India

Authors: Kuntala Lahiri-Dutt and James McQuilken

Metallic and nonmetallic deposits in India

Materials mined by ASM

- Barite, bauxite, chromite, coal, copper, diamonds, gold, gemstones, granite, iron ore, limestone, manganese, marble, mica, sandstones, and slate

Centre of Science and Environment, 2018.
Mineral governance framework

Government priorities
- Use satellite and remote sensing technology to map and monitor main ASM areas
- Development of an online National Mineral Information system for investors
- Actively closing ASM coal mining in the east, northeast, and iron ore in south
- Increase mining and quarrying contribution to GDP from 2–5%, much of which might come from ASM, but government favors large-scale and mechanized operations

Laws and policy
- Indian Mines Act, 1952
- Mineral conservation and development rule, 2017 (amended 27 March 2018)

Government institutions
- Ministry of Mines
- Indian Bureau of Mines (IBM)
- Ministry of Coal
- National Institute of Miners’ Health
- District Mineral Foundation (DMF)

Associations and member organizations
- None
**Economic and development data**

### 2017 Population

<table>
<thead>
<tr>
<th>Total</th>
<th>1.339 billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor force</td>
<td>520,194,130</td>
</tr>
<tr>
<td>Women</td>
<td>48.18%</td>
</tr>
<tr>
<td>Men</td>
<td>51.82%</td>
</tr>
</tbody>
</table>

### 2017 Classification (GNI per capita)

- Lower middle income: USD 1,820

### 2017 Gross Domestic Product

- USD 2.597 trillion

### 2011 Poverty headcount ratio

- Population on/below national poverty line: 21.9%
- Population living on <USD 1.90 per day: 21.2%
- Population living on <USD 5.50 per day: 86.8%

**Livelihoods**

### Employment

- ASM (not including quarrying of development minerals): >1–1.5 million directly, 3 million indirectly
- ASM (including quarrying): 12 million
- ASM informality estimate: 80% informal

### Gender participation in ASM

- Men: 60%
- Women: 10–40%

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255 World Bank, 2017b.
256 Ibid.
257 Ibid.
258 World Bank, 2011.
259 See India country profile text for discussion and data sources.
**Figure 10** Indian Average Daily Employment in Mines Disaggregated by Nonmetallic and Metallic Minerals 2015–2016\textsuperscript{260}

<table>
<thead>
<tr>
<th>Nonmetallic minerals</th>
<th>Number of mines</th>
<th>Average daily employment</th>
<th>Production value (INR crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>143</td>
<td>56</td>
<td>221,645</td>
</tr>
<tr>
<td>Fluorite</td>
<td>56</td>
<td>202</td>
<td>61,321</td>
</tr>
<tr>
<td>Vermiculite</td>
<td>89</td>
<td>6,416</td>
<td>39,613</td>
</tr>
<tr>
<td>Diamond</td>
<td>156</td>
<td>6,281</td>
<td>22,797</td>
</tr>
<tr>
<td>Graphite</td>
<td>295</td>
<td>22,797</td>
<td>3,408</td>
</tr>
<tr>
<td>Limeshell</td>
<td>499</td>
<td>22,797</td>
<td>3,231</td>
</tr>
<tr>
<td>Magnesite</td>
<td>932</td>
<td>22,797</td>
<td>1,778</td>
</tr>
<tr>
<td>Apatite &amp; phosphorite</td>
<td>1,048</td>
<td>1,868</td>
<td>1,048</td>
</tr>
<tr>
<td>Sillimanite</td>
<td>1,778</td>
<td>1,868</td>
<td>1,778</td>
</tr>
<tr>
<td>Garnet (abrasive)</td>
<td>1,868</td>
<td>1,868</td>
<td>1,868</td>
</tr>
<tr>
<td>Limestone</td>
<td>22,797</td>
<td>22,797</td>
<td>22,797</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metallic minerals</th>
<th>Number of mines</th>
<th>Average daily employment</th>
<th>Production value (INR crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin</td>
<td>32</td>
<td>32</td>
<td>282,966</td>
</tr>
<tr>
<td>Copper</td>
<td>3,231</td>
<td>3,231</td>
<td>3,231</td>
</tr>
<tr>
<td>Gold</td>
<td>3,408</td>
<td>3,408</td>
<td>3,408</td>
</tr>
<tr>
<td>Bauxite</td>
<td>6,281</td>
<td>6,281</td>
<td>6,281</td>
</tr>
<tr>
<td>Chromite</td>
<td>6,416</td>
<td>6,416</td>
<td>6,416</td>
</tr>
<tr>
<td>Lead &amp; zinc</td>
<td>6,916</td>
<td>6,916</td>
<td>6,916</td>
</tr>
<tr>
<td>Manganese ore</td>
<td>12,213</td>
<td>12,213</td>
<td>12,213</td>
</tr>
<tr>
<td>Iron ore</td>
<td>39,613</td>
<td>39,613</td>
<td>39,613</td>
</tr>
</tbody>
</table>

