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Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development

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Abstract

Informal mining activities provide livelihoods for millions of poor in mineral-rich developing countries. Yet, they continue to remain one of the least understood areas in mineral resource management. While its poverty reduction potential is acknowledged, the heterogeneous forms of mining that come under its purview are not well discussed. This article aims to draw attention to the politics of definition by briefly introducing the reader to the nomenclature currently used to describe such mining activities. Then the article examines the nature of informality that justifies the name, and then illustrates the claim by documenting a range of informal mining practices in India with cited examples from other Asian countries. It illustrates the variations in social-economic, technical and legal characteristics, by putting such mining in a community and participatory framework. Finally, the article discusses ways to move towards sustainable development with community participation in mineral-rich areas of developing countries.

Keywords: Informal mining; Artisanal and small-scale mining; India; Indonesia; Definition of informal mines.

Once there was a king who asked his adviser, 'how many crows are there in my kingdom?' adding that if he did not give the correct answer, his head would be cut off. The adviser thought carefully for a moment, and said: 'sir, I will tell you, and if you do not believe me, you can always count them'. 'Fool', shouted the king, 'how can I count them? Tell me at once!' 'Well sir', the aide replied, there are exactly 999,999, and if you find less, then obviously some have gone away, and if you find more, then some must be visiting' (An old Indian fable).

1. Introduction and background

Certain economic activities, such as informal mining pursued by poor people in developing countries, are rather difficult to quantify. The essential feature of informal mining is that there are few if any official records. The entire activity is unorganized and often escapes documentation because of the questions of legality attached to it. Even those informal mines that are regulated and legal do not generate much official data, due to their small and scattered nature and low profit margins. Whereas there are official records on large and formal mines, controlled by national and international regulations, informal mines are an elusive, unquantifiable and uncertain section of the mineral economy.

In developing countries, the informal activities in both urban and rural sectors constitute a large, if not major, portion of the economy and continue to draw the attention of scholars. In mining, however, most of the emphasis has, up to now, been on the formal mining sector. Research on informal mining has generally been country-specific, with little attention being paid to the diversity within the sector. Little or no attempt has been made to put such mining practices in the theoretical domain of the community-mining interface. Although not well documented, the informal mining sector in developing countries employs an immense number of people extracting low volumes of minerals from small deposits. Worldwide, approximately 13 million people engage in this low-paid, labour-intensive, physically demanding mining work, in which, due to low profit levels, neither occupational health and safety nor environmental issues are given much priority, if any at all (International Labour Organization, 1999; Labonne and Gilman, 1999). Carman (1985) suggested that, in 1982, about 16% of the total value of non-fuel minerals production came from mines with a capacity of less than 100,000

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tonnes per annum. Noestaller (1987) estimated that 31% of global mine production of industrial minerals, 20% of coal and 12% of metals, came from similar small-capacity mines. The mineral resource extraction situation has changed drastically since these estimates; small-scale mining has expanded in developing nations, driven by increasing population pressure and limited alternative income sources in rural areas; this development has been accompanied by environmental degradation. Consequently, recent estimates would show a much larger share than those assessments; informal mines may now even dominate the mining sector of a country such as Tanzania, where less than 3,000 people are employed in formal mining operations compared to more than 500,000 in small mines using artisanal techniques (World Bank, 1998). Informal mines are prevalent in all mineral-rich developing countries, including India (Sahu, 1992), Indonesia, Pakistan (Malik, 2001), Peru, the Philippines, Tanzania and Zimbabwe.

Against the background of these facts, the overall aim of this article is to:

- Elaborate and extend the concept of 'informality' in the mining context as well as to point out formal-informal linkages;
- Put informal mining in a theoretical framework through a description of the diversity of practices and miners; and
- Generate a mineral resource management study that includes poor communities and formulates recommendations for sustainable development policies in mining.

Three case studies are used to achieve these objectives: stone quarrying, gold panning and illegal coal mining in India. The further intention of the article is to give the mining research community an understanding of the social science perspective of the economics of small-scale mining in communities. The author's previous work[1] has found that the best way of collecting statistics on the informal resource management of poor and indigenous peasant communities is through in-depth — and time-consuming — repeated personal interviews and group discussions, observations and oral histories. The findings of this article are moreover based on official quantitative information and secondary data from government sources and the mining industry, wherever available.

2. The politics of definition

> *Definitions are tools, not truths, their value determined in use, not in terms of their approximation of some transcendental ideal. . . . Disputes over appropriate definition are thus political conflicts* (Sederberg, 1984: 94).

