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SCIENCE DIRECT
Journal of Cleaner Production 14 (2006) 427–435
Journal of Cleaner Production
www.elsevier.com/locate/jclepro

The role of artisanal and small-scale mining in China's economy

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Received 7 July 2004; accepted 1 August 2004
Available online 26 April 2005

Abstract

The last decades have seen increased international attention paid to a number of features of artisanal and small-scale mining (ASM). The beneficial roles of ASM in society and the economy in many countries, however, are often overlooked, while its negative impacts dominate official press coverage and scholarly publications of the sector. Through a review of the available literature and statistics, this paper works toward building a balanced picture of the overall role of ASM in China. First, the positive and negative impacts of ASM internationally are reviewed, followed by a short review of suggested and actual international policy responses. Then an examination of the impacts and role of ASM in China is undertaken. The authors argue that the contributions of ASM outweigh its negative impacts, but the central government needs to make more effort to regulate, guide and encourage the development of ASM and to create a sound environment for its operations.

Keywords: Role; Artisanal and small-scale mining (ASM); China; Policy

1. Introduction

Artisanal and small-scale mining (ASM) has had unprecedented growth in developing economies over the past few decades. ASM is defined as the use of rudimentary processes to extract valuable minerals from primary and secondary ore bodies, and is characterized by the lack of long-term mine planning/control. It can be illegal or legal, formal or informal and can encompass everything from individual gold panners to medium-scale operations employing thousands of people. In 1999, the International Labour Organization (ILO) estimated that there were between 11 and 13 million artisanal miners worldwide, almost 30% of whom were women [1]. ASM activities emphasize the extraction of a wide range of metals, precious stones, and industrial minerals, and accounts for a significant portion of the world's mineral and energy production.

Academics and especially journalists tend to focus on the negative impacts of ASM, generally underreporting its positive aspects. This is certainly the case in China [2], home of the world's largest ASM sector [3]. While these negative impacts should not be underestimated, overlooking ASM's positive aspects has led to policies that focus on the negative, with little consideration for the wider consequences. Through a review of the available literature and statistics, this paper works toward building a balanced picture of the overall role of ASM in China. First, the positive and negative impacts of ASM internationally are reviewed, followed by a short review of suggested and actual international policy responses. Then an examination of the impacts and role of ASM in China is undertaken.

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doi:10.1016/j.jclepro.2004.08.006

2. ASM internationally

ASM is an essential activity in many developing countries, as it provides an important source of employment and tax revenue, particularly in remote rural regions with few economic alternatives [4]. An estimated 80 to 100 million people are directly or indirectly dependent upon ASM for their livelihoods [5]. Hilson [6] argues that ASM plays a pivotal role in alleviating poverty in the developing world and contributes significantly to national revenues and foreign exchange earnings.

However, the employment, income and production generated from ASM often come with significant costs to miners' and nearby communities' health, safety, and environment. ASM hazards are many and varied, including: poor ground conditions leading to underground tunnel failure, methane or coal dust explosions from coal mines, flooding, machinery accidents, poor lighting and ventilation, explosives accidents, and electrocution [7]. Hydraulic monitoring of secondary deposits can also be extremely unsafe, as there is potential to undercut hill slopes and generate landslides [1]. Mercury (Hg), cyanide and other hazardous chemicals are used as reagents for recovering and purifying gold and other precious metals. Small-scale gold mining is a significant source of Hg to the environment, with as much as 800 tons/yr of metallic mercury being released into the environment worldwide [8]. Every year, about 120 to 240 tons of mercury are released into the environment in China alone due to gold amalgamation [9,10]. Fine dust from mineral processing leading to silicosis, and noise pollution, are endemic problems. ASM accidents are often underreported, due to the illegal or semi-legal status of most ASM operations; the ILO (1999) estimates that non-fatal accidents in ASM are 6–7 times greater than in the formal mining sector [5]. ASM operations can also lead to the destruction of arable and grazing land through excavation, the accelerated erosion of top soils, landslides, the collapse of old workings, unsafe tailings disposal, the lowering of water tables, soil contamination due to dust from mines and tailings, and increased levels of sediment load and flooding in nearby rivers.

In addition, ASM has been associated with a host of negative social impacts, especially in the boomtowns that arise from big mineral finds in remote locations. These include challenges such as prostitution, substance abuse, and gambling. Women are often disproportionately affected by these factors [11].

ASM is often regulated by the same legislation (i.e., for the environment, labour, mineral rights, exploration and permitting) as the formal mining industry. ASM compliance is generally low, due to the low education, lack of finance and poor levels of technology available to the miners.

The ASM academic literature frequently highlights policy alternatives intended to improve the overall situation for the miners. Hilson [6] argued that the international community could do much more to improve sustainability in the ASM industry by: (1) legalizing ASM and implementing sector-specific legislation; (2) contributing to community development and providing increased economic support; and (3) providing training and educational assistance, and playing an expanded role in the dissemination and transfer of important technologies. For India, Ghose [12] indicated that implementing educational-training related initiatives could facilitate additional environmental improvement at sites. In Brazil, Macedo et al. [13] suggested that the following could mitigate the impacts of ASM: improving coordination among public entities responsible for the control of the ASM sector; undertaking environmental management and reclamation initiatives; carrying out research and diffusing mining and environmental technology; developing and implementing appropriate licensing procedures for ASM; reviewing environmental impact evaluation and enforcement procedures; and improving regional planning. In Zambia, Kambani [14] suggested that institutions responsible for managing the environment were unable to effectively carry out regulatory and monitoring mandates due to inadequate resources, and recommended making it mandatory for all mining activities, including ASM, to submit environmental impact assessment reports before a license to mine or explore is granted. In Bolivia, Quiroga [15] outlined a preliminary strategy to move against social inequity in ASM. This strategy revolves mainly around implementing alternative sustainable livelihoods with the participation of the government (central and local), the private sector, NGOs and donors as facilitators and partners. It aims to reduce the number of families eking out a living from artisanal mining in order to enhance the viability of ASM. Hilson and Van Der Vorst [16] reviewed a series of strategies for improving environmental performance in the small-scale gold mining industry and concluded that while conditions varied regionally, few regulations and policies existed specifically for small-scale gold mining activity in developing countries. They argued that a combination of policy-, management- and technology-related initiatives was needed to facilitate environmental improvement in the industry.

In a handful of countries, legislation has been implemented in attempts to address some of the concerns mentioned above. Bugnosen et al. [17] conducted a pilot study on ASM legislations and argued that a growing number of Third World countries were introducing laws and regulations for their respective ASM sectors, but that these had not necessarily helped to promote the sectors' growth, and had not made significant improvements to the social and environmental