**Table 9** Employment in Indian Mines Disaggregated by License Category\textsuperscript{261}

<table>
<thead>
<tr>
<th>License type</th>
<th>Number of mines</th>
<th>Average daily employment</th>
<th>Production value (INR crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A = mechanized mines, &gt;150 laborers, &gt;75 laborers</td>
<td>983</td>
<td>462,363</td>
<td>221,645</td>
</tr>
<tr>
<td>Category B = other than A</td>
<td>1,071</td>
<td>26,331</td>
<td>61,321</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,054</td>
<td>488,694</td>
<td>282,966</td>
</tr>
</tbody>
</table>

\textsuperscript{260} Reproduced from data in IBM, 2015–2016, pp. 96–97. Note that certain key Development Minerals such as sand appear not to be captured.

\textsuperscript{261} Reproduced exactly from IBM, 2015–2016, p. 98.
Mining sector summary

With a long history of artisanal mining dating back to 400 B.C., India is one of the countries globally that has substantial ASM activity. The importance of ASM in India is in the variety and geographical spread of mineral and material availability, quality, and production, as well as the significant number of people, both women and men, laboring in the small-scale mines and quarries. Depending on the exact definition used, for example an absence of regular blasting and use of heavy earth moving equipment, and a labor force limited to 150 persons underground and 400 overall, it is suggested that over 95% of mines in India fall into the small-scale mining category. A wide range of minerals are mined in India (Figure 10). As many as 36 of the 64 different fuel, metallic, and nonmetallic industrial metals are mined exclusively by the small-scale sector and another 14 are mined partly by small-scale and partly by medium-scale operations. Yet, data that disaggregate specifically and exactly between ASM and large-scale operations remain scarce, and the sector remains largely informal and poorly supported.

Mineral governance framework

India’s ASM sector has little recognition in the country’s mineral governance framework. The Indian Bureau of Mines (IBM) classifies all minerals into two categories, ‘major’ and ‘minor’, and gives the responsibility of governing the ‘minor minerals’ to the concerned state governments. The central government tends to prioritize large-scale and mechanized mines. This apparent lack of interest in the sector from the central government is further evidenced by the lack of specific legislation covering activities. For example, while a distinction is made between ‘artisanal’ and ‘small-scale’ mining (SSM), with the later generally categorized as being undertaken with acquired mining rights under some statutory control, The National Mineral Policy of India mentions ‘Small Deposits’ (7.12) only once in passing: ‘Efforts will be made to promote small-scale mining of small deposits in a scientific and efficient manner while safeguarding vital environmental and ecological imperatives.’ Currently, the government is encouraging the formation of ‘clusters’ for these ‘micro, small and medium enterprises’ (MSMEs).

There is also no recognition of the history of artisanal gemstone or gold mining in India’s laws, turning many potential licensees into illegal operators by default. The regulations that do exist for the India mining sector are also criticized for their complex procedural requirements, and for lacking certainty, clarity, and efficiency. The archaic Factory and Labour Laws are outdated, the Land Acquisition Act allows the takeover by the government of forested land owned by indigenous people, and the small size of mining properties present challenges to miners. Women are also discriminated against in law: The Mining Act of 1952 prevents women from working in mines underground and at night. As a result, women are not able to find better paying jobs in the larger, industrial mines, leading to the situation in which women’s labor is concentrated in the ASM sector.

As such, the majority of mining operations (80%) in India are informal; they are loosely regulated, poorly recorded, characterized by poor compliance to laws, and use inefficient and rudimentary technology. Principal issues affecting the mining industry are land availability, conflicts with existing land usage (such as forests), regulatory uncertainties, and production inefficiencies.

In terms of the governance of the sector and wider public perception, following the liberalization of the economy in 1993, much in contrast with the constitutional objectives, mining has come to be associated with scams, conflicts, violence, and ecological degradation. Today, the mining industry’s relationship with society is undeniably both critical and under pressure. Rising levels of public opposition and social conflicts are impacting operations in India. For example, the National Green Tribunal (NGT) has played a key role in closing environmentally destructive mines in recent years, leading to the loss of jobs and unrest in north-eastern India; this is especially problematic because neither the NGT, nor NGOs on the whole,
differentiate between ASM, quarries, and LSM. Generally, NGOs are against small-scale mining, and as a result many quarry owners have formed important power groups in mining areas.

