

Rethinking the Ecological Restoration of Mining Areas from the Perspective of Rural Revitalization

Zeng Siyan¹, Chen Fu^{1,2,3}, Li Xiaoxiao¹, Luo Zhanbin¹ and Hao Shaojin²

¹ School of Environment Science and Spatial Informatics, China University of Mining and Technology, Xuzhou, Jiangsu, China

² Low Carbon Energy Institute, China University of Mining and Technology, Xuzhou, Jiangsu, China

E-mail address: chenfu@cumt.edu.cn

Abstract: The purpose of this paper is to improve the rural mining area's ecological environment and promote the rural mining area's sustainable development. From the perspective of rural revitalization, combining the essential connotation of the "resource-curse hypothesis", this paper analyzes the nature of rural recession in China's mining areas, and points out the problem that current mining area's management mode is lack of economic considerations, meanwhile the land re-use mode is inappropriate and the farmers in mining areas are not being resettled. From the perspective of rural revitalization strategy, it puts forward new requirements for the future implementation of ecological rehabilitation of mining areas. It is recommended that natural resource accounting system be adopted as an assessment mechanism, and that the "population-land-industry" rural development should be the core to carry out the construction of the ecological civilization of the mining area and the construction of farmers' rights and legal systems to realize the transformation from the ecological improvement to ecological restoration in the mining areas.

1. Introduction

China is a big country with coal, and it is also a country with a large population. The 19th National Congress of the Communist Party of China mentioned how we should achieve the development goals of "two hundred years". In 2035, the national economic level is aim to reach the level of intermediate developed country, and by 2050 it would enter into the ranks of developed countries. By then, the level of urbanization in our country may reach to 70%. Even so, there are still 4-5 billion people living in rural areas and a large part of people still live in rural mining areas. The multiple impacts of coal resources development on various aspects of society such as the environment and economy are closely related to the development of rural mining areas.

It is impractical view that China's "coal-rich, lean-oil, and low-gas" energy features determining the "de-coalization", and coal resource exploitation remains irreplaceable in economic development¹. The new era created by Xi Jinping has already started. Ecological civilization construction and rural revitalization have become the main theme of the times. The core of the "Rural Revitalization Strategy" lies in "Revitalization". Whether the reform policy implemented by our country can break the existing resource tax system and restructure the distribution of interest or not, it has become the key to building a new ecological civilization system and implementing the rural revitalization strategy². Only by



grasping this key can we really improve the ecological environment in the mining area and provide benefits for the people in the mining area.

2. Ecological Restoration of Mining Areas

Ecological restoration of mining areas refers to restoring the degraded mining area ecosystems' ecological balance caused by some mining activities through adopting suitable land utilizing method³. The ecological environment has become the key to the regional sustainable development⁴. With the degree of China's investment in the environmental field increasing gradually, the construction of ecological environment, as China's established national policy, has entered into various fields day by day⁵. From the viewpoint of the performance of local government, one of the important criteria for assessing the construction of an ecologically-civilized city is to assess "environmental culture" whether meets the requirements of urban development or not.

Through the combination of natural restoration and artificial rehabilitation, a semi-artificial restoration model is adopted for the entire region, and natural restoration modes can be implemented in regions which can rely on the restoration of ecosystem self-organization, self-sustainability, and self-renewal to increase the input and output of restoration. Scholars believe that we should pay more attention to the cost-effectiveness of ecological rehabilitation in mining areas⁶.

The high-quality land generation after the implementation of land reclamation in the mining area has become a backup resource for the increase or decrease of construction land. The ecological restoration of the mining area can relieve the pressure of urban economic development and is the primary task for the economic transition and sustainable development of resource-exhausted cities as well. In order to carry out ecological rehabilitation of the mining area, it must be based on local conditions to considerate comprehensively, choose a reasonable and effective land reclamation and ecological restoration mode⁷, so that it could achieve the balanced development and harmonious succession of the ecosystem in the mining area.

