

## Construction of Ecological Civilization: the Strategic Choice of Sustainable Development in Wumeng Mountainous Area

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**Keywords:** Wumeng mountainous area, concentrated and contiguous poverty areas, key ecological function areas, ecological civilization construction, sustainable development

**Abstract:** Wumeng mountainous area is one of the 14 centralized and contiguous poverty areas in China. It covers two Chinese key ecological functional areas, including the forest and biodiversity ecological function area in Sichuan and Yunnan and the karst rocky desertification controlling ecological function area in Guangxi, Guizhou and Yunnan Province. Its economic development is seriously lagged behind and it is important to protect its biodiversity. The task to prevent rock desertification prevention is very arduous. To achieve the balance of poverty and ecological protection and promote regional sustainable development is facing severe challenges. Ecological civilization construction pays attention to respecting for nature, conforming to nature and protecting nature. It also attaches importance to institutional innovation and development. It can fully explore the region's advantages and characteristics, which is the strategic choice for the sustainable development of Wumeng mountainous area. It can promote the transformation of the green mountains and water into the mountain with wealth. It can effectively coordinate the relationship between the rapid development of social and economic needs and the restoration of fragile ecological priority. The ecological civilization construction of Wumeng mountainous area must actively promote the industrial and mining ecological transformation and upgrading. And it should actively develop the characteristics of fruit industry, ecological agriculture and animal husbandry, ecological tourism and cultural industries. It should speed up the process of transforming the advantage of resources into economic advantage. Major projects of ecological protection and restoration, poverty alleviation funds and supporting policies should be used to the Wumeng mountainous area. Especially, they should be spent on the key ecological functional areas, ecological sensitive and ecological fragile areas, the protection and recovery of rivers.

### Introduction

The alleviation of poverty and ecological protection are two important components in the theme of sustainable development. Wumeng mountainous area is not only China's centralized and contiguous

poverty area, but also China's key ecological function area of biodiversity conservation and rock desertification control. To achieve the comprehensive goal of entering a well-off society in 2020, Wumeng mountainous area has the need of achieve a rapid development of regional economy. Wumeng mountainous area has the problem of economic development and ecological environment destruction in the present. If Wumeng mountainous area wants to achieve regional economic development and ecological environment protection, it must fully understand and discover the resource characteristics and ecological potential. It have to transform the regional social and economic development models and increase public infrastructure investment. And it should actively develop the ecology tourism and creative-culture industries. It should increase efforts to the ecological protection and restoration. It should improve the poverty alleviation policy and ecological civilization system including ecological compensation system to achieve the good circle of economic and ecological development and the leaping development of this area.

There are many studies on poverty alleviation in the Wumeng mountainous area. It includes the causes of poverty, the path of economic development, and the characteristics of resource development, land reform, national cultural resources development, industrial structure, economic development paths and many other aspects. For the study of Wumeng mountainous area, it emphasizes on the leap-forward development and the goal of a well-off society in a whole. However, it does not have a deep understanding of the backward cause of Wumeng mountainous area. And it pays less attention to contradiction between rapid economic development and ecological protection. This paper aims to analyses the reason of poverty and provides advice about ecological environment protection and economic promotion to explore the sustainable development path of Wumeng mountainous area from the perspective of ecological civilization.

### **Overview of the Researched Area**

Wumeng mountainous area includes 38 counties (cities, districts) of Yunnan, Sichuan and Guizhou province, covering an area of 110,000 square kilometers. It accounts for 10.5% of the total area of Sichuan, Yunnan and Guizhou province. At the end of 2014, the population of Wumeng mountainous area was 19.52million, accounting for 12% of the total population of these three provinces. The GDP of Wumeng mountainous area in 2014 was 311.55 billion yuan. The per capita GDP of Wumeng mountainous area in 2014 was only 15,954 yuan. It is only 34% of the per capita GDP of China, 45% of Sichuan, 59% of Yunnan, 60% of Guizhou. Wumeng mountainous area is located on the border of Sichuan, Yunnan and Guizhou province. It is away from the central cities and developed regions of the three provinces. It is a region of southwest in China and its economic development is relatively backward. Wumeng mountainous as a national key area of poverty alleviation in China, it has many state-level poverty-stricken counties. It totally has 38 counties (cities, districts). However, the national poor counties are up to 31 and the proportion is up to 81.6%. About the industry, in 2014, the ratio of primary, secondary and tertiary industry is 22: 41: 37 in Wumeng mountainous area. The main income of the region depends on the agriculture and the industry. In 2014, the total output value of agriculture, forestry, animal husbandry and fishery. and extended service industry was 111 billion and 500 million yuan, accounting for 36% of GDP; the total value of industrial output was 132 billion and 567 million yuan, accounted for 43% of GDP.