The variation in definitions describing the range of informal mining practices reveal an ambivalence among the world's mining institutions towards informal mining. Apparently innocuous definitions implicitly tell of the agenda of the name-giver: 'small-scale mines' as per International Labour Organization (Jennings, 1999), or 'artisanal mines' by United Nations (1999). The first emphasizes the size factor, without clear reference to vital questions such as whether it is dealing with volume of production, or of investment, or area or labour involvement. This creates a false dichotomy between large versus small mining.

The second stresses the nature of production, whether the mines are referred to as traditional work or as small-scale production. Interestingly, the United Nations has deviated from its earlier position by using 'artisanal' as against 'small-scale' as in its 1972 document (United Nations, 1972). The nomenclature is important, because it indicates that there is indeed a challenge here.

Informal mining occurs in both industrialized and developing countries, but with marked differences. In industrialized countries, the smaller mines tend to use technological inputs, with a skilled workforce using state-of-the-art machinery. The return to investment tends to be high because of the capital-intensive nature of operations (Burke, 1995).

On the other hand, artisanal mining differs in a broader way from informal mining in industrialized countries. In my view, artisanal works in general imply a traditional activity, requiring considerable skill that is usually created over generations of craft-based living, often passed from one generation to the other within the family. However, the term 'artisanal' is quite common for describing other primary resource activities, such as fisheries. In this way, Gulbrandsen and Savins (1987) use the term to describe traditional fishing folk in Fiji. In relation to mining, the Mines, Minerals and Sustainable Development report (IIED/WBCSD, 2000) compromised to combine aspects of both size factor and production process by describing them as 'artisanal or small-scale mining (ASM),' even going to the extent of differentiating between artisanal, semi-industrial and industrial small-scale mining. One should remember here that the Mines, Minerals and Sustainable Development (MMSD) process, although it made efforts to incorporate civil society, academics, non-governmental organizations and consultants, was funded by mining companies (IIED/WBCSD, 2002). Thus, it is likely that this identification might be biased. The ethical question of whether the client-sponsor relationship influences results, which is a common issue in social research, cannot be ignored in any research.

This article makes a case for redefining the range of such mining practices as 'informal' to include both legal and illegal operations of small size, labour-intensiveness and low returns. Such a redefinition is especially needed in view of the roles of local communities in these mines and in order to fully appreciate those roles. In fact, even the MMSD

[1] See Lahiri-Dutt (2002), for example.

report refers to the elements of 'informality' inherent in small-scale mines (Hentschel *et al*., 2002; Lahiri-Dutt, 2003; also Graulu-San, 2003; and Biller, 1994). The countries in which such mining occurs invariably have large segments of their economy in the informal/unorganized sector, a fact that reflects upon the mining economy as well. This article explores the diversity within the informal mining sector in order to understand community issues in mineral resource management. The case studies in Asia, described below, focus on India and Indonesia, both being large mineral producers with complex mineral resource issues.

3. Selection of Indian and Indonesian cases

India is an important mining country in Asia, producing over 300 million tonnes of coal per annum, and 84 other minerals (Dhar and Thakur, 1995). Several major multinational mining companies, including some from Australia, are building up extraction interests in India. With regard to stone production, India stands seventh in the world.[2] Much has been written about the Indian mining industry by its huge technocracy (Dhar and Thakur, 1995), but as Vicziany (1998) rightly pointed out, a much greater emphasis has been put on the physical footprints of environmental degradation, rather than social development.

The conflicts over development and displacement in India have been well recorded. Whereas the Government has hesitantly accepted participation rights of communities over forests,[3] no such response has taken place in the mining sector. Again, the situation is indeed volatile as the nationalized mining industry is now undergoing a process of disinvestment due to the economic liberalization that changes the role of private capital. The country has a rather poor statistical base, and there is a lack of clarity regarding the role of the informal mining sector with characteristic bursts of violence and conflicts.

Excellent comparisons can be drawn with Indonesia, the biggest minerals producer in Southeast Asia, with 60 million tonnes of coal annually (Aspinall, 2001), and one of the world's most important mineral producers, both economically and environmentally (Flavin, 2001). It also has one of the highest levels of biological diversity (Mittermeier *et al*., 1997), and its natural resources are vital to Indonesia's Government, its citizens and to the international community. The country's national economy is based on resource extraction, and resource-dependent rural communities comprise 60–65% of the population (World Bank, 1998; Indonesian Bureau of Statistics, 1998) Conflicts of interest between State and people have assumed critical proportions (Simatauw, 2002). The degree of environmental damage caused by informal mines, the complexities of resource ownership and the fact that about 75% of labourers in informal mines come from outside, make Indonesia an interesting case. A Mbendi profile on Indonesia cites these as issues that need to be addressed (Mbendi, 2004). In both India and Indonesia, strong anti-mining movements have begun to voice their dissent (Moody, 2002).[4]

