0.34	40
Minle County	0.06	0.06	0.09	0.03	0.17	0.40	6
Linze County	0.08	0.03	0.03	0.04	0.15	0.33	46
Gaotai County	0.07	0.05	0.03	0.03	0.15	0.34	41
Shandan County	0.07	0.07	0.04	0.02	0.15	0.35	28
Kongtong District	0.06	0.05	0.06	0.04	0.14	0.33	44
Jingchuan County	0.04	0.03	0.05	0.03	0.12	0.28	75
Lingtai County	0.07	0.04	0.07	0.03	0.14	0.34	35
Chongxin County	0.06	0.03	0.04	0.03	0.14	0.30	63
Zhuanglang County	0.05	0.05	0.09	0.02	0.13	0.34	34
Jingning County	0.05	0.07	0.11	0.02	0.13	0.38	15
Huating City	0.07	0.04	0.07	0.04	0.15	0.37	19
Suzhou District	0.09	0.04	0.06	0.03	0.19	0.41	5
Jinta County	0.08	0.05	0.04	0.05	0.15	0.36	24
Guazhou County	0.07	0.04	0.04	0.04	0.14	0.33	51
Subei County	0.07	0.03	0.02	0.06	0.14	0.31	58
Akesai County	0.09	0.05	0.02	0.05	0.14	0.34	37
Yumen City	0.09	0.04	0.04	0.05	0.13	0.36	26
Dunhuang City	0.07	0.03	0.03	0.05	0.17	0.34	33
Xifeng District	0.06	0.04	0.05	0.03	0.17	0.35	29
Qingcheng County	0.06	0.06	0.05	0.02	0.17	0.37	20
Huanxian County	0.07	0.05	0.08	0.04	0.14	0.38	13
Huachi County	0.07	0.07	0.04	0.05	0.14	0.36	25
Heshui County	0.06	0.04	0.04	0.04	0.13	0.32	56
Zhengning County	0.03	0.05	0.04	0.03	0.13	0.28	74

Ningxian County	0.05	0.06	0.08	0.03	0.14	0.36	22
Zhenyuan County	0.06	0.06	0.07	0.03	0.15	0.36	21
An Ding District	0.06	0.02	0.08	0.02	0.16	0.35	32
Tongwei County	0.05	0.06	0.08	0.03	0.14	0.36	23
Longxi County	0.11	0.03	0.08	0.02	0.14	0.38	11
Weyuan County	0.04	0.05	0.07	0.03	0.14	0.32	52
Lintao County	0.05	0.03	0.10	0.02	0.17	0.38	12
Zhangxian County	0.03	0.03	0.04	0.04	0.11	0.25	81
Minxian County	0.03	0.02	0.07	0.03	0.14	0.28	71
Wudu District	0.07	0.03	0.09	0.03	0.20	0.43	3
Chengxian County	0.11	0.02	0.04	0.02	0.15	0.34	36
Wenxian County	0.04	0.05	0.05	0.04	0.15	0.33	49
Tanchang County	0.02	0.03	0.06	0.03	0.14	0.29	69
Kangxian County	0.03	0.03	0.06	0.02	0.15	0.30	62
Xihe County	0.04	0.03	0.05	0.02	0.14	0.28	77
Lixian County	0.03	0.03	0.05	0.04	0.15	0.30	66
Huixian County	0.05	0.03	0.05	0.03	0.14	0.31	59
Liangdang County	0.03	0.05	0.02	0.04	0.14	0.27	78
Linxia City	0.07	0.03	0.02	0.04	0.13	0.30	67
Linxia County	0.05	0.05	0.07	0.02	0.15	0.35	30
Kangle County	0.04	0.03	0.05	0.02	0.13	0.28	76
Yongjing County	0.05	0.03	0.05	0.04	0.16	0.34	42
Guanghe County	0.04	0.01	0.06	0.02	0.10	0.23	83
Hezheng County	0.04	0.04	0.05	0.02	0.13	0.28	72
Dongxiang Autonomous County	0.03	0.02	0.07	0.04	0.17	0.33	45
Jishishan County	0.02	0.06	0.04	0.02	0.17	0.32	55
Hezuo City	0.03	0.02	0.02	0.04	0.12	0.22	85
Lintan County	0.03	0.03	0.03	0.05	0.15	0.28	73
Zhuoni County	0.02	0.04	0.04	0.03	0.14	0.27	80
Zhouqu County	0.03	0.03	0.04	0.05	0.13	0.29	70
Diebu County	0.04	0.03	0.02	0.05	0.16	0.32	57
Maqu County	0.03	0.02	0.02	0.05	0.12	0.24	82
Luqu County	0.03	0.03	0.02	0.04	0.15	0.27	79
Xiahe County	0.03	0.03	0.01	0.05	0.18	0.30	65