Wumeng mountainous area is a typical plateau mountain structure terrain with high mountain and deep valley. Spatial and temporal distribution of precipitation is uneven. The territory of rivers across two watershed which are the Yangtze River and Pearl River, and is arranged in a crisscross pattern. The huge hydropower resources can provide basic energy security for Xiluodu, Xiangjiaba, Baihetan, Wudongde and other large hydropower stations, so as to drive the development of

hydropower energy industry. Wumeng mountainous area is the largest coal distribution area in southern China, with the proven reserves of about 50 billion tons [1]. It has a wealth of mineral resources with phosphate rock, iron ore and copper mine proved reserves of 4 billion tons, 1 billion tons and 10 million tons and pyrite proved reserves of 500 million tons. The area is rich in biological species with various vegetation types and the forest coverage is to 38.1%. It is the important ecological function area of Yangtze River and the upper reaches of the Pearl River. In the "the Division of National Ecological Functional Areas (revised version)" by the Ministry of Environmental Protection and the Chinese Academy of Sciences, Wumeng mountainous area has 19 counties of national key ecological functional areas. It is 50% of the amount of counties in this area. The protection zones have an area of 45578 square kilometers, accounting for 43% of the whole area. There are the forest and biodiversity ecological functional area in Sichuan and Yunnan and the karst rocky desertification controlling ecological function area in Guangxi, Guizhou and Yunnan Province. In addition, the region also has 12 national nature reserves, a world's cultural heritage, 3 national scenic spots and 8 National Forest Park. It's the important areas about biodiversity conservation, soil and water conservation governance and cultural heritage preservation in China.

As a concentrated area of nationalities, Wumeng mountainous is a "national corridor" in the central China [2]. It is the intersection part of the central plain culture and the southwest minority culture. There are four autonomous counties, including Weining Yi, Hui and Miao Nationalities Autonomous County, Maibian Yi Nationality Autonomous County, Luquan Yi and Miao Nationalities Autonomous County, Xundian Hui and Yi Nationalities Autonomous County. There are about 35 ethnic minorities, including Yi, Hui and Miao nationalities' gathering areas. The total population of the region is 20.86%. It's major Yi, Miao gathering area in China. In the language, most ethnic minorities have their own language. Rich language and culture make the land is different. In clothing, the unique clothing of the different nationalities has added color to this land. In traditional customs, the Yi's "Torch Festival", the Miao's "New Year's Eve", the Buyi's "Niuwang Festival", the Mulao's "Yifan Festival" have made this area lively.

