Research on the Regional Environmental Protection and Imbalance of Economic Development in Qinghai Province

Xin Qing¹, Juanyi Li¹,², Falan Zhao¹,²*
¹ College of Civil Engineering, Qinghai University, Xining, Qinghai, 810016, China
² Qinghai Provincial Key Laboratory of Energy-saving Building Materials and Engineering Safety, Xining, Qinghai, 810016, China
*Corresponding author’s e-mail: zhaofl2004@qhu.edu.cn

Abstract. Due to differences in economic foundation, natural and geographical environment, and other factors, the regional economic development of Qinghai Province is unbalanced, and regional environmental protection is problematic. This paper uses the location entropy method and the coupling coordination model to evaluate the economic development and environmental protection of eight regions in Qinghai Province. Finally, combining the characteristics of economic development and natural environment in the main areas of Qinghai Province, corresponding countermeasures and suggestions are put forward.

1. Introduction
China’s economic environment is in a critical period of transforming the economic development mode and optimizing the economic and industrial structure [1]. Therefore, the construction of a new institutional system is the focus of economic work under the new historical conditions and the key element to solve a series of difficult problems. There is a certain gap in the economic development of various regions in Qinghai, and there is a phenomenon of economic development disconnected between regions. In recent years, the issue of regional economic development imbalance has attracted the attention of many scholars, and good research results have been achieved. The scope of research on regional economic imbalance covers all aspects of the country, provinces, and cities. In the process of studying the imbalance of regional economic development, scholars mainly use deviation-share analysis method, econometric model, entropy method, Gini coefficient method, etc. [2-3].

2. Overview of Regional Research
Qinghai is located in western China and is one of the vital provinces on the Qinghai-Tibet Plateau. The province has significant topographical differences. It is rich in natural resources, among which hydropower, solar, wind, and animal husbandry resources are in the leading position in the country. Social and cultural undertakings are prominent, and the tourism industry is developed.

3. Analysis methods and data sources

3.1. Analysis method

3.1.1. Location entropy method
Location entropy method is an objective weighting method. Its objectivity lies in the fact that the original
The data used in the calculation is the actual value of the evaluation index [4]. Calculate various indicators through a dimensionless method. The main dimensionless calculation method is as follows:

1. \( X_{ij} = \frac{x_{ij} - m_j}{M_j - m_j} \)
   Note: \( i \) is the year, \( j \) is the area of Qinghai Province, \( M_j \) is the maximum value of \( x_{ij} \), and \( m_j \) is the minimum value of \( x_{ij} \).

2. \( X_{ij} = X_{ij} + a \)
   Note: The value of \( a \) should be close to the minimum value of \( X_{ij} \), therefore, the value of \( a \) obtained in this paper is 0.00001.

3. \( M_{ij} = \frac{\sum_{i=1}^{n} x_{ij}}{n} \)
   Note: Perform dimensionless processing on the original data, eliminate the influence of the unit, and calculate the contribution rate of the \( i \) index under the \( j \) area.

4. \( e_j = -\sum_{i=1}^{n} M_{ij} \ln (M_{ij})/\ln (n) \)
   Note: \( 0 \leq e_j \leq 1 \)

5. \( K_j = 1 - e_j \)
   Note: The difference coefficient and coefficient value are calculated.

6. \( W_j = \frac{K_j}{\sum_{j=1}^{m} K_j}, j = 1,2,3 \ldots m \)
   Note: Determine the evaluation index weight \( W_j \), and calculate the economic development score of Qinghai Province.

7. \( F = \sum_{i=0}^{n} W_j * M_{ij} \)
   Note: The obtained index weight value \( W_j \) is multiplied with the ratio \( M_{ij} \) of the \( i \) evaluated object in the \( j \) area to obtain the comprehensive score of each evaluation object, and the comparison is made according to the ranking of the scores.

### 3.1.2. Coupling degree model

The coupling degree model is used to analyze the coordinated development level of things [4].

