



Analysis

Phasing Out Mercury? Ecological Economics and Indonesia's Small-Scale Gold Mining Sector



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ABSTRACT

This article uses an ecological economics approach to analyse tensions surrounding efforts to phase out mercury in Indonesia's artisanal and small-scale gold mining (ASGM) sector, among the largest sources of mercury pollution worldwide. Many scholars and environmental activists have long hoped that global restrictions in mercury trade would drive up mercury prices and decrease mercury use and pollution in ASGM. However, in Indonesia, despite global mercury trade restrictions, recent increases in domestic mercury supplies through new cinnabar mining developments have made mercury less expensive and more available, destabilizing efforts at reducing mercury use. This article discusses implications of domestic cinnabar mining for controlling mercury in Indonesia's ASGM sector, highlighting obstacles to implementing the Minamata Convention, a treaty that aims to restrict mercury use. We link discussion of mercury mining to other socioeconomic processes, labour relations and power dynamics shaping mercury use in gold mining and hindering collectivised mercury-free technology uptake. Examining new evidence regarding the social metabolism of a changing extractive economy, we underscore why an integrated ecological economics paradigm – carefully grounding analysis in the context of local labour situations – is needed to challenge assumptions and inform new strategies for mercury reduction/elimination in ASGM.

1. Introduction

Over the past decade, scholars addressing mercury pollution have drawn attention to the proliferation of contaminated sites in artisanal and small-scale gold mining (ASGM) areas globally, employing a variety of approaches to studying the social and ecological costs of pollution (Li et al., 2009; Bose-O'Reilly et al., 2010; Telmer and Veiga, 2009). There has also been a significant body of literature on technologies for reducing mercury use in gold extraction (García et al., 2015; Appel and Na-Oy, 2012) as well as socioeconomic influences on gold mining practices (Spiegel, 2009; Spiegel, 2012a; Hilson, 2006; Dondeyne and Ndunguru, 2014; Saldarriaga-Isaza et al., 2013). However, there has been a paucity of literature, particularly in Asia, focusing on relationships between mercury production, trade flows, mercury use in ASGM and the inter-connectedness of different extractive processes along gold/mercury commodity chains and their associated labour and power dynamics. In this paper, we focus on challenges in reducing mercury pollution in Indonesia's ASGM sector. After

years of inter-governmental debates culminating in the Minamata Convention on Mercury (UNEP, 2013a), the Government of Indonesia announced its plan to phase out mercury use in ASGM completely by 2018. Signed by Indonesia and more than 120 other countries, the Minamata Convention stipulates that countries with “more than insignificant” ASGM activity develop National Action Plans for this sector, including measures to control mercury trade, capacity-building to raise risk-awareness and support cleaner technology adoption in ASGM communities, formalization or regulation of ASGM, and other measures that emerged after years of extensive inter-governmental negotiation (Fritz et al., 2016; Selin, 2014a; Selin, 2014b; Clifford, 2014; Spiegel et al., 2015; Sippl, 2015). We explore the ecological economics of mercury phase-out for the ASGM sector, highlighting a need to rethink assumptions underlying past market- and technology-centred solutions and carefully link analysis of mercury trade dynamics, institutional regulatory strategies and regional socioeconomic processes that shape on-going mercury use in gold mining areas.

Bringing attention to ecological implications of global trade,

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researchers and environmentalists have long argued that curtailing the international trade of mercury should have the effect of increasing mercury prices and reducing mercury use in all sectors, especially gold mining (Hylander, 2001). However, notwithstanding the ethical importance of international mercury trade restrictions, there have also been cautionary warnings that strict mercury trade bans could have the unintended effect of leading to new illegal mercury stockpiling and illegal dealing, thus accentuating the need for new attention to these “unofficial” dynamics – and the socioeconomic relationships in which they are embedded (Spiegel et al., 2005; Clifford, 2014). As Greer et al. (2006) noted, “It is crucially important that any mercury reduction strategy ratchet down supply and demand in a coordinated manner. This will ensure that steps taken to reduce demand do not flood the market with excess mercury supplies, which would invite mismanagement. Similarly it will ensure that a plummet in supply does not trigger a re-opening of already closed primary mines to meet unsatisfied demand” (p. 108). In this article we provide analysis of how, despite mercury export bans by previously significant global mercury suppliers – namely the U.S. and the European Union – and global commitments to phase out mercury use, increases in domestic mercury supplies through new cinnabar mining (HgS) developments in Indonesia have made mercury less expensive and more available to small-scale gold miners across the country, destabilizing efforts at reducing mercury use and pollution. Discussing implications of recent domestic cinnabar mining for mercury use in Indonesia’s ASGM sector, we stress the need for an ecological economics perspective that positions the implications of new mercury mining within Indonesia as part of a broader set of concerns about material flows, labour and power relations, and the social metabolism that underpins extractive economy developments (Martinez-Alier et al., 2010; Muradian et al., 2012). We also highlight key insights acquired from engaged research in small-scale mining communities during projects aiming to build capacities to reduce mercury use, agreeing with Muradian and Cardenas (2015) about the need to critically re-conceptualise environmental governance challenges not as “technical” problems but as “collective action dilemmas” that are nested in, and influenced by, broader social processes and value systems.