In terms of representation of the small-scale miner’s interests, in 2015 the Mines and Minerals (Development & Regulation) Amendment Act, mandated the creation of District Mineral Foundations (DMF) in mining districts. These are set up as a nonprofit body, to work for the interest and benefit of persons and areas affected by mining-related operations, and are funded through royalties from miners. But, in terms of their effectiveness as a mouthpiece for the sector, their operation, composition of representatives, and functions are governed by the relevant state government. Furthermore, while India’s strong tradition of trade unions could help support worker’s rights and improve labor conditions, due to the sector being largely confined to the informal economy, there are no significant independent unions or associations representing the rights and advocating on behalf of miners.

There are some active projects working to improve the livelihoods of the some of the poorest members of society engaged in ASM in the country. For example, the ILO’s International Programme on the Elimination of Child Labour (IPEC) also operates in India with a strong focus on mines and quarries. There are also a number of NGOs (e.g., Mine Labour Protection Campaign, Santulan, Bandhua Mazdoor Mukti Morcha, and Prasar) that are active in either helping organize miners, demanding legal rights, and improving working conditions through programs, such as the formation of a tribal cooperative marble quarry, providing safety gear, acquisition of identification cards to migrant labor, education of quarry workers’ children, and stopping bonded and child labor.

**Economy**

Exact figures on the contribution of ASM to India’s economy are challenging to determine. The Indian Bureau of Mines (IBM) provides a vast annual data set that is very detailed, including statistics, such as the levels of ‘Afforestation in Metalliferous Mines’ and ‘Consumption of Explosives’ disaggregated by the metal. Yet, it fails to determine between large-scale and ASM production.

In terms of production and the contribution of ASM to India’s economy, a range of figures are presented. One estimate suggests that operations produce 10% of the total value of mineral production in the country, but the proportion could be much higher. Another is that small-scale mining contributes 6% of total mining in India. Yet another opposing view is that mining contributes just 2% of India’s GDP, and that its contribution has been declining.

What is certain, however, is that mining, and thus ASM, remains a key economic sector in India both for domestic supply of metals, minerals, and materials for the world’s second largest population, as well as for export. India is the largest producer and exporter of dimension stones, accounting for nearly 30% of world production. Of these stones, in order of production quantity, sandstone and granite are most important, closely followed by marble, flaggy limestone, and slate. There are an estimated 12,000 stone crushing units in India with an annual turnover of over USD 1 billion. In total, formal mining exports amounted to INR 170,946 crore (approximately USD 23.74 billion) in 2014-15. In terms of value, diamond accounted for 83% of the total mineral exports during 2015-16, followed by granite 5%, alumina 2%, and iron ore 1%.

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266 IBM, 2015-2016.
267 Lahiri-Dutt, 2008.
269 Federation of Indian Chambers of Commerce & Industry, 2013.
270 IBM, 2015-2016.
Livelihoods

Exact and recent figures are difficult to obtain. According to the outdated ILO estimate, which do not appear to include all forms of quarry workers, 1-1.1 million people directly are said to work in ASM.271 Another publication, which is also now over a decade old, reports that over 1.5 people directly and 3 million indirectly are estimated to work in India’s ASM sector.272 However, given the lack of data on seasonal workers and the migrant laborers who circulate from one location to another, the number of people mining directly may be twice as high, at an estimated 3 million.273 The stone crushing sector alone, which is predominantly informal, is estimated to provide direct employment to over 500,000 people.274 Another estimate calculates there are 12 million quarry workers alone in India.275 This is in addition to the 3 million small-scale miners that are estimated working other metals and minerals, bringing the possible total up to 15 million (taking the lowest figure).

Yet many of these figures are unreliable. Census data provide employment figures in the occupational category mining and quarrying, thus clubbing together both ASM and LSM. These data also provide information on ‘Main’ (full time) and ‘Marginal’ (casual, part-time, seasonal) workers. However, the division of ASM and LSM is not clear. As outlined, the IBM does not disaggregate production data between ASM and LSM. However, it does, as per Rule 42 of Mineral Conservation and Development Rules, 1988, collect data based on two types of mines: Category A is based on > 150 total laborers, > 75 working underground and Category B on “other than A.” Thus, Category B figures can be small-scale operations, as well as a proportion of Category A. For metallic and nonmetallic minerals in 2015–2016, on page 93,276 it states there were a recorded 471 Category A mines employing 82,000 persons daily (Figure 10). Yet, on page 98 where the figures are tabulated, the table shows 983 mines employing 488,694 people—clearly there is an error in the report. The numbers on both pages tally for the 1,071 Category B mines, which are recorded to employ approximately 26,331 people. Given the total combined figures (2,054 mines, employing 488,694 people) it is assumed the Category A numbers on page 98 are correct (Table 9). Yet this oversight demonstrates the challenges with obtaining reliable data. The contribution of the mines to the total value of these nonmetallic minerals and metals in the same period, was 78% and 22%, respectively.