### 3.2. Data sources

The data comes from the “Qinghai Provincial Statistical Yearbook” [5] (2008-2018) and other statistical yearbooks as the original data. For a small part of the missing data, linear regression is used to process it by itself to calculate and supplement the completeness of the data.

### 4. Measurement and evaluation of regional economic and environment protection

#### 4.1. Construction of indicator system

After the calculation formulas 1-7, obtain the indicator system weight (Table 1) and comprehensive measurement score of Qinghai Province in the economic development of 2008-2018 (Table 2, 3).

| Index | Indicator code | Index Weight |
|-------|----------------|-------------|
| GDP (billion yuan) | X1 | 0.1043 |
| GDP per capita (yuan) | X2 | 0.1041 |
| Total investment (ten thousand yuan) | X3 | 0.139 |
| Total fiscal revenue (ten thousand yuan) | X4 | 0.1095 |
| Per capita disposable income of urban residents (yuan) | X5 | 0.1173 |
| GDP of the primary industry (billion yuan) | X6 | 0.1166 |
| GDP of the secondary industry (billion yuan) | X7 | 0.1116 |
| GDP of the tertiary industry (billion yuan) | X8 | 0.1192 |
4.2. Comprehensive evaluation of Qinghai Province

According to the calculation of the above-mentioned location entropy, the comprehensive evaluation scores of Qinghai Province in each year from 2008 to 2018 (Table 2 and Figure 1). From Table 2 and Figure 1, it can be concluded that the comprehensive evaluation scores from 2008 to 2018 show an upward trend, indicating that the overall economic situation of Qinghai Province is developing well.

Table 2. Comprehensive evaluation scores of Qinghai Province in each year (2008-2018)

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Score | 0.00320 | 0.010238 | 0.032864 | 0.062363 | 0.088536 | 0.108275 | 0.116366 | 0.127861 | 0.141085 | 0.147872 | 0.164220 |

4.3. Evaluation of the economic development of each city in Qinghai Province

As shown in Table 3 and Figure 2, during the period from 2008 to 2018, the economic development of various regions in the province has steadily improved amidst turbulence and changes. The development of Xining City is the best, and Guoluo is the slowest.

Table 3. Comprehensive score table in Qinghai Province

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Xining City | 0.0372 | 0.0376 | 0.0366 | 0.0355 | 0.0344 | 0.0353 | 0.0366 | 0.0364 | 0.0365 | 0.0377 | 0.0362 |
| Haidong City | 0.0142 | 0.0145 | 0.0143 | 0.0145 | 0.0151 | 0.0161 | 0.0171 | 0.0171 | 0.0171 | 0.0177 | 0.0176 |
| Haibei | 0.0047 | 0.0046 | 0.0046 | 0.0053 | 0.0057 | 0.0063 | 0.0055 | 0.0056 | 0.0060 | 0.0056 | 0.0052 |
| Huang Nanzhou | 0.0038 | 0.0034 | 0.0032 | 0.0029 | 0.0029 | 0.0031 | 0.0031 | 0.0034 | 0.0034 | 0.0035 | 0.0038 |
| Hainan | 0.0048 | 0.0052 | 0.0046 | 0.0046 | 0.0045 | 0.0046 | 0.0051 | 0.0054 | 0.0053 | 0.0054 | 0.0052 |
| Guoluo | 0.0006 | 0.0007 | 0.0008 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0010 | 0.0010 | 0.0009 | 0.0013 |
| Yushu Prefecture | 0.0036 | 0.0032 | 0.0078 | 0.0070 | 0.0055 | 0.0042 | 0.0037 | 0.0036 | 0.0039 | 0.0040 | 0.0040 |
| Haixi | 0.0256 | 0.0228 | 0.0224 | 0.0240 | 0.0240 | 0.0233 | 0.0207 | 0.0179 | 0.0183 | 0.0201 | 0.0209 |
5. Coupling and coordination analysis

Through SPSSAU online analysis software, the coupling and coordination analysis of each city in Qinghai Province is carried out. The results are shown in Table 4 and Figure 3. The conclusions are as follows:

1. From 2008 to 2018, the differences in the economic development of various cities in Qinghai Province are shrinking day by day, and the differences will be minimized in 2018.