In India, all natural resources belong to the State, although tribal land is non-transferable to a non-tribal. However, the legal loopholes, such as the Coal Bearing Areas Act, 1973 and poor control, combined with widespread illiteracy among indigenous communities, have created situations where the legal ownership of the resource is entirely by-passed (Lahiri-Dutt, 1999). However, unlike the forest sector, the mineral sector has yet to respond to the needs of local communities through the identification of common pool resources and livelihood issues. Still, 'deedless' customary lands, such as *gair majurwa* (Lahiri-Dutt, 2002), continue to pose severe problems in mining regions inhabited by *adivasi* (indigenous) communities. In Indonesia, indigenous community-based property rights and systems of governance have been obscured by broad claims of State authority to control natural resources for the national interest; this has led to environmental injustice (Lynch and Harwell, 2002).

Thus, although the situation is specific to each country, cases of informal mining from India may give us a clue to understanding the various urgent issues that need to be brought to light and made transparent in the context of mineral resource management. The cases discussed in this paper may help to understand the roles of the local communities in mining, the survival and livelihoods of a large number of poor people, the way local communities enforce their traditional rights over the land in the absence of a participatory process, and how, in mining in developing countries, the formal and informal sectors continually supplement and complement each other.

4. The informal sector

In the 1980s, in the Brazilian Amazon alone, somewhere between 240,000 and 1,000,000 wildcat miners were directly employed in the informal sector mining economy. In Brazil, these informal-sector miners are known as *garimpeiros*, and according to MacMillan (1995) there may have been some 300,000 of them working in hundreds of informal mines (*garimpos*). In India, however, unlike in Brazil, there are no nationally accepted criteria for defining informal mines. As a result, no statistical data are collected, although there is a Chief Mines Officer in each mineral-rich district, who gives out licenses for quarrying activities, such as sandstone mining. Chakravorty (2001) provides some revealing figures: such mines constitute about 90% of the total number of mines (about 8,700) and produce about 42% of the total output of non-fuel and minor minerals,

[2] India is the third largest coal producer in the world.

[3] See http://www.teriin.org, http://www.iifm.org and http://www.jfmindia.org, as well as Karlsson (2000).

[4] See also http://www.jatam.org and http://www.mmpindia.org

and 6% of the output of fuel minerals, especially coal. India has a long tradition of various folk and artisanal crafts and industries, which are always in the purview of the Government's policy actions. These are different from informal mining, which has not been identified as an artisan craft, nor has it received government support. Given the large bureaucratic structure revolving around the mining industry combined with the importance ascribed to the revenue-earning capacity of mining in a 'nation-building' agenda, this silence indicates an acceptance of informal mines along with the formal ones. The small segment of this informal mining sector that is actually illegal will be discussed later. In the following, informality itself will be interpreted and then applied to the context of mineral resource management.

The terms 'informal' or 'unorganized' are roughly equivalent with the 'bazaar economy' (Geertz, 1963) and with the 'lower circuit' of the 'upper and lower circuits' (Santos, 1975). The informal sector and its practices take innumerable forms in rural and urban locales. Informal characteristics can arise in all occupations, whether rural or urban, in agriculture, services, and trade or even in manufacturing activities (Hossain, 1995; Hye, 1993; Lalitha, 2000, 2002; Gandhi and Banerjee-Guha, 1995). For this reason, much literature (see, for example, Rakowski, 1994; Bhattacharyya, 1996, 1998; Joshi and Joshi, 1976) discusses the definition. The relationship between poverty, squatter settlements and the informal sector is well acknowledged (Sudarshan, 1998; Sethuraman, 1997; Lubell, 1991). Many studies stress the closeness of informality and illegality, including those on the 'irregular' (Dallago, 1990) or 'unofficial' economy (Alessandrini and Dallago, 1987); the 'shadow' economy (Gaertner and Wenig, 1985); the 'black' economy (Heertje *et al*., 1980); the 'underground' economy (Simon and White, 1982); and even the 'subterranean' economy. This connection has long attracted the attention of social scientists.

