The Coupling Relationship Between Economic Poverty Alleviation and Ecological Poverty Alleviation in Concentrated and Contiguous Poverty-stricken Areas: Take Yunnan Province as an Example

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Abstract: The coupling and coordinated development of economic poverty alleviation and ecological poverty alleviation is an important strategy for poverty alleviation development in the new era. It is the basis for achieving the goal that all people get rid of poverty in 2020 and entering a well-off society together. Taking concentrated and contiguous poverty-stricken areas in Yunnan Province of China as the target research objective, the Entropy Method is used to evaluate the performance of economic, social, human settlement and ecological poverty alleviation. Then, the coupling harmonious degree model is selected to explore the correlation, consistency and coordination between economic poverty alleviation and ecological poverty alleviation. The results shows that: (1) The overall poverty alleviation performance is at a low-middle level, and the poverty alleviation performance in Tibetan inhabited area is the only one that ranks in the upper middle level, among the four regions of Yunnan. (2) The degree of coupling in Yunnan and the 4 regions is relatively high, basically in a highly coupled stage, but the degree of coupling harmonious is low, especially in the Wumeng Mountainous area. According to the conclusion, it is proposed to promote regional development and the economic and ecological coupling development through the optimization of the utilization and allocation of poverty alleviation resources, the appropriate tilt of poverty alleviation policies to areas with low performance and coupling harmonious, and the enhancement of the value of ecological services in Tibetan inhabited area.

1. Introduction

In 2011, according to the "Outline for Poverty Alleviation Development in China's Rural Areas (2011-2020)”, China designated a series of poverty-stricken areas as the main battlefields for poverty alleviation, including 14 regions, that is the Wumeng mountainous area, the rocky desertification areas of Yunnan, Guangxi and Guizhou, the border mountainous area in western Yunnan, etc. There are 4 concentrated and contiguous poverty-stricken areas in Yunnan, named the Wumeng mountainous area,
the rocky desertification area, the border mountainous area of the western Yunnan and the Tibetan inhabited area. In 2017, there were 88 poverty-stricken counties in Yunnan, of which 86 were concentrated in contiguous poverty-stricken areas, including 15 in the Wumeng mountainous area, 12 in the rocky desertification area, 56 in the border mountainous area of the western Yunnan, and 3 in the Tibetan inhabited area. In 2018, there were a total of 40 poverty-stricken counties in Yunnan, all of which were located in concentrated and contiguous poverty-stricken areas, including 11 in the Wumeng mountainous area, 7 in the rocky desertification area, 21 in the border mountainous area of the western Yunnan and 1 in the Tibetan inhabited area. It can be seen that the concentrated and contiguous poverty-stricken areas, which are located in deep mountainous areas, rocky desertification areas, high-altitude areas and areas with poor ecological environment, are the main areas where the poverty-stricken population in Yunnan, the success of poverty alleviation in these areas is directly related to Yunnan could complete the task of poverty alleviation or not in 2020. And for these poor farmers who suffered geological disasters, floods, droughts and other disasters frequently, the improvement of the ecological environment is indispensable for them to achieve stable and sustainable poverty eradication. Therefore, in the process of poverty alleviation, we should implement the strategy that economic and social developments go hand in hand with ecological improvement.

Ecological poverty alleviation is the organic combination of ecological construction and poverty alleviation to avoid over-pursuing economic benefits and neglecting ecological environment in the process of poverty alleviation in some areas, which eventually leads to the return to poverty [1]. Most of the poverty-stricken areas are ecologically fragile areas, which are highly dependent on the environment and natural resources with high intensity but low utilization rate due to poor production conditions, lagging economic development, their productive activities lead to the deterioration of land quality and ecological degradation, further exacerbating the destruction of ecosystems and poverty increasing. Thus, the vicious cycle of increasing population, over-exploitation of resources, serious ecological degradation and increasing economic poverty is formed [2-3], which shows the non-benign coupling between ecological environment and social economy [4]. In 2015, China issued the decision on winning the battle against poverty, which calls for poverty alleviation development, while paying attention to environmental protection and ecological restoration, so that people can develop in harmony with economy, society and ecological environment. Therefore, the key point of poverty alleviation strategy in the new era is the simultaneous operation of ecological governance and poverty alleviation, the organic combination of ecological protection and poverty alleviation, the mutual promotion of ecological construction and precise poverty alleviation [5].

