Mining in Forest Areas - Problems, Causes and Concerns: A Review

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ABSTRACT

India’s rich mineral reserves lie in the same regions that hold its greenest forests. In this review paper, we particularly look at mining in forest areas of India. The discussion shows that mining is not only a direct, but also an underlying cause of forest loss and degradation. It also has a negative impact on wildlife, river systems, tribal livelihoods, tourism and climate. Though India has many laws and acts related to mining in forest areas, it has failed to counter these socio-economic and environmental problems; the only reason is blatant violation of all these laws. Though mining needs to be continued in a sustainable manner, critical ecosystems like forests should not be sacrificed, for short-term gains.

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Mining in Forest Areas - Problems, Causes and Concerns: A Review

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I. Introduction

Exploitation of forests for commercial interests are often promoted by conventional forestry debates. These debates, however, exclude local communities, and hardly mention mining as a cause of forest destruction. For example, after two years of intensive review of the world’s forests, mining is mentioned only once in the report of the Intergovernmental Panel on Forests (1997) to the United Nation’s Commission on Sustainable Development. The Global Forest Resources Assessment, 2005 (Food and Agricultural Organization (FAO) 2006), also mentions mining only once; not as a direct cause of forest destruction, but as a cause of forest fires. According to the State of the World’s Forests, 2007, the world has four billion hectares (ha) of forest, covering about 30 percent of the world’s land area. Deforestation is going on at an alarming rate of 13 million ha a year. Over a period of 15 years, i.e., between 1990 and 2005, the world has lost three percent of its total forest area (FAO 2007). This study only estimates recent deforestation; it however, does not include information about mining-induced deforestation. Though the second part of the report is devoted to selected issues in the forest sector, there has been no mention of mining.

Nevertheless, pressure on forests also comes from outside the forestry sector and one such important cause is mining. Mines can occupy and despoil large tracts of land. Not only the many mines opened during the past few decades, but also the current mining

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2 Important forms of deforestation include illegal logging, illegal land occupation, illegal cultivation, grazing pressures, unsustainable agriculture, the demand for fuel wood and charcoal to meet basic energy needs, refugee-related problems, mining and oil exploitation in forested areas not conducted in accordance with national legislation, natural climatic events and forest fires.

3 Most fires in forests and woodlands today are caused by humans – either for conversion of forests to agricultural lands; maintenance of grazing lands; extraction of non-wood forest products; hunting and clearing of land for mining; industrial development; or resettlement.

4 The selected issues include climate change, desertification, forest landscape restoration, forestry and poverty reduction, forestry sector outlook, forest tenure, harvesting, invasive species, monitoring, assessment and reporting, mountain development, payment for environmental services, planted forests, trend in forest products, urban forestry, voluntary tools, water, wildlife management and wood energy.
exploration affects forest ecosystems (Forest Peoples Programme, Philippine Indigenous Peoples Links and World Rainforest Movement 2000). According to a study of the World Resources Institute (WRI), large scale mining and exploration of fossil fuels, with their related roads and energy needs represent the second largest threat (after commercial logging) to frontier forests globally, affecting nearly 40% of all frontier forests classified as moderate or high threat (Bryant, Nielsen and Tanglely 1997). South America leads the list followed by Russia and North and Central America (Table 1).

<table>
<thead>
<tr>
<th>Region</th>
<th>Percent of Frontier Forest Under Moderate or High Threat (i)</th>
<th>Percent of Threatened forest frontiers at risk from Mining, Roads and other Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>77</td>
<td>12</td>
</tr>
<tr>
<td>Asia</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>North and Central America</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>South America</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td>Russia &amp; Europe</td>
<td>19</td>
<td>51</td>
</tr>
<tr>
<td>Russia</td>
<td>19</td>
<td>51</td>
</tr>
<tr>
<td>Europe</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Oceania (ii)</td>
<td>76</td>
<td>25</td>
</tr>
<tr>
<td>World</td>
<td>39</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: Bryant, Nielsen and Tanglely (1997)

Notes: (i) Threatened frontier forests are places where ongoing or planned human activities are likely, if continued over coming decades, to result in significant loss of natural qualities associated with all or part of these areas.
(ii) Oceania consists of Papua New Guinea (PNG), Australia and New Zealand.