3. The Inspiration of Resource Curse Hypothesis to Rural Revitalization

3.1. *The Resource Curse Hypothesis and Rural Revitalization*

The "Resource Curse" was first proposed by the English economist Auty in 1993⁸. This view holds that in resource-rich regions or countries, resources have not brought sufficient impetus to economic growth and have even become a limitation for regional economic development. Mineral resource-based cities are typical examples of the hypothesis of "resource curses"⁹. For example, in Datong City, Shanxi Province, it has depended on the mining industry for a long period of time. As a result, it has a crowding effect on other industries and the economic system is fragile. At the same time, overexploitation of mineral resources leads to depletion of resources and ecological deterioration.

3.1.1. The nature of resource curses. The development trajectory of resource-based cities is mostly "development-pollution-ecological destruction-ecological restoration", and the resulting deterioration of the ecological environment has seriously offset the results of economic development¹⁰. The essence of the "resource curse" hypothesis is that the benefits of the resource extraction industry have not really given the feedback to the farmers in the mining area and the ecological and environmental protection undertakings.

3.1.2. Rural recession. The ecological environment of the resource extraction site has been deteriorating, and peasants' life level and well-beings have been declined. The rural recession not only presents a decline in the agricultural industry and village settlements, but also reflects the decline of the rural natural ecological environment. It is crucial to reshape the order of governance in rural mining areas. Solving political discourse rights of farmers in mining areas and promoting the transformation of rural industrial economies are essential to increase rural economic density and develop rural economies¹¹.

3.1.3. Ecological Civilization Construction and Rural Revitalization. Promoting ecological civilization construction and implementing rural revitalization have become the main melody of the times. Reforming the existing resource taxation system and interest distribution relations, reshaping the whole management values of mining areas, attaching importance to the ecological environment of the mining areas and the social life of farmers are the key to building an ecological civilization system and implementing rural revitalization strategy in mining areas¹². Only by grasping this key can we improve the ecological environment in rural mining areas effectively and benefit farmers.

3.2. The Reasons of Unsustainable Mine Ecological Restoration

In 2016, China issued the “Opinions on Establishing a Uniform and Standard National Ecological Civilization Pilot Area” document to specify the specific implementation plan for the construction of an ecological civilization system. The pace of ecological restoration in the mining area should not be allowed to stagnate. Mining land reclamation has played an important role in ecological restoration. In the past 10 years, some model restoration projects have achieved great successes, such as the Hubei Huangshi National Mine Geological Park, the Shanghai Chenshan Botanical Garden Pit Garden, and the Xuzhou Panan Lake Wetland Company. The success of the demonstration project and the desire of local government's indicators for land use have greatly stimulated the government's recovery activities of mining sites. However, the practice results of ecological restoration in many mining areas have not reached the ideal state, such as the poor effect of the "Kietang rehabilitation model", the problem of reclaimed cultivated land in the mining area, and the bad end of new villages.

3.2.1. Lacking of Economic Considerations in Governance. The government-dominated mining areas are lacking of targeted aims in governance and exists unfair distribution of benefits, resulting in mine-village opposition. The Ministry of Land and Resources stipulates that land for construction purposes must be reclaimed as arable land before it can enjoy the policy of reclamation of industrial and mining abandoned land as an indicator of linked turnover for the replacement of urban construction land. In order to obtain indicators for urban construction land, local governments have reclaimed blindly and did not take the combination of economic, social, and environmental benefits into consideration during the reclamation process¹³. The land plots that are not suitable for agricultural development in the mining area are reclaimed into arable land, resulting in a series of chain reactions, such as poor quality of arable land, low economic benefits from agricultural production, and the loss of farmers' planting costs.

3.2.2. Disaccord to the Basic Laws of Ecological Development. Tangshan's South Lake Park, an ecological restoration demonstration project, its coal mining subsidence site is located in the south of the city center. There are a variety of unique landscape resources within the region. On the basis of fully utilizing existing resources, Tangshan Municipal Government has transformed the abandoned land, which has transferred a social burden into a positive factor for urban construction and real estate development^{14,15}. The successful case of the ecological restoration demonstration project affects the development mode of mine ecological restoration at this stage, and promotes the functional transformation of the natural ecological restoration industry to the humanistic ecological leisure industry through the construction of high-end villas and recreational health resorts. The determination of reutilization methods for remediation of contaminated land in mining areas should be considered comprehensively and should not be developed into tourism and landscape land blindly. The primary principle for determining the reclaimed land reclamation methods in mining areas is to adjust to local conditions.