If Max Weber's (1967) 'action frame of reference' is used, the 'informal sector' pertains to the non-rational realm (traditional or affective) and the formal to the rational (organized or bureaucratic level) realm. The informal sector connotes spontaneous personal preferences, which may be antithetically opposed to the formal. Illich (1981) feels that the informal sector may be dictated by 'vernacular values' (local, homespun beliefs), expressed in affective, non-rational action within the immediate locality. Jary and Jary (1991) refer to the distinction between formal and informal structures as a key variable in organizations. In short, informal mining economies often go along with local autonomy and action. As such, the informal sector is conceptually, methodologically and theoretically difficult to define in terms of its precise nature, size and significance.

The heterogeneity of the informal sector has been well documented (Rakowski, 1994). But this heterogeneity and also the close linkages of the informal sector both with formal and illegal businesses complicate the definition and measurement of its range of practices. The sector comprises small or micro-activities and individual or family-based self-employment; it includes the production and exchange of illegal goods and services, and often relates closely to issues such as the vigilance of laws regarding business permits, zoning codes, tax liabilities, labour regulations, contracts and work conditions, and the lack of legal guarantees for suppliers and clients (Mukhopadhyay, 1998; Roy and Banerjee, 1995; Aziz, 1984; Papola, 1981; Sethuraman, 1981; ILO, 1972). In the mining literature, informal mining is generally associated with illegality.

Informal mines vary from those small in size to those that cover extensive areas, either on an individual or aggregate basis (Lahiri-Dutt, 2003). They coexist with industrial mining. For example, even though India has one of the largest stone industries in the world, it also has small quarries mainly producing building or construction materials of low value concentrated in specific regions. Local villages have traditionally operated informal mines, such as the gold mines in the Cordilleras of the Philippines (see Carino, 2002), however, other informal mines are entirely operated by outsiders. Some informal mines may have women workers in large numbers, whereas others may be as masculine in operation as every major Australian coal mine. There are operational variations of many sorts, not only due to geological factors, which are neither clearly understood nor widely studied.

In Indonesia, formal mining provides a large source of revenue for the country, but informal mines are widespread (Boulan-Smit, 2002). The earnings from formal mining have rarely been used for regional development, nor have the resultant economic impacts been socially balanced (Kiroyan, 2001). These factors give rise to unrest among poor peasants (Marr, 1993). Ballard (2001) used a human rights approach to deal with the mining sector in Indonesia. He pointed out that the economic crisis in Indonesia in the late 1990s had much to do with the largely unregulated small-scale or artisanal mining operations. McMahon and Subdibjo (2000) reviewed the physical impacts of such mining in Indonesia and gave a detailed account of an illegal mechanized mine in Kalimantan. They found that current land access and land appropriation laws in Indonesia deny customary land and resource rights to local communities. This possibly might be an important reason for the mushrooming of informal mines.[5] The relation between the formal mining expansion and the spread of informal mining is an area worth exploring. The main interfaces are land and labour issues arising in areas of formal mining, accompanied by the failure of either the mining companies or the respective national governments to resolve them.

Environmental degradation and lack of subsistence livelihoods or alternative occupations are often the driving force in unauthorized informal mining. Alfa (1999) recognizes

[5] See Fitzpatrick (1997) for a detailed analysis of the incompatibility of rights to land under *adat* or customary law and the Basic Agrarian Law or BAL of 1960.

that grinding poverty in Niger has led to the development of small-scale mining, which — despite low profits and high risks — is the most widespread activity as it provides a way of survival for people in local communities. Martinez-Castilla (1999: 31) describes 'traditional' and 'informal' mining as being caused by '*the economic crisis, urban unemployment in the cities, poverty in the agricultural areas and the violence that prevailed in the 1980s*.' This has given rise to social phenomena, such as increasing individual, family or collective migration to areas other than the place of origin, in a search for safety and economic survival. The relationship of the local community with informal mining, especially where related to intense poverty and exclusion from formal mineral resource management, remains a problematic area of research.

5. Informality and legality

Informal mines are not always illegal, although they are usually perceived as such. Legality depends on the particular country's licensing policies as well as the responsiveness of the political infrastructure to the physical, social and economic issues arising in mining regions. In mining, the unofficial, clandestine economy is generally seen as informal, and is often associated with illegality. Informal, small mines in India, which are supposed to come under the same legal regulations as the larger ones, tend to flaunt applicable rules in connivance with corrupt local police and administrators. Thus, it is not unusual to find small mines, such as stone quarries, run by outsiders operating on the lands of indigenous people that are legally non-transferable (Lahiri-Dutt, 2003). In Indonesia, the Mining Law 11/1967 makes all small mines illegal, including traditional gold panning, though strictly speaking, it is a non-legal resource management activity. In Indonesia, informal mining has become more intensive and more diverse since the advent of democracy, and has expanded from diamonds and gold to include tin and coal.