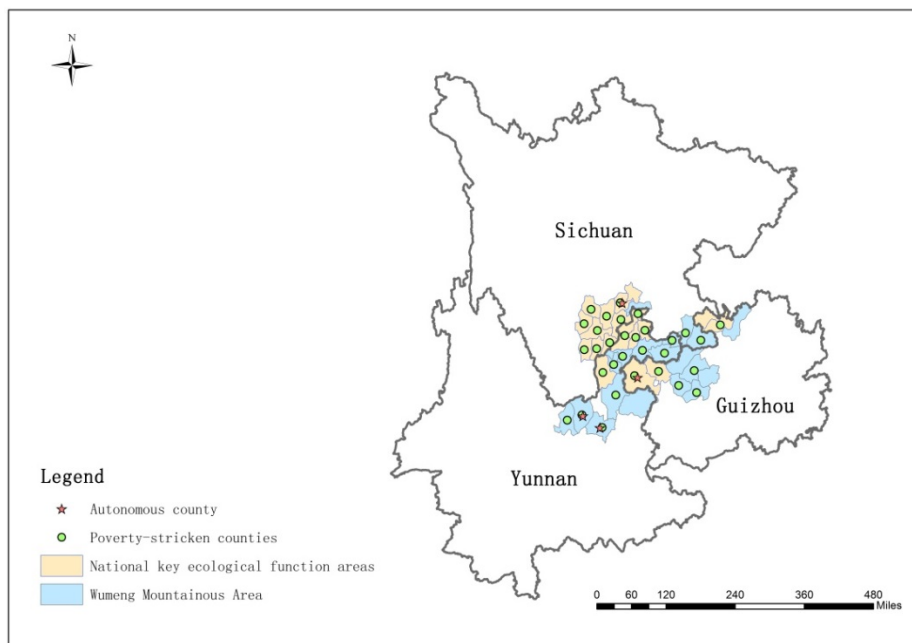


Fig.1 The Basic Situation of Wumeng Mountainous Area

## **Challenges for Economic Development in Wumeng Mountainou Areas**

### **Industrial Structure Is Irrational and Over-Reliance on Agriculture**

Wumeng mountainous area's industrial structure is irrational including over-reliance on land resources development planting industry, the unreasonable proportion of industrial and the lagging characteristic industry development. The first, second and third industry ratio of Wumeng mountainous area is 40:30:30 in 2001. The proportion of the first industry is too large and the industry is in the initial stage. It's a typical backward area of poverty industrial structure distribution [3]. After the industrial structure adjustment, the first, second and third industry ratio into 24: 42: 34 in 2010. The first industry is no longer an absolute advantage and the secondary industry began to become the leading army of economic development. The first, second and third industry ratio has been adjusted to 22: 41: 37 until 2014. The advantages of the first and second industries have been further weakened and the third industry has been developing continuously. Wumeng mountainous area has been aware of the irrational situation of industrial structure and changed the structure in 15 years. However, the first industry is still important when compared to the proportion 9:43:48 of China. The excessive use of land resources, the unreasonable development of mineral resources and the lagging development of the characteristics industry will further hinder the region's economic upgrading at present.

The primary industry is still dominated by agriculture. Excessive dependence on the crop industry ignores the development of forestry, animal husbandry, fisheries and agriculture, forestry, animal husbandry and fishery services. Wumeng mountainous area's industry is not complete. The proportion of light and heavy industry is unreasonable. Taking Guizhou as an example, the proportion of heavy industry in Chishui is only 4%, while the proportion of light industry in Tongzi, , Qianxi and Nayong is less than 8%. The industry of coal and metallurgy have played a definite part at local, while machine industry, cottonocracy and food industry are underdeveloped [4]. The tertiary industry and processing industry develop backward at local. The number of enterprises above designated size in the district and the number of agricultural and sideline products processing enterprises is too small, lacking of effective lead to the development of leading enterprises and bases, leading to potato farmers, tea, flue-cured tobacco, Chinese herbal medicines, bamboo and other products can't be further processed and used to create high economic benefits.

### **Natural Conditions Are Bad, Serious Damage to the Ecological Environment**

Wumeng Mountainous area is a typical plateau. It owns steep terrain, deep mountain valley, covering a large area of karst landforms. Its land is barren. Its rocky desertification is serious. It has fragile ecological environment. It's easy to take place earthquakes, landslides, debris flow, drought and other natural disasters [5]. The poor natural conditions not only contributed to the reduction of environmental carrying capacity, but also exacerbated the extent of poverty in the region.

Wumeng mountainous area took predatory exploitation of resources and damage the environment as the main means in the past development process. Wumeng mountainous area defines crop farming as a pillar of survival. However, the harsh natural conditions make the cultivated land resources in the area extremely limited. People strengthen the cultivation of arable land resources by the deforestation, land reclamation and other ways in the case of local residents cannot meet the basic life. The cultivation method of damaging forests to reclaim land intensified the stony desertification and affects migration of fish, birds and beasts; excessive exploitation of biological resources leads to the decline in the amount of wildlife resources and even extinction, thus hindering the maintenance of biological diversity; excessive excavation of mineral resources and

unreasonable utilization of land do great harm to ecological environment. It has resulted in the vicious circle of economic backwardness-the development of resources-undermining the ecological-economic development backward.