As elsewhere, the ASM sector in India is a reservoir helping to support the livelihoods of some of the poorest people. Using national survey data, Siddiqui and Lahiri-Dutt (2015) estimate that more than 42% of the approximately 1.4 million people from households engaged in mining and quarrying are considered to be marginal, or extremely vulnerable, without secure jobs, and living in extreme poverty (those defined as living on less than USD 1.90 per person per day). As with other artisanal sectors, such as carpet weaving and bidi (indigenous cigarettes) making in India, unacceptable forms of child labor and debt bondage are not uncommon in quarries.277 This is a particular feature of ASM in the country due to rural economic stagnation, caste-based social structures that sometimes sanction such exploitation, and the existence of semifeudal social structures.

Overall, the work in ASM is risky and unsafe, with none or limited personal protective equipment used. In terms of the methods of extraction, due to the lower barriers of entry, costs, and technical expertise required, as well as the higher value of precious or rare metals such as gold and tin, minerals such as mica, gemstones, and diamonds, or fuel resources such as coal, these resources are often the focus of artisanal activities. Stones and marbles, on the other hand, are largely extracted by more formalized, industrial, and larger small-scale mining operations.

272Lahiri-Dutt, 2007; Deb et al., 2008.
274Divya et al., 2012.
275Lahiri-Dutt, 2008—see section “Methodological Challenges of ASM Data.”
277Gunasekaran, 2014.
Women face particular gender-based discrimination in ASM, both in law and social norms. Despite women comprising 10–40% of the ASM labor force, with their participation depending on the type of commodity mined, they are often confined to lower level and poorly paid roles. In general, women do not own mining leases in India. Other factors determining women's participation include production technology, size of the operation, and remoteness of the mine location. As outlined, women are not legally allowed to work underground, but it is not uncommon to find women toiling in shallow underground quarries. There are very limited official data on the significant contribution and essential roles that women play in India's ASM sector. However, census data on occupational categories do provide some statistics regarding the number of women employed as both full-time and part-time workers in the mining and quarrying sector, as well as descriptors of their socioeconomic condition. In terms of specific commodities, stone quarrying employs the largest number of women, while artisanal salt extraction has the largest proportion of women involved.

**Key data needs**

Overall, little is being done by the government to improve the poor and exploitative labor conditions, and to address the root causes, that is, rural poverty and uncertainties of solely farm-based livelihoods. More detailed, disaggregated, accessible, and reliable data on ASM will be a first step toward improving the situation by drawing attention to the poverty, exploitation, and unsafe working conditions, and helping support the wider formalization, development, and improvement of ASM in India. Specifically, there is a need to produce, and make publicly available, the following data:

- Total numbers of full-time and part-time, seasonal and casual workers in the LSM and ASM sectors
- Accurate and reliable production figures for all commodities extracted by LSM and ASM sectors
- Variations in wage rates between women and men in both LSM and ASM sectors
- Mapping of the value chains of different mineral commodities, value added and the various actors involved
- Export figures (both the quantities and values) of ASM mineral commodities

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279 Mukhopadhyay and Lahiri-Dutt, 2014.
References


——. 2018. *India Map of Minerals*. Available at www.cse.org


Gonzalez, D. 2016. Opportunities, not oppression, to stop illegal mining in the Peruvian Amazon. Available at https://yaleglobal.yale.edu/content/opportunities-not-oppression-stop-illegal-mining-peruvian-amazon


Hruschka, F. 2018, November 22. Personal communication and feedback following review of an earlier version of this report.


MANAGEM. 2018. MANAGEM website. Available at http://www.managemgroup.com/


NSO. 2016. *Artisanal and Small-scale miners’ survey summary*. NSO and SDC.


Olivero, J., Mendonza, C., and Mestre, J. 1995. *Hair mercury levels in different occupational groups in a gold mining zone in the north of Colombia*.


UNDESA. 1972. Small Scale Mining in the Developing Countries. UNDESA Resources and Transport Division.


UNDP, UN Habitat, and Global Taskforce of Local and Regional Governments. 2016. Roadmap for Localizing the SDGs: Implementation and Monitoring at Subnational Level.


UNEP. 2012. Analysis of formalization approaches in the artisanal and small-scale gold mining sector based on experiences in Ecuador, Mongolia, Peru, Tanzania and Uganda. Geneva: UNEP.


Université du Québec à Montréal. n.d. Baseline Survey of Small-Scale Mining in Kyrgyz Republic.