The history of mining is characterized by the struggle for monopolistic control by large, multi-national or state-owned, formal mining companies to impose legality in the sector. Historical accounts of the gold rush in different countries at different points in time give a picture similar to what is happening on the ground in India or Indonesia today. Dominated by the external sources of legitimacy in the last 100 years or so, ordinary people have left the formal mining sector and its various demands. The process is correlated with increasing demands for resources, population pressure, and regulations that exclude some miners. The informal mines thus provide a minimum level of economic independence from governmental controls.

It is important to emphasize that the illegality of the informal enterprises is the result of the regulatory system itself. Low profit levels, inadequate policies and a lack of formal property rights are major factors leading to the illegal status of these activities (Heertje and Cohen, 1982; Alessandrini and Dallago, 1987). The high 'costs of formality' in developing countries also encourage illegality in informal practices in view of the complex, time-consuming and expensive regulations that are almost impossible to observe for small entrepreneurs and which tend to favour large firms (De Soto, 1990; 2001). Moonlighters and informal miners need to stay small and hidden to avoid detection, as they lack legal protection for their investment. This creates disincentives for growth and capital investment (Cross, 1998) and incentives for operating outside the formal norms of economic transactions established by the State and formal business practices. On the other hand, such mining may sometimes be legal (licensed), while flaunting the environmental and safety norms of the country.

The case studies presented below give brief illustrations of the range of informal mining. At one end of the spectrum are small and scattered stone quarries, which are legal and can have different levels of capital investment. At the other end are large, unauthorized mines, which can again be operated by local people, migrants or mafia warlords.

6. Three examples of informal mining

The following three examples of informal mining in India are briefly presented here to illustrate the above points. They represent:

- Licensed privately-owned stone quarries on *adivasi* land in the Pakur region of the Rajmahal Hills on the West Bengal-Bihar border;
- Non-legal, subsistence gold panning operations by indigenous families in the Subarnarekha River near the Ghatsila-Moubhandar area of Jharkhand; and
- Illegal coal mining in North Karanpura, Jharia and Raniganj fields of Jharkhand and West Bengal in the wake of new large mines and displacement of *adivasis.*

These case studies indicate the range of informality in mineral resource management and show variations with regard to key dimensions such as customary rights over natural resources, formal-informal linkages, legality and gender roles — besides physical environmental management aspects.

6.1. Stone quarrying in the Rajmahal region

Quarrying is a form of mining distinguished by the fact that the product is for building or architectural purposes, rather than being destined for further processing. India is the largest producer of dimensional stone, with 27% of world production, and is a major exporter. Much of the stone, especially basalt with a low profit margin, comes from quarries of various sizes. However, compared with marble, there are no data on basalt. Most of the basalt quarries belong to the informal sector, and the Rajmahal region

comprises one of the most important producing regions in eastern India.

Stone quarries in the Rajmahal region, locally called *pathar khadan*s, are small operations that proliferate next to each other, forming large clusters. These quarries have large numbers of women workers (Chakravorty, 2001), and they even employ bonded persons and children (Alfa, 1999). The Rajmahal basalts are bluish green in color, hard and heavy, and have proved to be the best quality of all such building and construction stones of Asia for their ability to withstand great pressure. This factor may have been a catalyst in creating a large agglomeration of small stone quarrying operations, or *khadan*s, unparalleled in the country. The technology of the stone quarries is very simple, the only mechanized unit being the crusher. Geo-physical conditions are also favourable, as the resource is found in the low hills (at 60 to 80 m elevation), and very good quality basalt, most suitable for economical extraction, is easily accessible. In such topography, the amount of labour required to remove the overburden is minimal, as hard rocks are available near the surface. Stone quarrying, a highly labour-intensive industry, has utilized the locally available cheap labour of the neighbouring indigenous communities. Low labour costs ensure high labour-intensiveness. *Adivasi* men have joined the quarries as wage labourers along with women working as partners to their male counterparts.

Initiated during the colonial period, the *khadan*s have flourished in recent decades. Strangely, not much of this is recorded by Government of India documents. Only the Census Report of 1961 gave an inventory of the number and locations of stone crushing units in different parts of the districts of Santhal Parganas and Birbhum. Later censuses have completely ignored this industry, despite the very rapid growth of the *khadan*s. The building boom after the independence of India gave the first impetus to the quarries at Malpahari, and in the area between Pakur and Maharajpur. Numerous small quarries also grew up outside the principal clusters of Malpahari and Rajgram, to supply boulders and ballast to the crushers located near the railway loading sites at Pakur. Many of these quarries were ephemeral operations and were soon abandoned, but some of them survived in spite of the of poor transportation system based on bullock carts. At present, approximately 260 quarries operate in the region stretching from Rampurhat in the south to Sakrigali in the north, straddling the Bengal-Bihar border. Three phases of growth of the Rajmahal stone quarries can be associated broadly with three different locations: riverside (1870–1900), rail side (1900–1960) and roadside (1960 onwards) locations, the last thriving in the last two decades (Lahiri-Dutt, 2003).