The damaged ecological environment is difficult and expensive if it wants to recover. But the economic foundation in Wumeng mountainous area is extremely weak. The amount of local financial revenue is small and the revenue could not meet the needs of its expenditure. The local people can't governance the environment without money. Local rich natural resources failed to be converted to economic advantages. The ecological benefits of potential resources were weakened.

**Population Base Is Large and Conception is Backward**

Wumeng mountainous area take "patron to eat mountain, by water draft" as a way of life in history. Labor cultivation is the main support for the breadwinner, so the population increased significantly. It's a typical feature of people are numerous and land is scarce. The population density per square kilometer in Wumeng mountainous area in 2014 was as high as 185. Although it is lower than the average population density of Guizhou Province, it is higher than that of Sichuan Province and Yunnan Province. The population density is even twice the population density of Yunnan Province (Fig 2). In the ares with steep slopes and barren lands, the population density is an important factor which can limit economic development. The per capita GDP of Wumeng mountainous area in 2014 was only 15,954 yuan (Fig.3). It is far below the per capita GDP of the country. It is lower than the per capita GDP of Guizhou, Sichuan and Yunnan province.

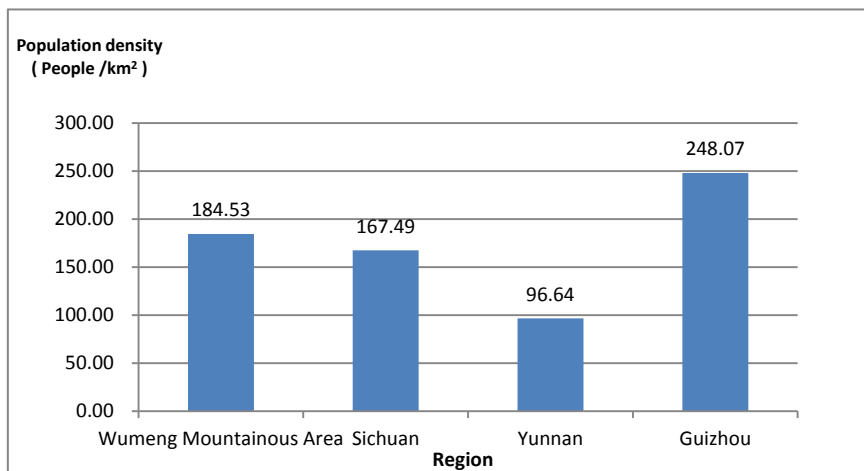


Fig. 2 Population density of each region

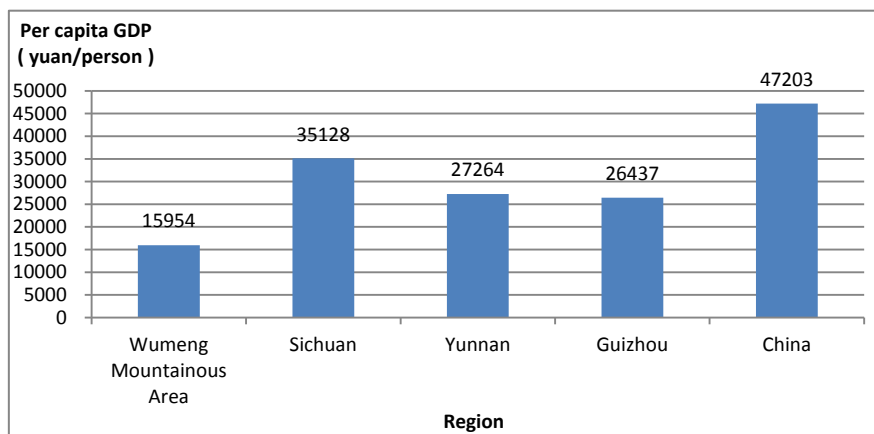


Fig. 3 per capita GDP in 2014 of each region



In Wumeng Mountain areas, due to economic poverty, closed geographical environment and the lack of communication with outside world, the educational levels of locals are generally low. According to Haicheng Hu in 2014, the local average education period is 6.54, the national average period of education is 9.1 and per capita education period is 2 years lower than the national average level [6]. The backwardness of education level has led to the deepening of the thought of natural farming in history, such as "deep excavation of soil, extensive grain", "deforestation" and "indigenous zinc smelting", exacerbating the fragility of the ecological environment further [7]. In this case, locals are "unwilling to acquire" new knowledge, fail to "understand" new technologies and "dare not to learn" new things [8].