3.2.3. Lacking Objective Understanding to the Nature of Rural Recession. The negative effects of mining activities are only accelerating the process of rural recession, and are not the real root cause of the current rural decline. The rural areas of some non-mining areas in the east coast of China have shown a trend of recession, and the rural areas of China and even the major economies in the world are

in recession, just the rural recession modes are different¹⁶. In the 40 years of reform and opening up, the income gap between urban and rural areas in China has changed from 1.7:1 to 2.7:1, and the traditional small-scale peasant economy is no longer sufficient for farmers to get rich, let alone catch up with urban residents. Industry is the foundation and source of sustained economic and social development in the region. The damage to the ecological environment in the mining area is only accelerating the process of rural recession, but the root cause of its decline is lack of industrial support¹⁷. Ecological restoration of mining areas must understand the nature of rural recession correctly, attach great importance to the development of rural industries, and provide impetus for rural construction.

3.2.4. Inappropriate Handling of Farmers' Problems in Mining Areas. The negative externalities caused by the destruction of the ecological environment in the mining area have many adverse effects on the production and living of the local residents. The ecological environment treatment in the mining area is related to the interests of farmers directly. Many scholars believe that the implementation of village relocation is the most fundamental solution¹⁸, but village relocation neglects the consideration of people, especially farmers. The ecological resettlement project moves farmers in the ecologically fragile area of the mining area to other places. Its essential appeal is to repair the ecological environment in the mining area. However, with the expansion of the scope of ecological migration and the problem of the removal of the farmers unsolved, the ecological refugees in the mining industry have emerged in a large number, lagging behind the pace of ecological restoration in the mining area seriously.

4. The Requirement of Rural Revitalization in the New Era on Ecological Restoration in Mine Area

The rural revitalization strategy is a concentrated expression of Xi Jinping's "three rural issues" ideology. For farmers in mining areas, the damage caused by the deterioration of the ecological environment has far exceeded the economic benefits brought by mining. Farmers' environmental awareness and economic considerations make them reluctant to support mining exploiting. Therefore, the core of carrying out the ecological restoration of the mining area is the concern of the farmers, not only to change the property rights of the farmland, but also to promote the economic transformation of the rural areas and the development of new economic and new industries. Through the formulation of an integral and systematic plan, the ecological restoration of the mining area will be implemented from the perspective of rural revitalization to solve the problems of ecological governance and rural regeneration in the mining area.

4.1. Establish an assessment mechanism for land reclamation in mining areas.

Faced with new problems, ecological restoration of mining areas must adopt new thinking mode. At the Third Plenary Session of the 18th CPC Central Committee, it was clearly proposed to carry out natural resource accounting system of accounting conversion among various natural resources. In order to obtain indicators for construction land use, the government reclamation of ecologically damaged areas that are not suitable for reclamation into cultivated land is used as arable land, resulting in many problems that exhausting the people and draining the treasury. Through the introduction of a natural resource accounting system, the reclaimed forest land, orchards, and fish ponds are converted into a certain proportion of arable land. The indicators of cultivated land generation can provide more funding for rural revitalization, and land reclamation in mining areas can be adapted to local conditions, which could find their suitable function for agriculture, forestry or prataculture.

4.2. Promote the development of rural industries.

The key of rural revitalization is to implement the requirements of "rich life, civilized rural culture, effective governance, livable ecology, and prosperous industries". Rural revitalization should be both active and sound, and it must be precisely provided for in system design and policy support. It is

necessary to give top priority to the development of rural industries and broaden the channels for peasants to promote employment and strengthen entrepreneurship and personal income. To achieve sustainable development in rural areas, we need to follow the village's own development laws, maintain rural characteristics and support the development of rural specialty industries.