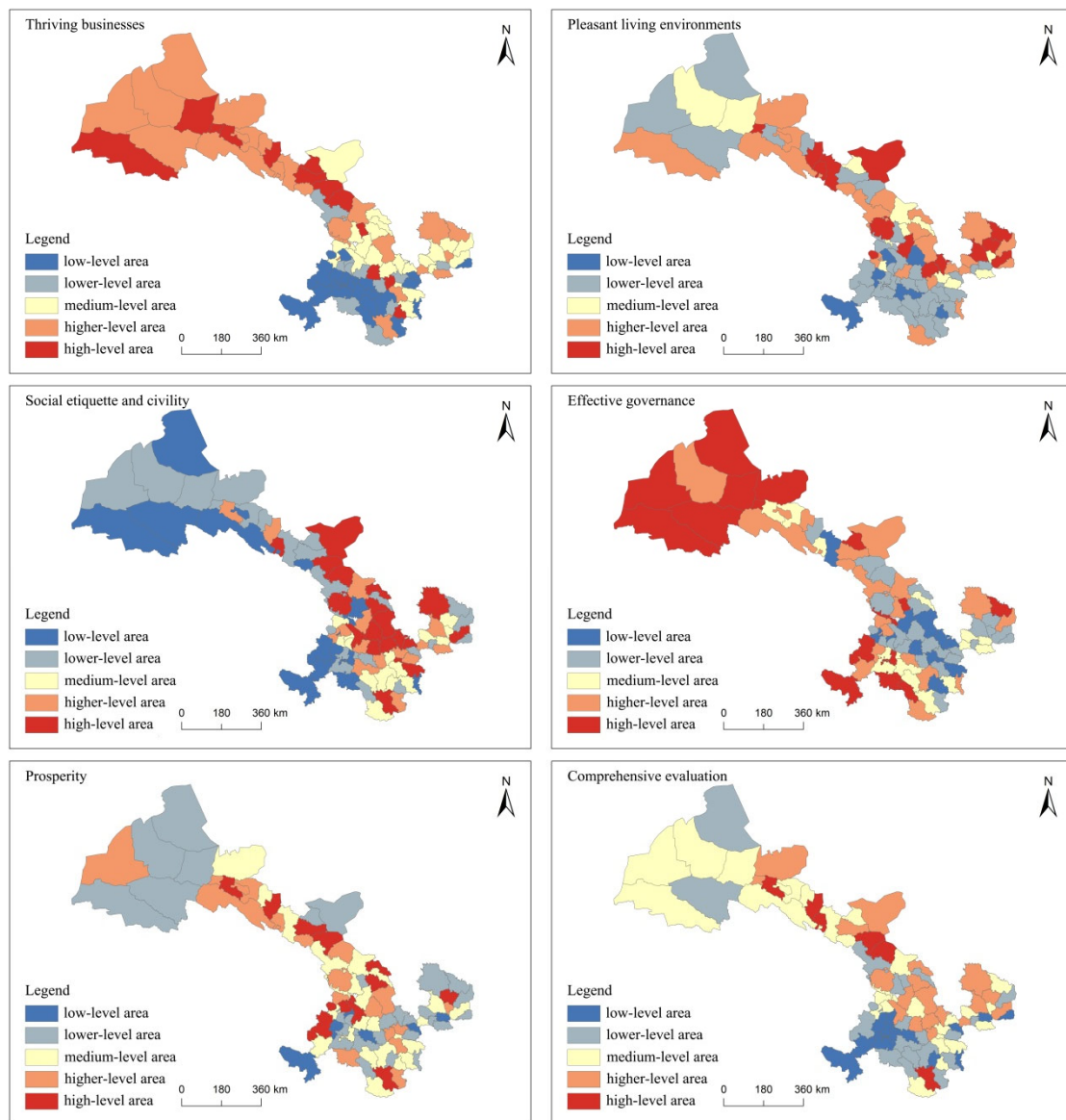


Figure 1. Spatial distribution map of comprehensive evaluation index of rural revitalization level in Gansu Province

(1) Thriving businesses. The average value of the industrial prosperity evaluation index is 0.06, of which 36 counties exceed the average index and 49 counties are lower than the average. The county with the highest evaluation index is Ganzhou District, Zhangye City, with an evaluation index of 0.12, located in the Hexi area; the county with the lowest evaluation index is Jishishan County in Linxia Hui Autonomous Prefecture, with an evaluation index of 0.02, located in the Southwest area. Combined with the evaluation index and spatial distribution map, the evaluation index of industrial prosperity from high to low is Hexi region, Longzhong region, Longdong region, Longnan region and Southwest region, generally showing a spatial distribution pattern of high in the northwest, low in the southwest, and high-level region and low-level region facing north and south.

(2) Pleasant living surroundings. The average value of the ecological livability evaluation index was 0.04, of which 38 counties exceeded the average level and 47 counties were lower than the average. The county with the highest evaluation index is Yuzhong County, Lanzhou City, with an evaluation index of 0.08, located in Longzhong area; the county with the lowest evaluation index is Guanghe County in Linxia Hui Autonomous Prefecture, with an evaluation index of 0.01, located in the Southwest area. Combined with

the evaluation index and the spatial distribution map, the ecological livability evaluation index from high to low is Longzhong area, Hexi area, Longdong area, Southwest area and Longnan area, generally showing a spatial distribution pattern of high in the northeast and low in the southwest.