Based on the data of poverty-stricken areas in Yunnan Province (2017-2018), this study takes the concentrated and contiguous poverty-stricken areas in 2017-2018 as the research objective, to set up the evaluation index system of economic poverty alleviation and ecological poverty alleviation, and thereby to establish a coupling model in combination, and measure the coupling harmonic degree of economic poverty alleviation and ecological poverty alleviation. Finally, this study will provide a way on poverty alleviation in the poverty-stricken areas of Yunnan Province, promote the well-off society construction together, and enhance the sustainable and coordinated development of the economy, society and the ecological environment.

2. Overview of the study area
From 2017 to 2018, the number of non-listed poor villages in concentrated and contiguous poverty-stricken areas accounted for 85.07% and 83.05%, respectively, in the non-listed poor villages of Yunnan Province. The number of non-listed deep poverty villages in concentrated and contiguous poverty-stricken areas accounted for 89.32% and 93.12%, respectively, in the non-listed deep poverty villages of Yunnan Province. In 2018, the number of villages with a poverty incidence of 20-30% in concentrated and contiguous areas accounted for 97.88%; the number of villages with a poverty incidence of more than 30% accounted for 98.25%. From 2017 to 2018, the incidence of poverty in concentrated and contiguous poverty-stricken areas was 3.9 and 4.38, respectively, the percentage points is higher than the average of Yunnan. It can be seen that the concentrated and contiguous
poverty-stricken areas are the main areas with deep poverty degree, high incidence of poverty and concentration of poverty population.

Tab. 1 Poverty in the concentrated and contiguous poverty-stricken areas of Yunnan Province (2017-2018)

| Indicators                             | Year | The Wumeng mountainous area | The rocky desertification area | The border mountainous area of western Yunnan | The Tibetan inhabited area | Total   | Yunnan province |
|----------------------------------------|------|----------------------------|-------------------------------|---------------------------------------------|---------------------------|---------|----------------|
| Number of non-listed poor villages     | 2017 | 1692                       | 775                           | 2299                                        | 110                       | 4876    | 5732           |
|                                        | 2018 | 1245                       | 396                           | 1171                                        | 40                        | 2852    | 3434           |
| Number of non-listed deep poor villages| 2017 | 1123                       | 470                           | 1505                                        | 63                        | 3161    | 3539           |
|                                        | 2018 | 977                        | 289                           | 918                                         | 37                        | 2221    | 2385           |
| Number of villages with poverty incidence between 20% and 30% | 2017 | -                          | -                             | -                                           | -                         | 462     | 472            |
|                                        | 2018 | 223                        | 42                            | 188                                         | 9                         | -       | -              |
| Number of villages with poverty incidence is greater than or equal to 30% | 2017 | -                          | -                             | -                                           | -                         | -       | -              |
|                                        | 2018 | 216                        | 26                            | 260                                         | 2                         | 504     | 513            |
| Incidence of poverty (%)               | 2017 | 16.95                      | 8.85                          | 10.34                                       | 19.01                     | 13.7    | 9.89           |
|                                        | 2018 | 12.15                      | 6.52                          | 13.22                                       | 7.20                      | 9.77    | 5.39           |

3. Index system, data sources and method

3.1 Indicator systems and data sources
As for the index of coupling of ecology and economy, According to the existing literature, the focus of this study and the availability of data, and based on the operability, scientifically, systematically, the index system of this paper is constructed, See Table 2.

Tab. 2 Evaluation index system of coupling relationship between economic and ecological environment

| Subsystem                          | Primary index                  | Weight | Secondary index                    | Unit                | Plus-minus | Entropy weight |
|------------------------------------|--------------------------------|--------|------------------------------------|---------------------|------------|----------------|
| Economic poverty alleviation (A)   | Economic Poverty Alleviation(A1)| 0.233  | Village average collective income(A11) | Ten thousand Yuans | +          | 0.045          |
|                                   |                                 |        | Household average endowment insurance(A12) | Yuan                | +          | 0.028          |
|                                   |                                 |        | Net income per capita(A13)             | Yuan                | +          | 0.111          |
|                                   |                                 |        | Areas of cultivated land per capita(A14) | mu                  | +          | 0.048          |
### 3.2 Methods

