

Special Issue On Environmental Management In The Small-Scale Mining Industry

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Abstract: *Many have overlooked the potential for environmental improvements in the grassroots industries of the developing world. One such industry, small-scale mining, has long proven to be economically important in Asia, Africa and South America. The sector has not only provided millions of people with employment but has also contributed positively to national mineral exports, revenues, and foreign exchange earnings in a number of countries. The most recent socioeconomic assessments of small-scale mining suggest that it provides employment (both directly and indirectly) to some 30 million people in the developing world, and that industry production accounts for approximately one-sixth of global non-fuel mineral output. Clearly, with the industry expanding at an unprecedented rate, there is an obvious need to address the environmental aspects of operations accordingly.*

Key words: mining industry, small-scale mining industry, management

More specifically, regional governments, academic units, and international agencies such as the United Nations and World Bank, must unite, pool research resources, and begin tackling the pressing environmental problems of the sector with improved strategy. This raises a number of key questions, however. First, what is currently being done globally to address the pressing environmental problems of the small-scale mining sector? Secondly, how are these problems being addressed in different countries? Finally, what can be done to ensure that the industry progresses along a more efficient and sustainable course? This special issue of the Journal of Cleaner Production is devoted to acquainting researchers and practitioners with the ways in which the environmental aspects of small-scale mining are being addressed throughout the world. The aim is to facilitate an exchange of ideas by illustrating, specifically, how the industry's major environmental problems are being combated and prevented regionally. The 12 papers comprising this special issue provide an interesting and varied selection of perspectives on environmental management in the small-scale mining industry. Collectively, the papers underscore the importance of promoting environmental management in the sector, and identify a series of promising technological, 0959-6526/02/\$ - see front matter 2002 Elsevier Science Ltd. All rights reserved. PII: S0959-6526(02)00030-6 legislative and educational measures for improving environmental performance. The first paper of this issue, by Jennifer Hinton, Marcello Veiga, and A. Tadeu Veiga, reviews technological and managerial strategies for facilitating environmental improvements in artisanal gold mining—the largest segment of the small-scale mining sector. The authors explore the environmental benefits of a number of technologies and the role of Processing Centres in providing education, services and information to miners. They further argue that several technologies and methods commonly used at large-scale mines can be downsized for use at small-scale operations, the keys to their widespread adoption being simplifications in design and demonstrable economic efficiency. John Andrew then explores the potential role of mediation as a means of resolving land use conflicts in the small-scale mining industry. He discusses the land use conflicts with which this activity is associated, identifies some of the initiatives that have been taken to try to deal with these disputes, and introduces mediation as a conflict resolution process. He concludes that mediation, generally, holds considerable potential for resolving disputes in this setting, thereby reducing the harmful effects of this economic activity on people and the environment. The next three papers are African case studies. The first of these, written by Benjamin N.A. Aryee, Bernard K. Ntibery, and Evans Atorkui, examines the environmental impacts of small-scale precious minerals and metal mining in Ghana, and outlines a series of initiatives for improving environmental performance in the industry. The authors not only describe the efforts that have been made to date to address the pressing environmental problems in the industry, but also identify a number of other promising measures for improving environmental conditions at sites. Stephens Kambani's paper focuses on the major issues affecting cleaner production in the Zambian small-scale mining sector, particularly, environmental complications and legislation. He also prescribes possible strategies for minimizing environmental impacts in the sector. Oliver Maponga and Clay F. Ngorima then profile the Zimbabwean gold panning sector, arguing that a combination of legislation, education, and appropriate technology has improved 92 Editorial / Journal of Cleaner Production 11 (2003) 91–93 environmental performance in a sector comprised of some 150,000 operators. After providing a brief overview of the environmental impacts associated with this activity, the authors examine and critique the four basic approaches taken by the Zimbabwean government to mitigate environmental problems in these sectors. The approaches have been identified as follows: (1) implementation of legislation; (2) dissemination of appropriate technologies such as James Tables, pans and sluice boxes; (3) execution of pilot environmental rehabilitation projects; and (4) expanded inputs from NGOs. The issue then focuses on small-scale mining in Asia. In the first of his two papers, Mrinal Ghose examines some of the key environmental issues affecting India's small-scale mining industry, particularly those operations located in the (Indian) Himalayas.