Energy exploration, mining and new roads encroach about half of South America’s threatened frontier forests. Over the past decades, exploitation of natural resources in

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5 According to the WRI, “frontier forests are the world’s remaining large intact natural forest ecosystems. These forests are – on the whole – relatively undisturbed and big enough to maintain all of their biodiversity, including viable populations of the wide ranging species associated with each forest type.
Bolivia, Guyana and Suriname, was driven partly by economic crisis. About 85 percent of Papua New Guinea’s frontier forests are under moderate to high threat, primarily from logging, agricultural clearing and mining (Bryant, Nielsen and Tangley 1997). It is calculated that, together with oil prospecting, mining threatens 38% of the last stretches of the world’s primary forests (World Rainforest Movement 2004).

World Wide Fund for Nature (WWF) and International Union for the Conservation of Nature (IUCN) published a report focusing particularly on the impact of mining on some of the world’s most diverse and biologically important forests (WWF and IUCN 1999). They identified five mining hotspots; they are: the Guyana and Andean regions of Latin America; West and Central Africa; the Russian Far East; Northern Canada and the Pacific Rim. The WRI described these areas as “Frontier Forests” (Figure 1).

**Figure 1: Major Mining and Major Forest Areas**

![Major Mining and Major Forest Areas](image)

*Source: WWF and IUCN (1999)*
According to the report, mining threatens the largest remaining tropical forest in Africa. Multinational companies are opening mines in sensitive rainforest areas. Furthermore, the World Bank and International Monetary Fund (IMF) are pressing the governments of these areas to open resources to foreign companies. In Brazil, the Grande Carajas project – world’s largest iron ore mine – has exploited the Amazon rainforest. Together with other projects, this has affected about 900,000 sq km of the forest; 55-60% was either deforested or seriously degraded by the year 1996 (WWF and IUCN 1999). In Indonesia, the Grasberg-Ertsberg in Irian Jaya discharges about 110,000 tonnes of toxic waste every day into the Ajikwa River, threatening over 2000 ha of forest (WWF and IUCN 1999).

The Venezuelan government has opened the Imataca Reserve, which is a pristine forest, occupying 3.5 million ha, to mining. In Sierra Leone, over the last two centuries, forest cover declined from 90% to 18%. Although much of the deforestation took place during the colonial era, forests are still being lost today through mining and other activities (WWF and IUCN 1999). Mining threatens unique boreal forest protected areas in the Russian Far East. This region contains in addition to rivers important for local salmon fishing, rare species like the snow sheep. The development of a massive nickel mine in Voisey Bay, Labrador, threatens the subsistence lifestyle of Innu Nation, one of the last semi-nomadic hunting groups in North America (WWF and IUCN 1999).

In Ecuador and Peru, mining corporations and individual miners clear large areas of forests (Miranda et al. 1998). In Papua New Guinea, nearly 90 percent of the country is still forested. However, more than one third of its forests are already allocated to oil, gas or mining concessions (Miranda et al. 2003). Policies that favour mining and other extractive activities in forested areas will more than likely stimulate forest decline. When these extractive activities generate large economic gains, it could be argued that a second round of effects may lead to an abatement of forest decline (Contreras-Hermosilla 2000).