#### 3.2.1 Entropy method and linear weighting method

There are many methods to determine the weight, such as principal component analysis, analytic hierarchy process, and entropy weight method and so on. Considering that the expert rating of AHP is too subjective, the principal component analysis method will omit some important factors with less contribution \(^6\). Therefore, the entropy weight method was chosen to determine the weight. The entropy weight method is an objective weighting method, which determines the weight of each index according to the amount of information transmitted to the decision maker, could effectively avoid the subjectivity caused by human factors and the overlap of information among multiple indicator variables \(^7\). The main calculation of the entropy weight method is:

1. **Dimensionless treatment.** The unit of data of each index is un-consistent, in order to eliminate this kind of inconsistency, the data need to be standardized, at the same time, in order to avoid the meaningless when the data is taken logarithm, the data need to be non-negative processing, unified plus 0.01, with reference to the research of Chen et al \(^8\).
(1) Calculation of index weight.

The proportion of indicator: 
\[ \eta_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} + 0.01 \]  
Formula (1)

The entropy of each index: 
\[ \theta_j = -\frac{1}{\ln m} \sum_{i=1}^{m} \xi_{ij} \ln \xi_{ij}, \quad \theta_j \in [0,1] \]  
Formula (4)

Weight of each indicator: 
\[ \omega_j = \frac{1 - \theta_j}{n - \sum_{j=1}^{n} \theta_j} \]  
Formula (5)

(2) Calculation of index weight.

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Formula (4)

Weight of each indicator: 
\[ \omega_j = \frac{1 - \theta_j}{n - \sum_{j=1}^{n} \theta_j} \]  
Formula (5)

(3) Using the linear weighting method to calculate the comprehensive scores of each region, and the comprehensive scores of each evaluation index. The formulas are as follows:

\[ \mathcal{R}_i = \sum_{j=1}^{n} \omega_j \eta_{ij} \]  
Formula (6)

\[ \mathcal{R}_j = \sum_{i=1}^{m} \omega_j \eta_{ij} \]  
Formula (6)

\[ \mathcal{R}_i, \mathcal{R}_j \in [0,1], \text{ if the score close to 1, the effect is better.} \]

3.2.2 Coupling degree and coupling coordination degree of the System

The transition process from disorder to order is called coupling degree, which reflects the degree of interaction and synchronization among the elements in the system, but it is difficult to reflect the status of interaction. The coupling harmonious degree could measure the interaction, harmony degree and phase character of the development process among all the elements in the system \[9\]. Therefore, a coupling harmonious degree model is constructed to measure the order, synchronism, coordination and stage between the poverty alleviation by economic poverty alleviation and ecological poverty alleviation in the concentrated and contiguous poverty-stricken areas. The formula is:

\[ \mathcal{N} = k \left\{ \frac{(\mathcal{R}_1 \cdot \mathcal{R}_2 \cdots \mathcal{R}_k)^{\frac{1}{k}}}{\prod (\mathcal{R}_i + \mathcal{R}_j)} \right\} \]  
Formula (7)

\[ \mathcal{R}_i \] is the overall score of each subsystem, \( k \) is the number of subsystems, and \( \mathcal{N} \in [0,1] \) is the degree of coupling. When there are only two subsystems, the coupling degree model of economic poverty alleviation and ecological poverty alleviation is obtained:

\[ \mathcal{N} = 2 \left\{ \frac{(\mathcal{R}_1 \cdot \mathcal{R}_2)^{\frac{1}{2}}}{(\mathcal{R}_1 + \mathcal{R}_2)^2 (\mathcal{R}_1 + \mathcal{R}_2)^2} \right\} \]  
Formula (8)

\[ \mathcal{R}_1 \] is the overall score of the economic poverty alleviation system, and \( \mathcal{R}_2 \) is the overall score of the ecological poverty alleviation system. In order to further investigate the harmonious degree between the economic poverty alleviation system and the ecological poverty alleviation system, the following coupling harmonious degree model is constructed:
\[ T = \alpha R_1 + \beta R_2 \]  
\[ D = \sqrt[\alpha]{T} \times \frac{1}{\beta} \]  
\( \alpha \) and \( \beta \) are the undetermined coefficient. In this study, the economic poverty alleviation system and the ecological environment poverty alleviation system are considered equally important. Therefore, in order to better describe the coupling and coordinated development degree of poverty alleviation by economy, society and ecological environment, we draw lessons from the classification standards of Lu et al \(^{[10]} \) and Gai et al \(^{[11]} \), the section and grade of coupling degree and coupling harmonious degree of economic poverty alleviation and ecological poverty alleviation are divided, as shown in Table 3.