(3) Social etiquette and civility. The average value of the evaluation index of rural customs and civilization is 0.05, of which 42 counties exceed the average index and 43 counties are lower than the average. The county with the highest evaluation index is Jingning County, Pingliang City, with an evaluation index of 0.11, located in the Longdong area, and the county with the lowest evaluation index is Xiahe County in Gannan Tibetan Autonomous Prefecture, with an evaluation index of 0.01, located in the Southwest area. Combined with the evaluation index and the spatial distribution map, the evaluation index of rural culture from high to low is Longzhong area, Longdong area, Hexi area, Southwest area and Longnan area, generally showing a spatial distribution pattern of high in the southeast and low in the northwest.

(4) Effective governance. The average value of the effective governance evaluation index was 0.03, of which 44 counties exceeded the average and 41 counties were lower than the average. The county with the highest evaluation

index is Subei County, Jiuquan City, with an evaluation index of 0.06, located in Hexi area; the county with the lowest evaluation index is Huining County, Baiyin City, with an evaluation index of 0.01, located in Longzhong area. Combined with the evaluation index and the spatial distribution map, the effective evaluation index of governance from high to low is Hexi area, Longzhong area, Southwest area, Longdong area and Longnan area, generally showing a spatial distribution pattern of high in the northwest and low in the southeast.

(5) Prosperity. The average value of the living affluent evaluation index is 0.15, of which 36 counties exceed the average level and 49 counties are lower than the average. The county with the highest evaluation index is Wudu District, Longnan City, with an evaluation index of 0.20, located in Longnan area; the county with the lowest evaluation index is Guanghe County in Linxia Hui Autonomous Prefecture, with an evaluation index of 0.10, located in the Southwest area. Combined with the evaluation index and the spatial distribution map, the living affluence evaluation index from high to low is Longzhong area, Hexi area, Southwest area, Longdong area and Longnan area, generally showing a spatial distribution pattern that decreases from the central part to the north and south ends.

