



# Trinity Model of Ecological Management of Coal Mining Subsidence Area

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**Abstract:** The mining of energy sources such as coal mines is extremely economical in the initial stage, but the collapse areas formed due to mining have also become an urgent problem, and S province has become one of the models for the exploration of the governance of such problems. Based on the literature study of other collapse area transformation, this paper takes the abandoned mine transformation forest park as an example, analyzes the current situation of collapse area governance through field research, systematically summarizes the operation model of mine transformation based on the analysis of coal mining collapse area BOT project, and constructs a comprehensive governance model of trinity of government, enterprise and society, hoping to bring some reference value for new ideas of collapse area governance.

**Keywords:** coal mining subsidence area, BOT Projects, green economy

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## 1. Problem formulation

At present, with the emergence of new energy, other renewable energy sources and the call for green water and green mountains, coal, a natural resource that has contributed greatly to human society, has seen a significant decline in market dependence. At the same time, resources are not renewable, pollution is difficult to control, ecological and environmental pressures increase, surface subsidence, abandoned mines exposed and other environmental problems arise. Therefore, it is necessary to limit the mining of coal resources, develop technology to improve the utilization rate, accelerate scientific remediation of collapsed areas and abandoned mines, and vigorously develop a green economy.

S Province is a large province of energy resources, the contradiction between economic development, resources and ecological environment is very acute. How to manage the collapse area and improve the ecological environment is not only an urgent task at present, but also a long-term strategic requirement. In this paper, based on such a background, we conduct a relevant study to explore the operation mode of the project of the trinity of government, enterprise and society, so as to make the coordination mechanism of development and conservation more scientific and reasonable.

## 2. Features of BOT model for coal mining subsidence area

By capitalizing, marketizing and industrializing the mountain and water resources, the collapse area management has realized a new ecological model of "government-led, market-operated, company-bearing and park-building".

Enterprises select first-class planning and design teams under the guidance of the district government and all relevant units to prepare a scientific and operational suburban forest park master plan and special information such as park landscape planning, traffic planning and water system planning to realize the policy orientation of industrial planning first, distinct park theme and reasonable spatial layout. In line with the overall urban planning and overall land use planning, first greening, and then the implementation of the park supporting facilities construction principle, to ensure that the greening area is not less than 80% of the total area of the park, the remaining 20% of the land area can be used for park supporting facilities construction and moderate development. Park greening tasks in the first three years in accordance with the 3:4:3 ratio to complete, greening investment in principle not less than 35,000 yuan / mu, to ensure that greening standards are not reduced; park supporting facilities to intensive use of land, giving priority to the use of unused land and abandoned mine land.

On behalf of the municipal government, the Office of Comprehensive Improvement exercises the responsibilities related to the construction and management of the forest park in the collapse zone, and is responsible for the entry and exit of the construction subject, the supervision and greening assessment of the park construction, work coordination and formalities, etc. The Municipal Development and Reform Commission, the Municipal Land Bureau, the Municipal Forestry Bureau, the Municipal Urban and Rural Planning Bureau, the Municipal Environmental Protection Bureau and other departments and relevant district governments coordinate and cooperate, scientific planning, strict approval, good land rights of the disputed wasteland, the inventory of the park's above-ground attachments, the transfer of land contracting rights and compensation

funds in full and on time, and promote the implementation of the work in place.

State-owned forest land and trees within the park area are adopted by enterprises in accordance with the document, and the adoption period is 70 years, and enterprises enjoy the right to use. For newly planted seedlings within the scope, enterprises enjoy ownership and use rights. Secondly, the district government is responsible for the expropriation of collective land and the transfer of rural land contracting rights within the park area, and in principle, the expropriation and transfer will be implemented in a 2:8 ratio by village, with the relevant costs borne by enterprises. Park on collective land in addition to state-owned forests on the ancillary facilities, funded by enterprises to give a one-time compensation, compensation standards developed by the district government and the Office of Comprehensive Improvement. Finally, the forest park paid land concessions and infrastructure fees in addition to the state regulations should be paid, the rest in principle, in accordance with the provisions of the two lines of income and expenditure returned to the park-related public infrastructure construction; greening standards, to be returned in full.

### **3. Trinity model construction for coal mining subsidence area**

#### **3.1 Government coordination**

The government should play an active leading role to create a vast platform for various enterprise subjects to carry out governance practices, adopt a trinity approach of policy support, enterprise subjects and social participation, actively promote the comprehensive management of coal mining collapse areas, accelerate the transformation of resource-based economy, and achieve ecological and environmental restoration and industrial structure transformation.