| Degree of coupling | Coupling stage   | Coupling coordination | Degree of coupling coordination |
|--------------------|------------------|-----------------------|--------------------------------|
| 0.91-1.00          | Highly coupled    | 0.81-1.00             | High-level coordination        |
|                    |                   | 0.63-0.80             | Good Coordination              |
| 0.61-0.90          | Running-in coupling | 0.56-0.62           | Intermediate Coordination      |
|                    |                   | 0.46-0.55             | Primary Coordination           |
| 0.21-0.60          | Antagonistic coupling | 0.41-0.45         | On the verge of reconciliation |
|                    |                   | 0.34-0.40             | Primary disorder               |
| 0.00-0.20          | Low coupling      | 0.20-0.33             | Secondary dissonance           |
|                    |                   | 0.00-0.19             | Severe dissonance              |

4. Results and analysis

4.1 Analysis of the comprehensive performance

4.1.1 Index weight

From the weight of Table 2, in the subsystem, the weight of economic poverty alleviation is 0.568, while the weight of ecological poverty alleviation is 0.432, the difference between them is 0.136, it can be seen that the economic poverty alleviation is paid more attention at present. Among the first-level indicators, the weight of social poverty alleviation is the highest, followed by ecological poverty alleviation, then the economic poverty alleviation, human settlements poverty alleviation is the lowest, the difference between the highest and the lowest is 0.195, the difference is large. Among the secondary indicators, the average per capita area of conversion of farmland to forest, the ratio of the number of people at junior middle school and above (excluding school-age children and school students), the average net income per capita and the average ecological compensation household own the highest weights, all of which are higher than or equal to 0.1, the weight of housing area per capita is also close to 0.1, and the other 12 indicators is less than 0.5.

4.1.2 The score of poverty alleviation performance

From the comprehensive score, the overall poverty reduction performance of Yunnan Province is about 0.2, in the lower level, which shows that despite the current poverty reduction has invested a lot of human, material and financial resources, but the results obtained are to be improved poverty reduction efficiency. In addition, the poverty reduction performance in 2017 was higher than that in 2018, mainly because 86 poor counties belonged to four contiguous areas of extreme poverty in 2017, and 42 counties were get rid of poverty, and the other 40 counties belonged to regions with deeper and broader poverty levels in 2018, it also results in lower poverty reduction performance. In 2017 and 2018, it is the same in the overall scores of the four regions, and the Tibetan inhabited region had the highest poverty alleviation performance, followed by the rocky desertification region of Yunnan and the mountainous area of Wumeng. The poverty reduction performance of Tibetan inhabited region is in the middle and upper level, and the other three regions are all in the middle and lower level, so there
is potential for improvement, especially, in the Wumeng mountainous area. In addition, the poverty reduction performance of the Wumeng mountainous area in 2017 was higher than that in 2018, mainly because most of the remaining counties in 2018 were located in the deep poverty areas of Zhaotong City.

Tab. 4 Comprehensive scores of poverty reduction in concentrated and contiguous poverty-stricken areas in Yunnan Province

| District                                      | 2017  | 2018  | 2-year average |
|-----------------------------------------------|-------|-------|----------------|
|                                               | Score | Rank  | Score | Rank  | Score | Rank  |
| Yunnan province                               | 0.228 | -     | 0.182 | 4     | 0.205 | -     |
| The Wumeng mountainous area                   | 0.138 | 4     | 0.064 | 4     | 0.101 | 4     |
| The rocky desertification area                | 0.292 | 2     | 0.364 | 2     | 0.328 | 2     |
| The border mountainous area of the western Yunnan | 0.267 | 3     | 0.272 | 3     | 0.269 | 3     |
| The Tibetan inhabited area                    | 0.671 | 1     | 0.76  | 1     | 0.715 | 1     |

According to the two sub-systems of economic poverty alleviation and ecological poverty alleviation, the achievements of economic poverty alleviation in Yunnan province in 2017 were higher than those in 2018, and the achievements of ecological poverty alleviation in 2017 were lower than those in 2018. The results show that in 2018, the remaining counties in Yunnan Province are poorer and their economic and social development capacity is weak. Comparatively, these remaining areas belong to the fragile ecological areas, and the government has invested more efforts in the ecological environment governance of these areas. In terms of economic poverty alleviation, the results of poverty alleviation in 2017 in the Wumeng mountainous area, the rocky desertification area and the border mountainous area of western Yunnan were all higher than those in 2018, and only the Tibetan inhabited area were lower than those in 2018. It can be seen that the remaining poor counties in most regions in 2018 are areas with more lagging economic development and deeper poverty levels. In the aspect of ecological poverty alleviation, the performance of ecological poverty alleviation in 2018 was higher than that in 2017 in the rocky desertification area, the border mountainous area of western Yunnan and the Tibetan inhabited area, and only in the Wumeng mountainous area was the performance of ecological poverty alleviation in 2018 was lower than that in 2017, it shows that most of the remaining poverty-stricken counties in 2018 have received more attention and support from the national and Yunnan provincial governments.