The 2000 publication of Forest Peoples Programme, Philippine Indigenous Peoples Links and World Rainforest Movement advocates the risks and problems posed to forests and forest dwellers due to mining. According to the report in 1992, the indigenous and tribal people from tropical forests around the world formed the “International Alliance of the Indigenous/Tribal People of the Tropical Forests” at a conference held in Penang, Malaysia, to confront the destruction of their territories and forests.
Conference adopted a “Charter of the Indigenous-Tribal Peoples of the Tropical Forests”. According to Article 26 of this Charter, they called for “the cancellation of mining concessions in our territories imposed without the consent of our representative organizations. Mining policies must prioritise, and be carried out under, our control to guarantee rational management and a balance with the environment". In the case of the extraction of strategic minerals (oil and radioactive minerals) in our territories, we must participate in making decisions during planning and implementation”. In 1996, a conference of indigenous and other forest-dependent peoples, organized under the Intergovernmental Panel on Forests (IPF), demanded that: “no activities must take place on indigenous peoples’ territories without full and informed consent through their representative organizations, including the power of veto”. However, in majority of the countries, these rights are not respected and indigenous people are dispossessed of their lands and resources. As a result, mining continues to affect not only forests, but also forest peoples’ lives and resources.

With this background, the main objectives of this paper are:

1. To discuss the problems related to mining in forest areas of India.
2. To find out the causes leading to this problem.

This article has been organized as follows: the first section is an Introduction to the study where mining in forest areas is examined in the international scene. The second section focuses on mining in Indian forest areas. Section three discusses the impact of mining on forests. Section four discusses the mining legislation in forest areas and violation of these laws. Finally, section five concludes the study.

II Mining in Forest Areas of India

According to the 6th Citizens’ Report of Centre for Science and Environment (CSE) titled, “Rich Lands Poor People: is ‘Sustainable Mining’ Possible?”, ‘almost all of India’s minerals are in the same regions that hold its greenest forests and most abundant river systems. These lands are also largely inhabited by India’s poorest and most marginalized people – the scheduled tribes and scheduled castes – who depend on the very same forests and watersheds for their survival’ (CSE 2008). The average forest cover of the 50 major mineral-producing districts is 11,890,400 ha – about 18 percent of the total

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7 Leticia Declaration on the Management, Conservation and Sustainable Development of all types of forests.
forest covers in the country (Figure 2). The forest cover of the top mining states is above the national average. Chhattisgarh has the highest forest cover (43 percent), followed by Jharkhand (30 percent), Orissa (27 percent), and Madhya Pradesh (26 percent) (CSE 2008).

The Forest Survey of India (FSI), in collaboration with the Indian Bureau of Mines (IBM), Nagpur undertook a study to assess the extent of forest cover in the area leased for mining in three mineral rich states of Bihar, Madhya Pradesh and Orissa. The study focused on five important minerals – bauxite, copper, iron, chromite and manganese. A total of 260 mining leases of these minerals covered an area of 90,695 ha in 1994. Using Geographic Information System (GIS), it was found that 53,217 ha of the leased area is under forest cover, out of which 71% is dense forest and 29% is open forest (Table 2). Madhya Pradesh, Orissa and Bihar account for 45%, 36% and 19% of the cover respectively (FSI 1999).

<table>
<thead>
<tr>
<th>State</th>
<th>Lease Area (ha)</th>
<th>Forest Cover in Mining Lease Area (ha)</th>
<th>Dense</th>
<th>Open</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orissa</td>
<td>37,664</td>
<td>9,764, 9,499</td>
<td>19,263</td>
<td>(36)</td>
<td></td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>31,442</td>
<td>20,388, 3,415</td>
<td>23,803</td>
<td>(45)</td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>21,589</td>
<td>7,564, 2,587</td>
<td>10,151</td>
<td>(19)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>90,695</td>
<td>37,716, 15,501</td>
<td>53,217</td>
<td>(58)</td>
<td></td>
</tr>
</tbody>
</table>