In understanding social and ecological processes in the extractive sector, Martinez-Alier and Walter (2016) articulate the importance of understanding links between unequal property rights, inequalities of power, pollution burdens and how access to natural resources are unequally distributed. We examine some of these links in areas of Indonesia where mining activities are booming, thus offering a country-specific analysis of key challenges and processes hindering the implementation of Article 7 of the Minamata Convention, which mandates that signatories “shall take steps to reduce, and where feasible eliminate, the use of mercury and mercury compounds in, and the releases to the environment of mercury from, such [gold] mining and processing” (Article 7, Paragraph 2). The first section below provides background of mercury use in Indonesia’s ASGM sector, contextualizing how Indonesia’s signing of the Minamata Convention represents a moment for invigorating focus on inequities in the gold mining sector. The next section discusses our methodology and analytical approach. This is followed by analysis of recent increases in domestic mercury mining and trade, and its implications for the economics of mercury use in ASGM across Indonesia. The final section builds on papers in *Ecological Economics* by Saldarriaga-Isaza et al. (2015a, 2015b) to highlight a need for strategies of mercury phase-out that closely engage socioeconomic and labour relations surrounding “cheap mercury” and “free mercury” as well as critical lessons learned from past efforts to support cooperatives as a means of replacing mercury use in ASGM with alternative technologies. In particular, our field experiences in Java and Kalimantan reinforce the concern that “rendering society technical” (Li, 2011) perilously neglects complex economic and power dynamics surrounding unequal access to ASGM legalisation opportunities – dynamics that inhibit local groups from transforming extraction technology. We

call for careful understanding of inter-linked socioeconomic relations and power dynamics that shape technology choices, material flows and mercury use practices.

2. Contextualizing the Ecological Economics of ASGM and Mercury in Indonesia

Globally, much environmental scholarship has stressed that ASGM is one of the world’s largest sources of mercury emissions and that new interventions are urgently needed in this sector (Veiga et al., 2014a; Davies, 2014; Swain et al., 2007; Sippl and Selin, 2012). Indonesia is recognized by the United Nations as the world’s third largest mercury emitter after China and India, with reports warning that mercury use and pollution in Indonesia’s ASGM sector has been increasing significantly over the past two decades (IPEN, 2015; Balifokus, 2015; Spiegel and Veiga, 2006). Addressing the period immediately before Indonesia signed the Minamata Convention on Mercury, Ismawati (2014) examined how US\$32 million in mercury was exported to Indonesia in 2012, largely for use in ASGM, noting a long-term correlation between the upward global gold prices and increased mercury imports into Indonesia between 1998 and 2012. The selection of 2018 for a complete mercury phase-out was the Indonesian Government’s own target, not a globally “required” target, and speaks to the urgency with which some government authorities have approached pollution in ASGM in policy announcements. Yet, while its ambitious pollution phase-out target has been welcomed by some, government announcements regarding Indonesia’s mercury plans have already elicited a range of sceptical responses. As one prominent Indonesian environmentalist noted, “Indonesia is the first to publish its national action plan...But it was made in a rush and did not involve other stakeholders” (quoted in Mongabay, 2015), highlighting a problem of not investing enough time and resources into vital participatory processes. Critiques have been levied by environmental activists that Indonesia’s National Action Plan is not compliant with the Minamata Convention and does not follow Annex C guidelines; and concerns about minimal participation have also been voiced by Indonesia’s National Association of Community Miners, which has argued that the government’s failure to legalise ASGM is the single greatest challenge that obstructs plans for significant mercury reduction, leaving technology planning to occur in a largely informal context that lacks regulatory support (Lestariipost, 2015). Further concerns have been raised that Indonesia is currently importing significant quantities of mercury “under the table” and “backed by powerful officials” (Ismawati, 2014), creating trade relations that could be difficult to police even if Indonesia’s government authorities wanted to reduce mercury importing officially.

Across Indonesia, artisanal and small-scale gold mining activities provide livelihoods to more than one million people, spanning 27 provinces (Balifokus, 2015). In broad technical terms, there are two types of ASGM - hard rock gold mining (primary ore) and alluvial gold mining (secondary ore) - each involving a range of ore types (and grades), technologies, mercury management practices and socioeconomic dynamics. Mercury is more heavily used in hard rock gold mining than in alluvial gold mining, although both types of ASGM can result in significant mercury pollution and toxic exposure (Bose-O’Reilly et al., 2010; UNEP, 2013b). National news media coverage in Indonesia has widely stressed that ASGM “costs the nation millions” (Nainggolan, 2015), highlighting ecological and health consequences of toxic contamination. Yet, much like in other countries where mercury has been thought of as an “agent of poverty” in the ASGM sector (Hilson and Pardie, 2006), studies have shown that alternative (mercury-free) technologies (e.g. direct cyanidation) usually require a higher order of economic capital investment and technical training as well as different labour and revenue-sharing relationships, while mercury amalgamation is generally the quickest, least expensive and easiest to manage gold recovery method for individual miners (Veiga et al., 2014a; Spiegel and Veiga, 2010).

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