In terms of the scores of economic poverty alleviation and ecological and environmental poverty alleviation, the economic poverty alleviation and ecological poverty alleviation in the Tibetan inhabited area are all between 0.25 and 0.5, at the middle and upper level, and the rest are all less than 0.2, at the middle and lower level, especially, the ecological environment of Wumeng mountainous area is very fragile, and its performance of ecological poverty alleviation is between 0.02 and 0.03. Based on the 2-year average, the economic poverty alleviation performance of Yunnan Province, Wumeng mountainous area and the rocky desertification area is higher than that of ecological environment, and the other two regions are opposite. It is obvious that, on the whole, the effect of poverty alleviation by economic society is greater than that by ecological environment.

Tab. 5 Scores of economic poverty alleviation and ecological poverty alleviation in concentrated and contiguous poverty-stricken areas of Yunnan Province

| District         | 2017 economic poverty alleviation | 2018 ecological poverty alleviation | 2017 ecological poverty alleviation | 2018 economic poverty alleviation | 2017 ecological poverty alleviation | 2018 economic poverty alleviation |
|------------------|----------------------------------|-------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|----------------------------------|
| Yunnan province  | 0.153                            | 0.074                               | 0.081                               | 0.102                            | 0.117                               | 0.088                            |
4.2 Analysis of coupling coordination degree

The coupling degree is higher than 0.91 in Yunnan Province from 2017 to 2018, which is in a high coupling stage, indicating that the correlation degree of poverty alleviation by economic society and ecological environment is high, while the coupling harmonious degree is between 0.20 and 0.33, the middle-level imbalance indicates that the coordination degree between the economic society poverty relief and the ecological environment poverty relief is not high and the spatial development is unbalanced. According to the coupling degree of the four regions, the coupling degree of the Wumeng mountains area was between 0.61 and 0.90 in 2017, which is in the running-in coupling stage, and the coupling degree of the other regions and the other years were in the high coupling stage, the economic poverty alleviation in each region is closely related to the ecological poverty alleviation. Inspecting the degree of coupling coordination, the coupling harmonious degree of the Tibetan inhabited area is between 0.56 and 0.62 in 2017-2018, which belongs to moderate coordination. In the rocky desertification area, the coupling harmonious degree is between 0.34 and 0.40 in 2017, which belongs to primary maladjustment, and between 0.41 and 0.45 in 2018, which belongs to the borderline coordination. The coupling harmonious degree of the border mountainous area of the western Yunnan is between 0.34 and 0.4, which belongs to primary maladjustment. The degree of coupling coordination in Wumeng mountainous area is the lowest, which belongs to the middle-level maladjustment in 2017 and reduces to the serious maladjustment in 2018. Therefore, the coupling degree of economic poverty alleviation and ecological poverty alleviation is not high, and the development of economic society and ecological environment is not balanced in space.

The value of coupling degree was found to be slightly lower in the border mountainous area of western Yunnan in 2018 than in 2017, but higher in Yunnan province and the other three regions in 2018 than in 2017, indicating that the correlation between economic poverty alleviation and ecological poverty alleviation was on the rise. In terms of coupling harmonious degree, the coupling coordination degree of Yunnan province, Wumeng mountainous area and the border mountainous area of the western Yunnan in 2017 are higher than that in 2018, and the other two years are opposite. It shows that the imbalance between the economic poverty alleviation and the ecological poverty alleviation in Yunnan Province and in some regions is increasing, and the abnormal reason lies in the fact that some counties with better economic conditions have been get rid of poverty in 2017, the remaining poor counties in 2018 are even weaker and the ecological environment is even worse, resulting in a lower coordination degree in 2018 than in 2017.