Source: FSI (1999)
To assess the forest cover in the metal mining areas of Orissa (chromite, manganese and iron), the forest cover map prepared by FSI, based on 1997-98 satellite data was overlaid on the composite mineral maps provided by IBM, Nagpur. It was found that out of total 364 leases, 148 leases of iron, manganese, chromite are being operated over 37,664 ha, which included 19,263 ha (36 %) of forest cover. In Bihar, it was found that in 1993, of the total 399 leases of all minerals, 93 leases of bauxite, copper, iron and manganese were being operated over 21,589 ha of area, which included 10,151 ha (19%) of forest cover. Similarly, in Madhya Pradesh, it was found that in 1994, of the 571 leases, 112 leases were operated on 31,442 ha which included 23,803 ha (45%) of forest cover. Therefore, of the total lease area of 90,695 ha, 53,217 ha (58%) was under forest cover. Furthermore, in this study, another important mineral, i.e. coal, was not included. In most coal fields, forest land is required for mining, and more so in open-cast mining. According to Kaul and Banerjee (1996), "the requirement of land for coal

Figure 2: Mining in Forest Areas of India
projects, envisaged during the 8th five year plan is about 98,000 ha of which about 24,000 ha (24 percent) would be forest land. In fact, the largest extent of land degradation by mining is in case of coal. The mining industry renders about 500 ha of land biologically unproductive every year”.

Mining and quarrying has destroyed large tracts of forest land in all the states of India. According to the Ministry of Mines (2008), Government of India, the total forest land diverted for mining in India has been estimated to be as high as 1,14,304.45 ha between 1980 and 2008 (Table 3). Chhattisgarh tops the list, followed by Andhra Pradesh and Orissa. In Chhattisgarh, the mining areas greatly overlap with the forest and tribal areas in the state; and the increasing mining activities and allied industries have had a tremendous negative impact on these (Vagholikar, Moghe and Dutta 2003). According to the Chief Conservator of Forest (CCF) land management’s office, around 12,598 ha of forest land was cleared for mining projects between 1985 and 2005 in Chhattisgarh (CSE 2008). However, over the last three years (2005 to 2008), 8479.54 ha of forest land have been diverted in Chhattisgarh for 52 mining cases (MoEF 2008). The Dantewada district, which accounts for 20 percent of the forest cover of the state, has around 2,010 ha of land under mining, and according to the district report, one third of the forests have been degraded because of mining (CSE 2008).

In Andhra Pradesh, about 18,178 ha of forest land was diverted for mining. This is the second highest diversion of forest land for mining during this period in the country, after Chhattisgarh. The forests in regions like Adilabad, Karimnagar and Warangal, which hold both forest and mineral resources (CSE 2008), are under threat. On April 10, 2006, in spite of all the opposition and protests by the people, the Ministry of Environment and Forest (MoEF) gave environmental clearance to the proposed uranium mining by the Uranium Corporation of India Limited (UCIL) at Nalgonda’s Lambapur and Peddagattu villages, and a processing plant in Seripally. The total leased mining area is spread over 527 ha and the processing plant is about 278 ha. UCIL informed in the public hearing that only a fraction of the area acquired would come under forest land. However, the fact is that about 445 ha out of the total site area of 527 ha lies in the Yellapuram reserve forest (CSE 2008).
<table>
<thead>
<tr>
<th>States</th>
<th>Total Land Diverted (Ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chhattisgarh</td>
<td>21421.42</td>
<td>18.74</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>18178.55</td>
<td>15.90</td>
</tr>
<tr>
<td>Orissa</td>
<td>16795.25</td>
<td>14.69</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>11970.08</td>
<td>10.47</td>
</tr>
<tr>
<td>Karnataka</td>
<td>11046.21</td>
<td>9.66</td>
</tr>
<tr>
<td>Gujarat</td>
<td>9866.40</td>
<td>8.63</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>9501.25</td>
<td>8.31</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>5188.03</td>
<td>4.54</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3638.29</td>
<td>3.18</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>2006.44</td>
<td>1.76</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>1652.34</td>
<td>1.45</td>
</tr>
<tr>
<td>Goa</td>
<td>1453.64</td>
<td>1.27</td>
</tr>
<tr>
<td>Bihar</td>
<td>418.17</td>
<td>0.37</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>359.21</td>
<td>0.31</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>283.16</td>
<td>0.25</td>
</tr>
<tr>
<td>West Bengal</td>
<td>276.91</td>
<td>0.24</td>
</tr>
<tr>
<td>Assam</td>
<td>152.20</td>
<td>0.13</td>
</tr>
<tr>
<td>Other States^</td>
<td>97.14</td>
<td>0.08</td>
</tr>
<tr>
<td>India</td>
<td>114304.75</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Ministry of Mines (2008)