The treatment of coal mining collapse area involves many departments, and enterprises need to submit all kinds of programs, agreements and reports when declaring and approving the treatment of coal mining collapse area, and should establish such a docking authority as comprehensive improvement office, and give internal personnel corresponding preparation, so as to contact governments at all levels up and down, and unite various departments on the left and right, and jointly review and approve various treatment programs, implement and realize policies, and evaluate the effectiveness of the treatment of coal mining collapse area. In the process of comprehensive management of the subsidence area, governments at all levels should introduce relevant laws and regulations in a timely manner to provide legal basis and guarantee for the development of land management work, and at the same time to combine the relevant national legal system to solve the problems of the subsidence area according to local conditions.

The government, as the main body responsible for planning, supervision and assessment, should provide corresponding funds for treatment, and adhere to the principle of "whoever treats, who benefits", and encourage enterprises and individuals to invest in coal mining collapse area treatment projects. Clear property rights and deadlines should be clarified, greening rights should be exchanged for construction, operation and management rights through various PPP financing models on a trial basis, sound preferential policies should be formulated to encourage and guide idle social capital to increase investment, and a sound exit mechanism should be formulated to protect the interests of enterprises in projects with low to medium returns. For the acquisition of land use rights, two ways are used to ensure an adequate amount of "incentive" land by linking the increase and decrease of urban and rural construction land and by revitalizing and adjusting state-owned construction land.

For the majority of stakeholders of the farmers to do a good job of resettlement and relocation, in different stages of coal mining subsidence area management process, to provide a wealth of employment channels, industry-based, employment-based, improve the system of rural land contract management rights transfer, land transfer to promote large-scale operation, to accelerate the modernization of agricultural production. Encourage farmers to use the transformation of collapsed land, develop ecological agriculture and recycling agriculture, and promote industrial transformation with structural adjustment. Call on farmers to form a competitive market body to promote efficiency with market operation. Guide rural secondary and tertiary industries to gather in central communities and small towns, accelerate the formation of leading industrial clusters with local characteristics, and promote the integration of production and cities with industrial clustering. Promote employment transfer with labor training, increase employment training and transfer output of labor force in collapse areas, and guide farmers to start their own businesses.

#### **3.2 Corporate cooperation**

The success of any coal mining collapse area governance model must allow government arrangers and enterprise producers to play different roles. The government side adopted in the past is dominant and directly using financial funds to govern coal mining collapse areas is undesirable, and the government faces a huge financial burden and is unable to mobilize social motivation or enterprise alone side to participate in such long-period, high-risk, and capital-demanding medium- to

low-yield projects, often changing direction to pursue other high-return, high-yield, and short-period industrial projects, resulting in coal mining collapse area governance in trouble.

In the pre-construction stage, enterprises adopt suitable PPP financing mode to sign agreements with other enterprises, social organizations and individuals, cede part of their operation and use rights, widely absorb social funds into the field of collapse area treatment, and set up special treatment funds, which are managed by special personnel or departments, so as to preserve and increase their value by market means, provide sufficient funds for the subsequent treatment process, and solve the problem that the capital chain is easily broken. Enterprises also need to improve governance technology, strengthen staff skills training, improve the construction of supporting facilities related to greening tasks, improve the development and perfection of relevant technologies in road building, irrigation, hill cutting, tree planting and change of scenery governance links, optimize resource allocation, reduce cost investment, increase industrial efficiency and improve the ecological environment under the premise of meeting basic work requirements. Enterprises also need to set up fire departments to prevent natural disasters or man-made causes from affecting the green coverage.

In the middle and late stage of operation and management, the enterprise seizes the general direction of national policies, and under the background of resource-based economic transformation, builds online publicity windows with the help of "Internet+" wisdom platform, and expands network influence through WeChat, microblogging and self-media. Cooperate with other types of enterprises to improve the park's supporting infrastructure and build a number of modern service industry projects such as cultural tourism, retirement and leisure, sports and fitness. Actively dock with relevant government units to expand publicity and attract and encourage the general public to be consumer-oriented. Cooperate with social organizations to co-organize large scientific, educational, cultural and health events at the provincial, national and international levels, expanding the visibility of the park and providing a huge boost to the local economy.

### 3.3 Individual participation

In the comprehensive management of multiple subjects, in addition to the government's initiative to take the lead, a large number of enterprises involved, but also need to actively respond to individuals to participate in the "government-led, policy support, social participation, open governance, market-oriented operation" mode of governance, to accelerate the solution of abandoned coal mines, old coal mines and other historical coal mining collapse area problem. Individuals with the ability to drive the surrounding villagers to collectively participate in the management and development of the sinkhole, establish a long-term revenue mechanism, and engage in secondary and tertiary industries to ensure rural stability and agricultural development. In the village relocation and individuals should have a sense of ownership, respond to the call to actively participate in the management process of the collapse zone, for example, to carry out reforestation activities, or participate in fund-raising and financing activities, individuals contribute their share to the management of the collapse zone by uniting and collaborating with the general public, taking advantage of the information age and expanding publicity.

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