4.3. Strengthen the low economic density of rural industries.

Rural endogenous development can be revived through rural industries and exogenous development mainly depends on urbanization, but this two must be combined effectively. Rural revitalization depends on the industry and the construction of ecological civilization. However, "people" is the key factor for rural revitalization. If rural development is separated from farmers, there will be no way to talk about rural features and cultural heritage. By increasing the rural industries density and promoting the transformation of rural industries from the low-density into high-density industries, it will promote the integration of rural development and the elimination of the contradiction of urbanization in the process of rural revitalization.

4.4. Make full use of the resources of the original mining area.

The nature of ecological restoration in mining areas is an environmental governance project. It strongly depends on financial support and this project depends on the function of government's macro-control deeply. The government's financial investment decision to establish an ecological demonstration project is feasible, but it is impractical to implement all-round and large-scale ecological restoration. The government has introduced and promoted relevant incentive policies to improve the use of existing residual solid resources in the mining area through the improvement of ecological restoration management methods. Through the development and utilization of mineral resources, the funds for the ecological restoration of the mining area will be guaranteed, and the dividends of the ecological civilization construction system will be tapped.

4.5. Improve the legal system for the protection of farmers' rights.

The destruction of the ecological environment in the mining area has threatened the vital interests of farmers. Farmers have been forced to stay away from their native land and become mining ecological refugees. Farmers lose equal rights to distribute natural resources because the government is not only the "participant" but also the "administrator" to participate in the distribution of interests in the development of mineral resources. By formulating special laws and regulations relating to the protection of mineral ecology, farmers, care measures, rights and obligations, the relief measures for environmental infringement will be enriched, and the construction of life insurance and follow-up development plans for mining and ecological refugees will be strengthened.

ACKNOWLEDGMENT

This paper was supported by the following fund project: National Natural Science Foundation "Research on Ecological Resilience of Mine Land"(No.51474214).

REFERENCES:

- [1] Teng J W, Qiao Y H and Song P H 2016. *J. Chinese Journal of Geophysics.* **59**. 4633-53.
- [2] Shi W P and Jia K 2011 The overall complementary reform of mineral resource tax institution in China: international comparative perspective *J. Reform.* 01(2011)5-20.
- [3] Dai T G and Liu X H 2006 The present situation and prospect of mine ecological restoration in China. *J. Modern Mining.* 06(2006)140-3.
- [4] Zhang J M, Li Q S and Hu Z Q. 2013 *J. Coal Science and Technology.* **41**. 173-7.
- [5] Liu Y S. 2018 *J. Scientia Geographica Sinica.* **73**. 637-50.
- [6] Hu Z Q, Long J H and Wang X J. 2014 *J. Journal of China Coal Society.* **39**. 1751-57.
- [7] Mu Y M and Gao L M 2014 Simply talking about ecological restoration of coal – mining

- subsidence with high groundwater level. *J. Journal of green science and technology*. 03(2014)201-3.
- [8] Auty.R.M. 1993 *Sustaining Development in Mineral Economics: the Resource Curse Thesis* (London: Routledge)
- [9] Deng W and Wang G W 2014 Resource dividend or resource curse? *J. Zhejiang Social Sciences*. 07(2014):35-46.
- [10] Zhang Y. 2017 *Research on resource curse effect in multi scale Perspective* (China: Northeast Normal University)
- [11] Wen Q and Liu Y S 2014 *J. Scientia Geographica Sinica*. **34**. 1077-84.
- [12] Guo X M, Zhang K J and Yu H 2018 Implementing the system of rural revitalization strategy and systematic understanding. *J. Rural Economy*. 01(2018)11-20.
- [13] Wan L W. 2012 *Research on environmental costs and benefits in the construction period of ecological mining area* (China: China University of Mining and Technology)
- [14] Jiang Z J and Liu J P 2013 *J. China Population, Resources and Environment*. **23**. 157-63.
- [15] Liu F Y. 2007 *Research on the co-regeneration strategies of industrial wasteland in Chinese mining cities* (China: Tsinghua University)
- [16] Liao C R and Chen M Q 2017 *J. Journal of Agro-Forestry Economics and Management*. **16**. 795-802.
- [17] Wang W L 2016 *J. Issues in Agricultural Economy*. **37**. 83-90.
- [18] Wang X J, Yang J and Shao C F 2014 *J. Ecological Economy*. **30**. 122-6.