The average value of the comprehensive evaluation index of rural revitalization level in Gansu Province is 0.33, of

which 48 counties exceed the average and 37 counties are lower than the average. The county with the highest evaluation index is Ganzhou District, Zhangye City, with an evaluation index of 0.47, which is located in the Hexi area. The county with the lowest evaluation index is Hezuo, Gannan Tibetan Autonomous Prefecture, with an evaluation index of 0.22, located in the Southwest area. In general, the areas with high comprehensive evaluation index of rural revitalization level in Gansu Province are mostly concentrated in Longzhong area and Hexi area, and the areas with low comprehensive evaluation index of rural revitalization level in Gansu Province are mostly distributed in Southwest area and Longnan area.

3.2. Analysis on Influencing Factors of Rural Revitalization Level in Gansu Province

3.2.1. Index Selection

In this paper, the rural revitalization level index of Gansu Province is set as the explained variable; and the economic development, financial investment, medical resources, public transportation, fixed assets investment and compulsory education resources are selected as the explanatory variables of the rural revitalization level in Gansu Province, as shown in the following table.

Table 3. Influencing factors of rural revitalization level in Gansu Province

Explanatory Variable	Specific Definitions and Units	Variable Summary
economic development	GDP per capita (RMB)	X ₁
financial investment	general public budget expenditure (10000 RMB)	X ₂
medical resources	number of medical and health institutions (PCS)	X ₃
public transportation	proportion of villages with access to public transportation (%)	X ₄
fixed assets investment	growth of total fixed asset investment (%)	X ₅
compulsory education resources	School-age children enrolment rate (%)	X ₆

3.2.2. Measurement Results and Analysis

According to the selected explained variables and explanatory variables, this paper uses the “Tobit regression

model” to calculate the influencing factors of rural revitalization level in Gansu Province, and the calculation results are as follows.

Table 4. Tobit regression results

Variable Summary	Regression Coefficient	Standard Deviation	z value	p value
X ₁	0.024	0.005	4.702	0.000
X ₂	0.022	0.006	3.921	0.000
X ₃	0.016	0.007	2.432	0.015
X ₄	0.067	0.021	3.143	0.002
X ₅	0.003	0.004	0.881	0.378
X ₆	0.006	0.004	1.357	0.175

(1) The regression coefficient of X₁ is 0.024 and passes the significance test of 1%, indicating that the economic development has a significant positive effect on the improvement of rural revitalization level in Gansu Province. The development of rural areas cannot be separated from the improvement of regional economic level. Only with a sound economic foundation can the rural revitalization strategy be implemented unimpeded. Promoting the diversified development of rural economy can not only change the original single development form of rural areas, but also make them play their regional advantages and highlight regional

characteristics on the basis of maintaining the current level of development. Gansu Province is a big agricultural province in the western region of China, and its agricultural industry is undergoing transformation and upgrading in full swing. How to achieve high-quality economic development in rural areas is a key issue that needs to be considered in the economic development of Gansu Province.

(2) The regression coefficient of X₂ is 0.022 and passes the significance test of 1%, indicating that the financial investment has a significant positive effect on the improvement of rural revitalization level in Gansu Province.

To a certain extent, the development of rural areas depends on strong financial support. In general, the more financial input to the local area the governments provide, the stronger and the better the level of the infrastructure protection ability the area will become, the higher quality of life the rural residents will owe, and the better the rural living surroundings will be. Apparently, these conditions can eventually promote the rural talents backflow and economic growth, and more, in return. All of these factors can form a whole circle perfectly and positively. On March 24, 2022, Gansu Province held a key financial work conference. The meeting clearly pointed out that, the current focus of our province for the fiscal expenditure is to adhere to financial resources sinking, ensure the smooth operation of county finance, and continue to protect and improve the basic livelihood for the people.

(3) The regression coefficient of X3 is 0.016 and passes the significance test of 5%, indicating that the medical resources have a significant positive effect on the improvement of rural revitalization level in Gansu Province. At present, the rural revitalization work in Gansu Province is progressing in full swing. However, the problems of uneven distribution of medical resource, unequal levels of medical and health care in different regions still exist. Thus, high-quality public service resources, medical and health resources are much more assigned to the urban areas, most likely to excluded for the rural areas. Today, with the epidemic situation becoming normal, how to improve the medical and health public service system in rural areas, how to improve the basic health facilities in rural areas, and how to solve the shortage of health personnel in rural areas, are the urgent difficulties to be overcome in the revitalization of rural medical services in Gansu Province.

