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PRACTICAL ARTICLE

Evaluating the sustainability of mine rehabilitation programs in China

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Social, economic, and environmental restorations are important concerns in mine rehabilitation programs. Nonetheless, limited attention has been given to the social and economic evaluation of mine rehabilitation programs in developing countries with fast-growing economies and large populations. To evaluate the social, economic, and environmental sustainability of mine communities before and after mine rehabilitation programs, we placed the study in China, which has experienced large-scale mine closures resulting from resource depletion. By adopting an integrative model, sustainability cube, we evaluated social, economic, environmental, and overall sustainability (the combination of social, economic, and environmental) of its mine rehabilitation program—the national mine parks (reengineering closed mines as tourist parks, which constitutes the mine rehabilitation program) at the community level before and after the park establishment. Our results indicate that the implementation of national mine parks has improved the overall sustainability of local communities; the sustainability scores of the economic and environmental sectors increased significantly, while the sustainability score for the social sector decreased (mainly due to increased emigration after mine shutdown). We provide suggestions to improve social sector performance in mine rehabilitation programs, aiming to further enhance overall sustainability after mine closure.

Key words: China, mine rehabilitation, national mine parks, sustainability cube

Implications for Practice

- Evaluation of social and economic sustainability needs to be incorporated in mine rehabilitation programs in newly industrialized countries.
- National mine park (reengineering closed mine as tourist park) is an effective way to improve the sustainability of mine communities after mine closure.

Introduction

Mine rehabilitation is one of the biggest challenges among economic development and environmental conservation (Olsson et al. 2014; Hák et al. 2016), which usually refers to the restoration of the postmined landscape to the intended postmining land use (Hannan 1995). Most mine rehabilitation programs, such as those implemented in the United States and Australia, focus on environmental restoration (Banning et al. 2008; Doley & Audet 2013; Sena et al. 2015; Triska et al. 2016). Questions regarding social and economic impacts, such as whether a local economy decreases due to mine shutdown or if increases in local emigration result from job losses after mine closure, should be incorporated as important concerns in mine rehabilitation, particularly at a community level.

Our study aim here is to evaluate the social, economic, and environmental sustainability of mine communities before and after mine rehabilitation programs, which are of great scientific value and policy implications. Although a series of studies had investigated social and economic impacts of adjacent communities after mine shutdown in developed countries like Germany (Kabisch 2004; Gross 2010) and Australia (Gardner & Bell 2007; Burton et al. 2012; Rosa et al. 2020), similar research is still rare in newly industrialized countries, and this is particularly true for those populous countries with rapid economic growth rates. China is a case in point.

China is the most populous country, and its economy is growing at a fast rate among major nations (Liu & Diamond 2005). The country is starving for mineral supplies (Kesler et al. 2015). The production of coal, crude steel, and cement in China all rank the highest globally (Editorial Department of China Mining Yearbook 2014), yet the intensive exploitation has also led to increased mine closures resulting from resource

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