2. From 2008 to 2018, the economic development of provincial capital cities was the fastest, and the economic development of Guoluo prefecture was the slowest, and the economic development coordination among the cities showed a zigzag coordination in the early period (2008-2016), and in the later period (2017-2018) showed a steady increase in coordination.

Table 4. Coupling coordination degree analysis

| Year | Coupling degree C value | Coordination index T value | Coupling coordination degree D value | Coordination level | Coupling degree |
|------|-------------------------|---------------------------|-------------------------------------|--------------------|-----------------|
| 2008 | 0                       | 0.42                      | 0                                   | 1                  | Extreme imbalance |
| 2009 | 0                       | 0.404                     | 0                                   | 1                  | Extreme imbalance |
| 2010 | 0.501                   | 0.386                     | 0.44                                | 5                  | On the verge of disorder |
| 2011 | 0                       | 0.326                     | 0                                   | 1                  | Extreme imbalance |
| 2012 | 0                       | 0.298                     | 0                                   | 1                  | Extreme imbalance |
| 2013 | 0.824                   | 0.438                     | 0.601                               | 7                  | Primary coordination |
| 2014 | 0.842                   | 0.518                     | 0.661                               | 7                  | Primary coordination |
| 2015 | 0                       | 0.534                     | 0                                   | 1                  | Primary coordination |
| 2016 | 0.746                   | 0.56                      | 0.646                               | 7                  | Intermediate coordination |
| 2017 | 0.829                   | 0.546                     | 0.673                               | 7                  | Intermediate coordination |
| 2018 | 0.865                   | 0.653                     | 0.751                               | 8                  | Intermediate coordination |
6. Analysis of the causes of unbalanced economic development in Qinghai Province
Prefecture-level cities under the jurisdiction of Qinghai Province are divided into Xining City, Haibei Prefecture, Haidong City, Hainan Prefecture, Guoluo Prefecture, Huangnan Prefecture, Yushu Prefecture, and Haixi Prefecture. Based on the weight calculation of the location entropy method, the evaluation result of the comprehensive measurement and the analysis model of the coupling coordination degree, the following analyzes the causes of the unbalanced regional economic development in Qinghai and Qinghai from the difference in location and resources, and the difference in industrial structure development.

7. Suggestions and countermeasures
Through the analysis of the status quo of Qinghai’s regional economic development, it is found that there are large gaps in the economic development of various regions in Qinghai. In order to promote the coordinated development of regional economy in Qinghai Province, the following suggestions and countermeasures are proposed.

First, relying on the region’s own advantages, vigorously develop regional advantageous industries and adhere to the strategy of giving priority to the development of rural areas and agriculture. Exploit the unique resource characteristics of various regions in Qinghai, form characteristic industries, and promote local economic development. Second, vigorously promote regional cooperation and deepen the coordinated development of various industries. Third, increase support for poor counties, promote equalization of public services, and gradually narrow regional gaps. The poverty area in Qinghai Province is relatively large. Inconvenient transportation and harsh natural environment restrict the pace of economic development in some areas of Qinghai Province.

8. Conclusion
There are many factors leading to the unbalanced regional economic development and environment protection in Qinghai Province. This paper analyzes the main reasons for the large gaps in the economic development of various districts and environment protection in Qinghai Province. From the differences in the location, resources, and industrial structure development of each region, and all regions should base on the development status of Qinghai Province, all regions of Qinghai Province should increase financial support to poverty-stricken areas from the perspective of establishing a market-oriented economic system and taking advantage of regional advantages, so as to achieve targeted poverty alleviation, reduce regional differentiation, and promote various the regional coordination, cooperation mechanism realizes resource sharing, promotes the sustained, coordinated and healthy development of the province’s regional economy.

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