| District                                      | 2017 Coupling degree | 2017 Coupling coordination | 2018 Coupling degree | 2018 Coupling coordination | 2-year average Coupling degree | 2-year average Coupling coordination |
|-----------------------------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|------------------------------------|
| The Wumeng mountainous area                    | 0.109                | 0.029                      | 0.043                | 0.021                      | 0.076                          | 0.025                              |
| The rocky desertification area                 | 0.19                 | 0.103                      | 0.18                 | 0.184                      | 0.185                          | 0.143                              |
| The border mountainous area of the western Yunnan | 0.119               | 0.148                      | 0.102                | 0.169                      | 0.11                           | 0.159                              |
| The Tibetan inhabited area                     | 0.379                | 0.292                      | 0.399                | 0.36                       | 0.389                          | 0.326                              |
5. Conclusions and suggestions

5.1 Main conclusions
In this paper, the index system of economic poverty alleviation and ecological poverty alleviation is constructed, and the performance of economic poverty alleviation and ecological poverty alleviation in the concentrated and contiguous poverty-stricken areas of Yunnan Province is calculated by entropy weight method. On the basis, the coupling degree and coupling harmonious degree are measured by using the coupling harmonious degree model, and the consistency and harmony of the development of economy, society and ecological environment in Yunnan concentrated contiguous special poverty area are explored. The main conclusions are as follows:

Firstly, the weight of indicators. In terms of the weight of indicators in concentrated and contiguous poverty-stricken areas in Yunnan, the weight of economic poverty alleviation is higher than that of ecological poverty alleviation in the sub-system; in the weight of first-class index, social poverty alleviation > ecological poverty alleviation > economic poverty alleviation > human settlements poverty alleviation. Among the secondary indexes, 5 indexes are higher about 0.1, and the others are lower than 0.05.

Secondly, the performance of poverty alleviation. The overall poverty reduction performance of Yunnan province is in the middle and lower levels. Among the four regions, the Tibetan inhabited region has the highest poverty alleviation performance, reaching the middle and upper levels, and the rest are in the middle and lower levels. In some regions, the poverty reduction performance in 2017 was higher than that in 2018, mainly because the poverty level of the remaining poor counties was deeper and the scope of poverty was wider, so the poverty reduction performance in 2018 was more difficult and decreased accordingly.

Thirdly, the coupling harmonious degree. The coupling degree of Yunnan province and every region is high, basically in a high coupling stage, from disorder to order change significantly. However, the degree of coupling coordination is generally not high, which is in moderate coordination, near coordination, primary imbalance, middle imbalance and serious imbalance, and no region is in good coordination and high coordination.

5.2 suggestions
Based on the actual development of Yunnan province and its contiguous poverty-stricken areas, this paper puts forward to the following suggestions: Firstly, the utilization and allocation efficiency of poverty-alleviation resources should be enhanced. Taking into account the fact that poverty reduction in Yunnan province and other regions is not high, and through adjusting and helping measures, promoting the development of industries in poor regions, more effective skills training to upgrade human capital comprehensive skills, strengthen the coordination between ecological protection and appropriate development, etc. to promote the performance of poverty alleviation. Secondly, we should focus on helping the Wumeng mountainous area where the performance of poverty alleviation and coupling coordination degree ranked lowest. In 2017, 11 counties in the Wumeng mountains area
belonged to Zhaotong city, accounting for 73.33%; in 2018, 8 counties in the Wumeng mountains area belonged to Zhaotong city, accounting for 72.72%. Therefore, we should focus on supporting deep-poverty areas such as Zhaotong city, where economic development is lagging and the ecological environment is fragile, the pro-poor policies adopted a moderate tilt, and constantly promote the economic and social development and the improvement of the ecological environment of these regions through human capital, ecological poverty alleviation and industrial poverty alleviation. Thirdly, the rocky desertification area and the border mountainous area of western Yunnan, where the coupling degree between economic poverty alleviation and ecological environment poverty alleviation is not high, while the government attaches importance to economic and social development, and at the same time enhances the income of poor farmers to get rid of poverty as early as possible, we should also pay attention to the protection and improvement of the ecological environment. Fourth, for regions such as the Tibet inhabited area, where economic poverty alleviation and ecological poverty alleviation are moderately coordinated, their ecological resources and national characteristics should be fully tapped and utilized, and through improving infrastructure conditions and innovating development models, to enhance the value of ecosystem services, ecological advantages into economic advantages, and constantly promote its development to a higher degree of coupling coordination.

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