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Letter to Editor

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Coupling and Coordination of Coal Mining Intensity and Social-Ecological Resilience in China

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Letter to editor

Introduction

Coal is a major source of energy around the world. However, the negative effects of mining are significant barriers to the long-term development of mining districts [1]. There are significant changes in the restoration characteristics and reaction methods for mining under the combined influences of diverse mining intensities, different natural ground conditions, and social-economic development. The spatial distribution should be correctly assessed at the macroscale to guide the development and usage of coal resources as well as ecological restoration.

This paper used web crawler technology and multi-source remote sensing data to assess mining intensity and social-ecological resilience at the county level in China, and to divide the mining areas into nine regions. Differentiated solutions for ecological restoration, resource development, and usage in the various coal mining zones were presented based on the zoning results [2]. Coal mines are widely scattered and abundant throughout China, according to the appraisal data, with the majority of them located in the central, southwest, and northwest regions. Nearly half of coal mining regions, however, have low resilience. High mining intensity-low resilience areas, in particular, are concentrated in north China, accounting for 10.83 percent of the total. To avoid potential ecological concerns and reduce economic consequences, extra attention should be paid to these areas.

It can also cause regional agricultural development and land-use changes to stall. Furthermore, a coal resource supports the coordinated development of local electricity, metallurgy, and other associated industries due to its important role in the economy, resulting in imbalanced industrial development and significant industrial pollution. Coal mining subsidence causes horizontal and vertical ground movements, which cause inclined deformations, horizontal deformations, curvature deformations, and other consequences that impair regional infrastructure such as highways, pipelines, electric transmission lines, and settlements [3-5]. These impacts, as well as the harm they cause, can endure anywhere from a few months to decades. The direct and indirect consequences of various mining technologies and degrees of mining intensity

Coal is a key energy resource that contributes to national social and economic development, accounting for percent of global energy structure. However, mining has the potential to have long-term consequences for the development of adjacent places .vegetation destruction, change in original landscape pattern, soil erosion, soil heavy metal pollution caused by mining residue, water resource pollution, groundwater level reduction, and biodiversity destruction are all possible consequences of mining 2014, Hendrychová . Quadros. Coal mining is also linked to the local social and economic structure in a complex symbiotic way.

Assessing a system's resilience can help to achieve sustainable development. Price defined resilience as a measure of a system's stability and collapse condition following a disturbance. It was originally used in ecology to assess ecosystem stability. It can explain nonlinear changes in an ecosystem as a system's ability to adapt to changes and maintain its original condition in the face of external disruptions. Within a particular threshold, an ecosystem can sustain itself and respond to disruptions, but beyond that, the system will collapse. As a result, systems can adapt to changing conditions brought on by disruption. Global changes are gradually rising as external shocks become more complicated as human society develops. The link between human society and natural ecosystems has also been verified, and the resilience theory in social-ecological systems has been further explored. The ability of a system to preserve its function, structure, characteristics, and feedbacks after a disturbance is known as social-ecological resilience. The connected social-ecological system, unlike the ecosystem, contains human subjective activity. So, in a dynamic and complex system, social-ecological resilience means that a system can adapt to a changing environment while absorbing a disturbance and achieving long-term sustainable development.

Coal is an important global energy resource. However, the negative impacts of mining are important factors restricting the sustainable development of mining areas. Under the superimposed influences of different mining intensities, different natural ground conditions, and social-economic development, there are large differences in the restoration characteristics and response strategies for mining. To guide the development and utilization of coal resources and ecological restoration, the spatial distribution should be appropriately analyzed at the macroscale. Based on the web-crawler technology and multi-source remote sensing data, this paper attempted to estimate the mining intensity and the social-ecological resilience respectively at the county level, to divide the mining areas into nine regions in China.

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Conflict of Interest

The authors declare that they are no conflict of interest.

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