Though the growth of this informal industry continues unabated until the present, it remains largely unrecorded and unorganized, even where operating legally under individual, licensed ownership. The aspect of illegality often arises in relation to land ownership; many of the quarries operate on 'non-transferable tribal land' that is being used for quarrying through various corrupt practices. Whereas the quarries are all worked by local indigenous labour, the owners are non-local, originating from other states and regions of India, often being persons who have business interests in adjoining areas, such as in retail and wholesale trade, transport and manufacturing. Trucks, privately operated by companies, carry out most of the transportation. As stone work in the *khadan*s is a rudimentary extractive industry, with nearly all the labour done manually, the largest cost component is wages. The labour-intensive character of *khadan*s has made them an easy form of capital investment with a high rate of return. However, the workers do not benefit from the labour-intensive character of the industry. In fact, respiratory diseases (as well as tuberculosis) are common and cause early deaths, and the *adivasi* labourers are not tied to any particular quarry work, which is highly seasonal in nature. The quarry owners do not offer any medical facility, and the nearest hospital is many kilometres away from the *khadans*.

There is no doubt that the stone quarries of the Rajmahal region, licensed but not subject to government monitoring, have had devastating effects on the regional physical environment. It should be noted that large-scale coal mining, which is subject to government control, has also had severe environmental impacts. Derelict lands, huge quantities of dust in the air, abandoned pits, overburden and waste dumps, devegetation, soil erosion and degradation, desiccation of springs, reduction in surface run-off, and encroachment on agricultural lands are significant physical impacts that result from stone quarrying activity in Rajmahal (Das, 1993).

6.2. Gold panning on the Subarnarekha riverbed

The Subarnarekha River, a river system separate from that of the Ganges, courses through the state of Jharkhand[6] in eastern India and flows into the Bay of Bengal. The land through which the river flows comprises old erosional surfaces – Ranchi and Hazaribagh plateaus, separated by a steep scarp – was once covered by forests, but has now been degraded into dry deciduous and scrub jungle. The region has a very complex geological structure, with a number of plateaus and remnants of hills, with a richness of mineral resources that has inspired experts to call it 'the museum of minerals in India.'[7] The Subarnarekha River, flowing from the Chota Nagpur Hills, brings traces of gold in its alluvium. It is an ephemeral stream, carrying huge quantities of silt in its waters during the monsoon months

[6] In 2000, the southern part of Bihar was constituted as a separate State of India under the name Jharkhand, meaning literally 'the land of forests' (*jhar* is forests or jungle and *khand* is land, including hills and plateaus).

[7] Subarnarekha, 'streak of gold,' from s*ubarna,* meaning gold and *rekha,* line; the name indicates that the existence of gold in the river's sand was not unknown.

of July–September. The seasonal variability of its flows has prompted the construction of storage reservoirs, such as the Dimna Lake, serving the steel city of Jamshedpur. More recently, the ill-conceived Chandil Dam project, funded by the World Bank, is still incomplete after many years of construction. The dam has had a particularly negative impact on the livelihoods of local *adivasi* villagers, as the amount of silt deposits has decreased significantly due to the dam. This has resulted in a loss of livelihoods for local communities, which have now turned towards alluvial gold panning for subsistence. Along a stretch of about 40–50 km of the river, thousands of men and women start early in the morning to pan gold from the silt. Originally farmers, these villagers have learned to supplement their sporadic incomes with gold panning on the riverbed.

The *adivasi* groups of the region have a wide variety of cultural and economic systems. These communities have lived on this land for thousands of years, tilling the land in small clearings or gathering food from the forests, hunting and fishing or producing crafts for a living. Through these ordinary day-to-day practices, they have maintained distinct cultural forms in kinship, language, religion, art and aesthetic systems. The special and spiritual relationship of indigenous peoples with their land has encouraged the enactment of legislation against the alienation of traditional lands of indigenous peoples. However, as we have seen before in the case of stone quarries, large resource projects often receive priority over the interest of the local *adivasi*s. Hence, the Subarnarekha dam project was planned to provide irrigation water to the Orissa-Bihar border region. It caused several villages to be displaced and consequently, many of the *Mundas, Santals* and *Kumhars* are now engaged in gold panning along the riverbed.