### **Infrastructure Is Behind, Lacking of Public Service Investment**

Traffic transport is inconvenience. According to statistics of Regional Development and Poverty Alleviation Plan in Wumeng mountainous area, the traffic trunk road network has not yet been formed in Wumeng mountainous areas; the road grade is low; 47.4% of the counties have no secondary highway; 15.1% of towns have no pitch (cement) road; 76.8% of administrative villages have no cement road; 31.3% of administrative villages have no highway. The existing road cannot meet the material transport. Drinking water, fertilizer and agricultural products still need to human [9]. It's a great obstacle to urbanization.

Farmland water conservancy facilities are insufficient. Kun Wang once conducted a survey on water conservancy facilities in Zhaotong City: up to 2010, farmland irrigation rate had been only 31.7%, which could not meet normal farming needs; reservoir storage capacity was only 580 million cubic meters and per capita storage capacity was 114 cubic meters, which was lower than the national per capita value of 326 cubic meters and provincial per capita value of 180 cubic meters; rural unsafe drinking water population occupied 46% of the total population, higher than 30% of national proportion and 21% of provincial proportion; tap water popularizing rate was only 26%, lower than the 19% of provincial level[5]. In addition, the area of water storage works due to disrepair, incomplete support, mismanagement and other reasons, making agricultural irrigation can't be effectively protected, and even the phenomenon of drinking water is also difficult to occur.

Social services is shortage. Wumeng mountainous area's health medical conditions are poor and lack of various types of medical equipment and medical staff. Cultural and educational facilities is also extremely scarce. The development level of the county is almost closed. Libraries and other public service facilities almost no settings and lack of schools and teachers.

### **Development Mode Is Not Scientific, Institutional Policy Is Flawed**

At present, the economic development mode in Wumeng Mountainous areas is unsustainable and unfriendly to the environment.

There also exist deficiencies in the regional security system in Wumeng mountainous areas. In terms of poverty alleviation system, the central, provincial and local civil departments' relief coverage is small; there lack of management and supervision systems, so that it is hard for poverty alleviation funds to be truly granted to those "old, weak, sick and disabled" who really need assistance; with regard to development system, Wumeng mountainous areas being a national energy and mineral base, for a long time, people blindly ask for resources but neglect compensation. Therefore, the excessive exploitation of land gives rise to severe water and soil losses and sharp decline of biological diversity [10]. In the fiscal policy, the shortage of advantages of resource-related industries and public service infrastructure investment result in the area of industrial development structure is unreasonable. In the ecological compensation policy, the central government lack of payments to the ecological projects and ecological environment restoration

can't get financial support.

## **Suggestions on Economic Development in Wumeng Mountainous Areas**

### **Adjusting Industrial Structure, Developing Advantage of Resources**

Wumeng Mountainous area should be dominated by agriculture, the common development of other industries [11]. Industrial structure adjustment principle is: adhere to the development of the first industry, optimizing the development of secondary industry, and developing the third industry. For the first industry structure adjustment, the first to adjust farming. Wumeng mountainous area is rich in potatoes, flue-cured tobacco, walnut, raw lacquer, chili, gastrodia elate, tea and other agricultural special products, should let the rich food crops and cash crops to create greater economic benefits. Wumeng mountainous area's industry can rely on the development of local agriculture, forestry and product processing, expanding sales of local advantage crops. In addition to the agricultural and industrial, it can use a unique natural and cultural resources in the area development of tourism and cultural industries. Wumeng mountainous area not only has the vitex negundo, zhijin cave, sedan chair mountain ecological tourism resources, as the old revolutionary base areas and ethnic minority, also owns the rich cultural history background of cultural tourism resources. Wumeng mountainous area's government through policy support, attracting foreign investment and promotion, adjust measures to local conditions to the development of tourism industry [12].