(4) The regression coefficient of X4 is 0.067 and passes the significance test of 1%, indicating that public transportation has a significant positive effect on the improvement of rural revitalization level in Gansu Province. The precondition of developing rural areas is to build rural roads. At the same time, the construction of rural roads is also one of the important guarantees to support the development of rural revitalization strategy. The improvement of the coverage of public transport can not only strengthen the connection between rural areas and the outside world, facilitate villagers' travel, but also help the development of the local tertiary industry and rural tourism. The Implementation Guideline issued by the Ministry of Transport in 2021 stresses the need to strengthen innovation in the field of rural transport, strengthen the renovation of old roads in rural areas, and drive industrial development in rural areas with public transport.

(5) The regression coefficient of X5 is 0.003, but it does not pass the significance test of 5%, indicating that the fixed asset investment has insignificant positive effect on the improvement of rural revitalization level in Gansu Province. Social capital is an important force and a guarantee to promote the implementation of the rural revitalization strategy. As the most active element in the national economy, social capital can inject modern production factors such as talent, technology and management into agriculture and rural areas. And the fixed asset investment can not only boost the rural economic growth, but also help increase the rural residents' income. At present, the governments need to strengthen the guidance and protection of the enthusiasm of social capital investment in rural areas, in order to break through the constraints of the epidemic in Gansu Province, to change the situation of the continuous low fixed asset

investment in rural areas, and to expand the effective fixed asset investment in rural areas.

(6) The regression coefficient of X6 is 0.006, but it does not pass the significance test of 5%, indicating that the compulsory education resources have insignificant positive effect on the improvement of rural revitalization level in Gansu Province. Known to all, the education plays a fundamental role in the rural revitalization. Education is the foundation for any of a country. If the youth is stronger, the country will be stronger as well. Better development of rural education can help the rural areas to better realize talent and cultural revitalization. At present, there is indeed a problem of uneven distribution of compulsory education resources in the development of county-level rural areas in Gansu Province. Considering the current development situation of COVID-19, how to improve the online education level in rural areas and carry out the online teaching activities during the period of home isolation of the epidemic is what Gansu Province needs to figure out in the revitalization of rural education.

4. Conclusion

In this paper, a relatively comprehensive evaluation index system of rural revitalization level in Gansu Province was constructed on the basis of reference to existed literatures. The entropy method was used to calculate the comprehensive evaluation index of rural revitalization in Gansu Province in 2019, and the Tobit regression model was selected to analyze its influencing factors. The main conclusions of the research can be summarized as follows:

(1) The rural revitalization level of each county in Gansu Province has the problems of lower overall development level and unbalanced development among the region. The areas with higher comprehensive evaluation index of rural revitalization level in Gansu Province are mostly concentrated in Longzhong area and Hexi area. The areas with low comprehensive evaluation index of rural revitalization level are mostly distributed in the Southwest area and Longnan area where ethnic minorities live. The indexes of Longzhong area, Hexi area, Longdong area, Southwest area and Longnan area showed a decreasing trend in turn. The distribution interval of the comprehensive evaluation index of rural revitalization level in Gansu Province is [0.22, 0.47]. Among all of the 85 counties, Ganzhou District, Zhangye City, with the highest evaluation index, was twice as high as Hezuo City, Gannan Tibetan Autonomous Prefecture, which had the lowest evaluation index.

(2) The four factors of economic development, financial investment, medical resources and public transportation, have significant positive effects on the improvement of rural revitalization level in Gansu Province. Among them, economic development has the greatest positive effect on the improvement of rural revitalization level, followed by financial investment, public transportation, and medical resources. In addition, the two factors of fixed asset investment and compulsory education resources have an insignificant positive relationship with the improvement of the rural revitalization level of Gansu Province.

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