

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Resources Policy

journal homepage: www.elsevier.com/locate/resourpol

Resolving artisanal and small-scale mining challenges: Moving from conflict to cooperation for sustainability in mine planning

T. Zvarivadza^{a,*}, A.S. Nhleko^a

^a School of Mining Engineering, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa

ARTICLE INFO

Keywords:

Artisanal and small-scale mining
Sustainable development
Economic development
Mine planning
ASM policy
Conflict resolution

ABSTRACT

Despite the considerable challenges posed by artisanal and small-scale mining (ASM), it remains part of our lives. Conflict between ASM miners as well with large-scale mining companies, civil strife, social unrest, and corruption to mention a few problems are the order of the day in ASM. Environmental damage and possible contribution to economic meltdown are a cause for concern. The main thrust of this paper is to discuss the challenges posed by ASM across the whole spectrum of political, social, economic, and environmental and health and safety issues. The paper also proposes some proactive and realistic approaches to resolve the challenges discussed in order to move from conflict to sustainability in mine planning. ASM is characterized by relatively uneducated and unregistered miners, and policies targeting ASM miners should be disseminated in a comprehensible manner lest such policies remain in our dreams and the policy books. Since it is the government that funds clean-up of the mess from ASM, one of the best ways to avoid this expenditure is developing cooperative approaches through different governmental instruments, persuading the ASM miners to mine responsibly. The contribution of ASM to unemployment reduction cannot be ignored, but being mainly an informal sector, it is very difficult to quantify its contribution to economic development. Capturing meaningful rent from these miners may also remain a dream if non-consultative policies are imposed on this sector. Tracing the miners can be a nightmare when reactive approaches are implemented. Large-scale mining companies, government, and civil society at large have to adopt a cooperative approach to devise sustainable, workable, and realistic ways to convert ASM miners into contributors to sustainable development.

1. Introduction

The definition of artisanal and small-scale mining (ASM) varies from country to country, but it generally involves the exploitation of deposits which are not profitable to mine through large-scale mining (LSM). ASM is conducted by small groups of 20–50 people and rudimentary tools are used. According to [Danielson and MacShame \(2003\)](#), artisanal and small-scale miners are people working with simple tools and equipment, usually in the informal sector, outside the legal and regulatory framework. Some countries differentiate between artisanal mining and small-scale mining. In India small-scale mining is mostly organized mining carried out with acquired mining rights under some statutory control, although unlicensed or informal activities are not uncommon e.g. straying into unlicensed areas from existing mines and working in disputed territory, while artisanal mining is uncontrolled, illegal, and unauthorized ([Chakravorty, 2001](#)). This is also the Zimbabwean perspective ([Svotwa and Mtetwa, 1997](#)). ASM normally flourishes in areas with old mine workings (reef mining). It is equally

prevalent along rivers (alluvial mining). Commodities such as gold and precious stones with high value compared to their weight are normally mined under ASM. These miners normally work in groups of 2–20 or slightly more consisting mainly of members of the same family. Although women constitute a large component of the ASM, in each group it is normally the male counterpart who happens to be the family head that leads others and has control over the proceeds from ASM. These miners go where the mineral is and rarely seek regulatory approval.

ASM has been existent since time immemorial and remains part of our lives. [Svotwa and Sibanda \(2000\)](#) project an exponential growth in ASM as from 1980 into the far distant future as depicted in [Fig. 1](#). The same trend is echoed by the [Human Rights Watch \(2015\)](#), indicating an exponential small scale gold production increase in Ghana from 1990 to 2013 as depicted in [Fig. 2](#). This type of mining poses great challenges across the whole spectrum of sustainable development, be it political, economic, social, or environmental. From the definition it is clear that whether registered or unregistered, these miners may cause untold damage to sustainable development if large-scale miners ignore them in

* Corresponding author.

E-mail address: Tawanda.Zvarivadza@wits.ac.za (T. Zvarivadza).

<https://doi.org/10.1016/j.resourpol.2017.12.003>

Received 9 August 2017; Received in revised form 18 November 2017; Accepted 6 December 2017
0301-4207/ © 2017 Elsevier Ltd. All rights reserved.