### **Strengthening the Ecological Environment Construction, Making Green Water Castle Peak**

Wumeng mountainous areas are one of the ecological shelter zones in the upper reaches of Yangtze River in China, whose ecological environment is fragile and suffers many historical problems. Development at the cost of predatory exploitation of resources should be abandoned [5]. It covers a large area of biodiversity conservation, soil and water conservation, water conservation and other ecological functional areas. We must increase the protection efforts to improve the quality of management, prohibiting poaching, disorderly mining and deforestation strictly

In the construction process of ecological environment, the protection of natural forestry resources, returning farmland to forests or grassland, the treatment of stony desertification, the construction of protection forest and the comprehensive governance of water and soil loss should be paid attention to, so as to restore the ecological environment. Besides, central finance should enhance the strength of ecological compensation related to transfer payment and give ecological compensation for poverty-stricken villages which play the functions of water conservation, maintenance of biological diversity and conservation of water and soil. In this way, when the agricultural production of people in poverty-stricken villages is damaged, those people can use eco-compensation funds to develop other industries.

### **Controlling the Population and Improving the Quality of the People**

On account of that large population size is an important factor limiting the development of the local economy. It's urgent to control effectively the population of the Wumeng mountainous area. The government shall continue to carry out family planning policy. For families with more than two children, the law should be enforced strictly yet politely to ensure effective control on population growth and to relieve human-land contradiction [13].

To enhance the quality of education and culture in Wumeng mountainous area, there is a need for government to increase investment in education, to push students to complete the compulsory education stage, to give some help and support to poor students. At the same time, publicity and culture education should be strengthened which could change deep-rooted outdated concept of local

residents, and cultivate the values that “Knowledge Change Destiny”.

### **Strengthening the Construction of Transportation Network**

The backwardness of traffic facilities is a major bottleneck restricting the development of Wumeng mountainous area, which restricts the circulation channels between the inner and outer areas of the Wumeng mountainous area and hinders the scientific and cultural exchanges between the Wumeng mountainous areas, resulting in a semi-closed area here. Though natural resources developed gradually, it cannot be quickly converted into goods and currencies [1]. Regional Development and Poverty Alleviation Plan in Wumeng Mountainous Areas pointed out should accelerate the construction of main transportation channels, railway, highway, and airport and shipping projects. We should increase the number of highway mileage, while paying attention to the reasonable layout of the traffic and tourism industry to enhance the value of local tourism resources in the road construction, improving technology to overcome the geographical environment and opening up the barrier between the counties in the railway construction. And in the aviation construction, we should construct the new Bijie Airport, relocating Zhaotong Airport, and plan general airport, so that tourists and goods can quickly flow [14].

### **Improving the Ecological Policy Compensation and Strengthening Supervision Work**

In addition to the competition of ecological compensation mechanism of Wumeng mountainous areas, policy compensation is also necessary. Namely, central government should give certain right and opportunity compensation to provincial government, while provincial government should give right and opportunity compensation to municipal government accordingly. Within the authorization period, the compensation receivers can utilize the priority and preferential treatment to make out a series of new policies to promote development and raise funds. In addition, developers and utilizers of ecological environment should pay certain charges, because their development and utilization of ecological resources, such as mine resources and forest resources will cause harm to the ecological environment besides bringing forth corresponding value. Therefore, compensation fees should be charged from those developers and utilizers, so as to solve the environmental problems left by resource development. Besides, those collected compensation fees can be used to change the production mode and living mode of local farmers and herdsmen.

### **Summary**

Through the analysis of the social environment, ecological environment and humanistic environment of Wumeng mountainous area, it is understood that the current environmental characteristics of the Wumeng mountainous area are characterized by backward economic development, contradictory resources of human resources, poor ecological environment and social infrastructure, and lack of potential resources use efficiently. Wumeng mountainous area's economic development is facing all kinds of challenges, which requires the local government to develop a reasonable development goals, sticking to combine poverty alleviation projects, ecological construction and population control, not to use the cost of ecological damage to economic development, increasing the basic services facilities construction efforts to play the advantages of local characteristics of resources, changing the proportion of production structure, and improve all kinds of support policies, in order to achieve ecological environment and socio-economic sustainable development of Wumeng mountainous area.



## Acknowledgement

This research was financially supported by the National Key Research and Development Program (No. 2016YFC0502100).

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