He then describes the schematics of the environmental management plan (EMP), which helps to ensure that the potential environmental impacts of a project—in this case, a small-scale mine—are incorporated into the early stages of developmental planning. He also briefly describes the overall legislative environment in India, and discusses the research contributions made by resident universities in the area of mining, small-scale mining and the environment. Ghose's second paper is of a slightly different focus, examining more in detail the legislative environment in India, and how it potentially affects the performance of resident small-scale mines. The next paper, by Geoff Crispin, profiles environmental management in Papua New Guinea's (PNG) small-scale mining industry. He argues that although small-scale gold mining has become an indispensable part of the rural economy in PNG, at the same time, the industry has had a wide range of environmental and health-related impacts. He also indicates how, over the past 3 years, there has been significant effort made to further understand PNG case—more specifically, attempts have been made to gather a wide range of data related to resident small-scale gold mining activity. He notes that the purpose of this information collection is to formulate a management plan to administer and help the small-scale gold mining community garner the benefits and reduce the risks associated with this form of industrial activity. Next, Philip Andrews-Speed, Minying Yang, Lei Shen, and Shelley Cao provide a much-needed analysis of China's township and village coal mining (TVCM) sector. The authors first provide a brief overview of the development of the small-scale coal mining industry in China over the last two decades, and then discuss the major problems in the sector—notably, environmental damage, poor mine safety, low recovery of resources, and widespread illegal mining. More importantly, the authors examine the process by which laws and regulations pertinent to the TVCM sector are drafted, adopted, and implemented, as well as the institutional structure of the Chinese government. The authors' examination and evaluation of the legislative scheme for the TVCM sector will undoubtedly benefit the Chinese legislative bodies and enforcement agencies responsible for reviewing the legal and institutional framework of the country. Two case studies of South American small-scale mining are then presented. The first paper, by Arlei Macedo, De'cio Jose' de Almeida Mello Freire, and He'rcio Akimoto examines the historical and present conditions of the Brazilian non-metallic small-scale mining industry, together with the efforts made by governmental and nongovernmental organizations to improve mining technology and the environmental management of resident operations. As most of the literature on Brazilian smallscale mining describes the garimpo (small-scale gold mining) segment, this contribution helps to bridge a major gap in the literature. The final South American case study, by Sergio Castro and Mario Sa'nchez, analyzes the importance and environmental impacts of small-scale gold, silver and copper mining in Chile. Moreover, the authors describe important small-scale mining support services, the schematics of the legislative framework in place for the industry, and the research contributions made by resident universities in the area of small-scale mining and the environment. The concluding paper in this issue, by M. Babut, R. Sekyi, A. Rambaud, M. Potin-Gautier, S. Tellier, W. Bannerman, and C. Beinhoff, is fittingly, a 'Note from the Field'. The paper has been strategically inserted at the end of the issue to help to underscore the need for a makeshift change in the way we conduct small-scale mining research. Researchers continue to overanalyze the environmental impacts of small-scale mining, with scant heed being paid to the underlying causes of these problems, and the ways in which they can be minimized and prevented altogether. This has particularly been the case with mercury pollution: whereas numerous studies have been undertaken to determine the degree of mercury contamination persisting in a given area, few papers have been produced that contain details of both the mercury study itself and recommendations for addressing the specific environmental problem at hand. The authors of this particular paper, however, provide a rare combination of results and recommendations. They report the findings of a mercury study conducted in small-scale gold mining regions in Dumasi, Ghana, and then outline some of the measures various institutions are trying to implement to prevent these problems. The time for a special journal issue of this scope is long overdue. Although several international conferences have been held, in which the salient environmental issues of small-scale mining have been discussed in great detail, as already explained, it is high time that we become more 'progressive' in our approaches in tackling Editorial / Journal of Cleaner Production 11 (2003) 91–93 93 the environmental problems of the sector. Rather than continuing to overanalyze the industry's environmental impacts, we must begin identifying barriers to environmental improvement, opportunities for strengthening regulatory control, and practical strategies and tools for promoting cleaner production. I would like to give special thanks to Professor Don Huisingh for encouraging the development of this special issue. I would also like to thank the distinguished editorial board selected for this issue who provided constructive commentary to all authors. I am confident that this special issue will facilitate a much-needed exchange of ideas between industry researchers, academics, and government directors, and help to initiate further research in an industry in dire need of environmental improvement.

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