Gold panning on the Subarnarekha River is a simple operation. The coarse, black gold-containing alluvium is washed, about 2–4 kg at a time, in a *kerwa*, or a wooden bowl or tray. Some fishing communities, such as the *Layak*, who have lost their traditional livelihoods, are now involved in gold panning. A group of women cross the river in a boat from Maisarda Village early every morning, except during the monsoon season. The women use a spade, locally called a *kudal*, and often cut the gravel and stone flakes on the rocky river bank. They wash away the stone and mud to finally get the black deposit, which sometimes contains a speck of gold. The tiny piece of gold is carefully kept in a leaf of a local tree, *palash*, then tucked into the finder's waistband. Gold panning comes to a near halt in summer when very high temperatures make it difficult to stand or walk on the sand. In Kharsawan, for example, an entire village of *Mundas* is now involved in gold panning. Traders from the nearby urban centres visit the periodic markets to buy the gold from them, the average daily income being highly variable, between Rs 50–500 (US$1–10). Sometimes, gold panning is a complementary activity to fishing and cultivation, which provide food when the river is in spate during the monsoons. One villager in the village of Sarikela-Kharsawa stated: '*There seems to be a relation between the river and the gold panning. There are not only adivasis but other communities as well doing this. Such people treat this as a business or an occupation for a living and earn enough for their labour*.' According to another respondent, however, the practitioners of this occupation are mostly local villagers, who need to supplement their income, since the reservoir of the Chandil Dam has displaced many of them. This respondent felt that gold panning takes place along the entire course of the river, from Ranchi in Jharkand, to West Bengal and Orissa. The availability of gold is greatest following the rains, when gold panning is most profitable. *Mahajan*s from nearby towns throng the local markets (*haats*) to buy the gold. Another villager was proud of the fact that she had learnt the job of gold panning by herself. She noted that previously they used to cultivate locally but now they can earn about Rs 15 a day from panning so most men and even children of the village do panning. The average earning varies between Rs 10–20 a day, which is low, even by Indian standards. The gold is usually sold to local *mahajan*s or to those who visit the *haat*s.

6.3. Illegal coal mining in the North Karanpura, Jharia and Raniganj fields

Coal mining was started in India in 1774 by two Englishmen and picked up as local needs grew. From the beginning, it acquired an 'enclave character' (Rothermund and Wadhwa, 1978), that remained largely unchanged in spite of the enthusiasm of local landlords, and private companies, and continued even after nationalization of the industry in several phases between 1971–1973. Coal mining inevitably led to changes in the social composition in eastern India, as collieries brought in contract labour or *coolie*s to work the mines. Thus, transformation of the social fabric of the region coincided with the processes of changing land characteristics. Local landowning castes were able to reap the benefits of mining. Jobs as *babu*s (supervisors), cash compensations, and other services flourished in this highly urbanized and industrialized belt. Another driving force behind this transformation, that took place in two waves, was the change in the natural environment. In the first wave of change, the forests rapidly gave way to settled agriculture, and land-based castes (tribals) were driven out or turned into itinerant labourers. Once the collieries had obtained surface rights to land, rather than just underground mining rights, large tracts of barren or derelict lands began to appear. In the second (current) wave, a rapid rate of ecological destruction is taking place and modern, capital-intensive technology has aided this process by hastening mineral extraction. As a result, the subsistence base of disadvantaged communities has been undermined, and rural women have commonly been the ones to suffer most.

Currently, there are about 200 open cut and underground coal mines, large and small, operating in the eastern part of India covering the Raniganj, Jharia, and Karanpura fields.

The structure of the industry is highly organized, and three state-owned companies – Eastern Coalfields Limited (ECL), Bharat Coking Coal Limited (BCCL) and Central Coalfields Limited (CCL) – operate in the region. These companies divide their jurisdictions into individual 'areas' under which there are individual collieries, thus giving rise to an intricate administrative hierarchy, partly inherited from the managing houses of the British but also evolved during the last 30 years or so of state ownership. Mining and industrial production in eastern India have flourished since the 1850s, particularly with the establishment of Tata Iron and Steel Company (TISCO) in Jamshedpur in 1907. Later on, in the 1950s, more steel plants were built, and more industries followed. The 'creation of wealth' that followed in the region has not benefited the weaker, more disadvantaged and poorer members of the local communities. On the one hand, large urban centres have appeared, whilst, on the other, massive displacement has led to dispossession and disruption of communities.