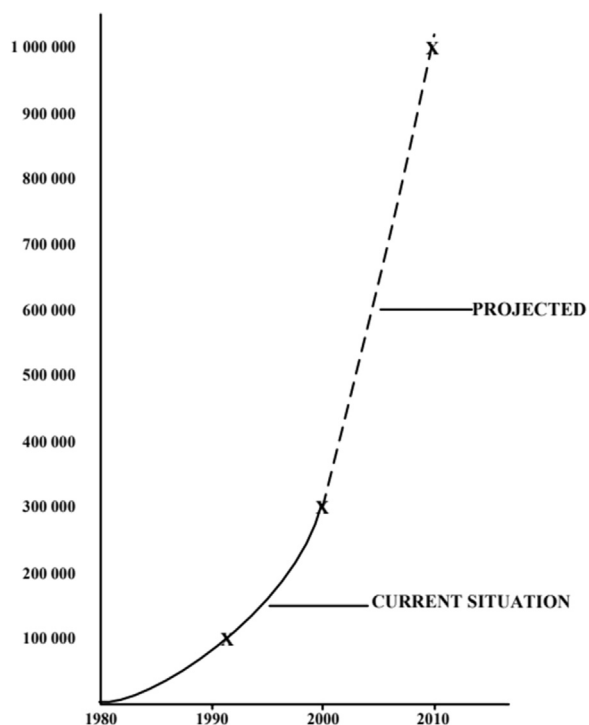


Fig. 1. Growth of small-scale mining in Zimbabwe – number of small-scale miners from year 1980 to year 2010 and beyond (Svotwa and Sibanda, 2000).

planning. Regulations may just exist on paper and not be sufficient to arrest the challenges from ASM when appropriate planning is not incorporated. This paper puts across several approaches that need to be embraced in order to amass benefits from ASM for the success of the country's economy. The formulation of the approaches encompasses realistic considerations. ASM solutions also need to be implementable.

While ASM is a thorn in the flesh, its contribution to unemployment reduction cannot be ignored. However, the employment may come at the expense of national development if there is no reliable way of taxing the proceeds from ASM. Also the benefit of employment may be outweighed by the problems caused by ASM when realistic solutions are not developed. Some short-sighted governments may enforce strict measures like banning ASM because of the planning challenge in dealing with ASM activities. However, banning ASM is not an easy task since it contributes much to the livelihood of the most impoverished uneducated sector of society. Table 1 provides estimates of the number

Table 1
Estimates of the number of people working in the ASM sector in the MMSD research countries (Hentschel et al., 2002).

Country	Total number of workers (thousands)
Bolivia	72
Brazil	10
Burkina Faso	100–200
China	3000–15,000
Ecuador	92
Ghana	200
India	500
Indonesia	109
Malawi	40
Mali	200
Mozambique	60
Peru	30
Philippines	185.4
PNG	50–60
South Africa	10
Tanzania	550
Zambia	30
Zimbabwe	350

of people working in the ASM sector in 18 countries (Hentschel et al., 2002). Recent statistics on ASM practice around the world are presented by the Alliance for Responsible Mining (2013) in Fig. 3. The difficulty of eliminating ASM is emphasized in Fig. 4, which shows the ownership structure of small scale mines in china.

This paper starts by expressing the different challenges of ASM in different facets of life. This leads to considerations to be faced in planning the solutions needed for sustainability in mine planning. After the comprehensive coverage of the challenges an in-depth discussion is presented on plausible ways to foster a conducive operating environment for ASM and LSM.

2. Challenges posed by ASM

ASM poses a wide assortment of challenges. These challenges can be grouped into social, political, economic, environmental, and safety and health challenges.

2.1. Social challenges

Social cohesion is the fabric that holds communities together. It is the building cell that influences the peace of a nation at large. The practice of ASM in an area brings with it some social challenges that

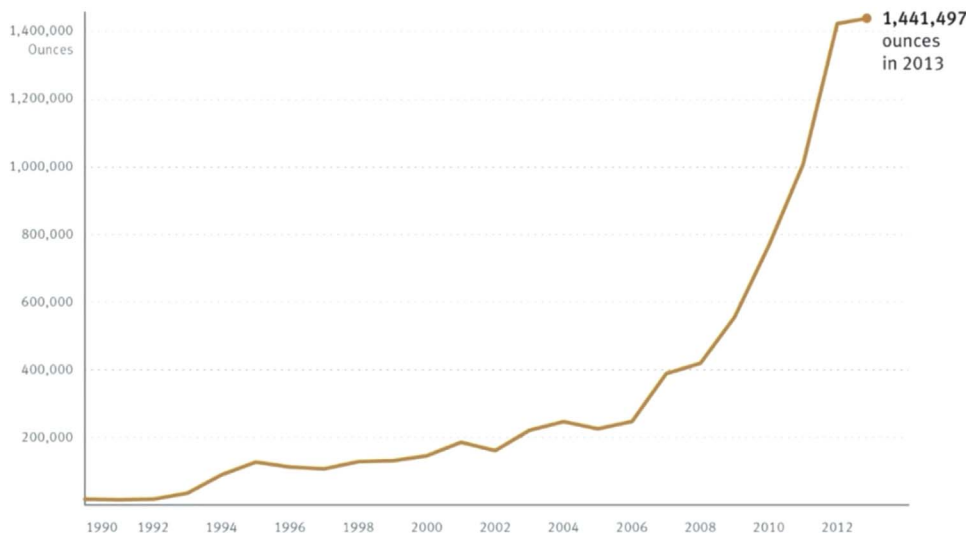


Fig. 2. Small-scale gold production in Ghana (Human Rights Watch, 2015).

Download English Version:

<https://daneshyari.com/en/article/7387570>

Download Persian Version:

<https://daneshyari.com/article/7387570>

[Daneshyari.com](https://daneshyari.com)