A characteristic that needs to be mentioned here is the increased trend to mechanize open cut mines. Currently, the production ratio is 60:40 between open cut and underground mines. Environmental governance is poor in both kinds of mines, but the open cut mines, which have nominally lower production costs, have larger ecological impacts and have caused displacement of *adivasi* villagers of the region. There are also a large number of abandoned underground voids from older collieries, and subsidence is frequent. Mine fires, both spontaneous combustion and those caused by illegal mining nearby, have blighted the land and made it derelict. Overburden dumps and other anthropogenic landforms have more or less completely altered the natural landscape of the region. There is hardly any significant forest cover left and a sprawling conurbation has grown, due to massive immigration. Moreover, agriculture has completely decayed, uprooting the local peasantry. Thus, the mining economy has become the only form of gainful economic activity that can provide subsistence to poor people. It is important to note that the premier mining research institutes of India – Indian School of Mines, Central Mining Research Institute, and Directorate General of Mines Safety – as well as the headquarters of Bharat Coking Coal Limited, Eastern Coalfields Limited and Central Coalfields Limited — are all located here. As stated earlier, the fact of illegal informal mining is a part of everyday life of the region and the mining institutions, company and district administrations are aware of these activities. Some illegal miners work on privately owned land, but sometimes they work in existing mines, or in old abandoned ones. Accidents are almost as common as the sighting of illegally mined coal being carried on bicycles.

In the last three decades of rapid expansion of mining, the consequent decay in agriculture has begun to ravage the region's poor peasantry. This is a result of ecological change due to widespread mining, in conjunction with inadequate state policies and lack of enforcement of good environmental practices. However, the deterioration of the natural resource base has affected even those communities which were never directly engaged in coal mining. The combination of a falling groundwater table, loss of commons, land subsidence, subsurface mine fires, deforestation and destruction of cultivated land by dumping of rocky overburden material from opencast mines, makes survival very difficult for women in the region, especially of poorer groups. Agriculture, the traditional activity of local villagers, has seriously deteriorated over the last two and a half decades under state ownership of the collieries. Much of the cultivation is actually on colliery-owned land and, again constitutes another form of scavenging that goes on in old abandoned mines, and on privately owned land.

7. Conclusions

The three cases discussed above demonstrate the range of characteristics within the informal mining sphere. Most often, those who work on licensed mines do not own them, and operators do not own even some of the larger illegal operations, except in the case of panning for gold on the riverbed, using 'free' resources.

Many small mining operations, such as stone quarrying, are carried out in a legal manner with licenses, but quantitative data about them are nevertheless lacking. The incomes earned from these mining practices are small, and labourers are often compelled to take up such activities in the absence of other productive occupations. The salient features of informal mines are: low levels of mechanization; labour-intensiveness; and considerable environmental degradation. Informal mines have low safety standards; poorly trained miners; a large influx of migrant workers; low pay scales; low productivity levels; and a chronic lack of capital. They operate without concessionary rights; with little consideration for environmental impacts, and are almost always ignorant of existing mineral reserves.

Understanding informal mines is critical to gaining an insight into community and participatory developmental issues in mineral-rich developing countries. Informal mines are generally discussed as being a law and order problem, and causing environmental degradation. However, there are other underlying issues that explain the prevalence of these mining ventures. From another perspective, it is the decaying subsistence base and lack of access to natural resources in the mining regions of these countries that has pushed impoverished rural inhabitants to engage in small-scale mining as an alternative means of livelihood. Whereas some people enjoy the advantages of the increased money circulation resulting from the formal mining economy, the majority is excluded from such benefits, and instead suffers from the depletion of the subsistence base.[8] As local communities

[8] The exclusion of large sectors of the population from the development process is well documented by many experts, such as Fernandes (1992).

often receive inadequate compensation, or no compensation at all, nor any form of economic rehabilitation for agricultural or other lands lost to mining, they find themselves trying to cope with rapid social and economic change by starting mining operations of their own. Some informal mines are thus 'people's mines' in the true sense of the term. These mines may, in some cases, reflect the efforts of communities to re-establish rights over local natural resources.

Informal mining has a specific and inherent value, especially for poor local people. It is an activity that allows them to develop their own capacities and economic potentialities, and to meet the challenges they face due to limited access to subsistence resources. This inherent value is what gives informal mines such relevance to policy decisions in mineral resource management. However, it is still difficult to say exactly how informal mining can be conducted in a legal, safe and environmentally sustainable manner. That is an area that needs further study.

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