According to the estimates of the Orissa Department of Forests and Environment, 31,780 ha of forest land was diverted for different projects, including mining (CSE 2008). Mining alone accounted for half of the forest land diverted in the state – around 16,795 ha (Ministry of Mines 2008). Over the last three years, Orissa tops the list with 21 approved mining cases. In the forest land diverted for mining (over the last three years), it stands second (6987.39 ha) only to Chhattisgarh.

^Other states include Arunachal Pradesh (59.62 ha), Kerala (29.19 ha), Tripura (8.27 ha), Sikkim (0.04 ha) and Punjab (0.002 ha).
In Madhya Pradesh, about 11,970 ha of land has been diverted for mining between 1980 and 2008. This accounts for 10 percent of the total forest land diverted countrywide. Forest land degradation has been particularly extensive in regions like Panna (diamond mines) and the Amarkantak Forests (bauxite mines) (CSE 2008). Between 1980 and 2008, around 11,046 ha of forest land in Karnataka was diverted for mining activities; this accounts for approximately nine percent of the total forest land diverted for mining in India. Actually, the forest diversion figures could be much higher; there are no records prior to 1980 (CSE 2008). According to the State of Environment Report 2003, prepared by the Government of Karnataka, a major chunk of the mine lease in some districts is in forest areas. For example, 38 percent of mine leases in Chitradurga, 66 percent in Bellary and 96 percent in Chikmagalur districts are in forest areas.

Around 9,866 ha of forest land has been diverted in Gujarat. In its eagerness to promote mining and mineral-based industries, the state government has adopted a policy of denotifying reserved forests, and has turned a blind eye to illegal mining inside forests and wildlife sanctuaries (CSE 2008). According to the Ministry of Mines (2008), nearly 9,501 ha of forest land, i.e. approximately eight percent of the total forest land diverted for mining in India, has been diverted for mining in Jharkhand between 1980 and 2008. This does not include the thousands of ha of forests diverted and devastated by coal mines (CSE 2008). During the 80s, coal companies acquired thousands of hectares of forests in Damodar Valley in Jharkhand for mining operations. In Singbhum district, a similar devastation of forest lands took place during the extraction of iron ore (CSE 2008).

In Rajasthan, about 5,188 ha of forest land has been diverted for mining since 1980. Surface mining has depleted most of the forest cover. An assessment of the area indicates that over a period of twenty years (1971 to 1991), nearly 20 times the area leased for mining has been affected; the area covered by mining has increased by 35 times; the forest cover decreased by 46 percent; the dense forest area by 90 percent; and agricultural land by 12 percent.

Most of the minerals in Maharashtra are found in areas which are rich in forests; for instance, the mineral – rich district of Chandrapur, which is home to dense forests (CSE 2008). According to an official estimate, about 3,638 ha of forest land had been leased out for mining operations between 1980 and 2008. The state accounts for nearly three percent of the total forest land diverted for mining in the country. However, no data is available on the area that may have been destroyed through illegal mining.
The Himalayan states of Uttarakhand and Himachal Pradesh, whose biggest assets are their forests, streams and rivers, are now facing devastation due to mining. In Uttarakhand, the forest land diverted for mining is around 283 ha; and in Himachal Pradesh, it is around 1652.34 ha (Ministry of Mines 2008). Particularly, in the Sirmaur district of Himachal Pradesh, reckless limestone mining has resulted not only in rapid destruction of forests, but also in water pollution. In the Tehri-Garhwal region, the areas leased for mining were next to the forest reserve, which served as the only link between forests and people for purposes of fodder and fuel wood. In Uttarakhand, soapstone and magnesite quarries have also deprived the natives of large tracts of forest land, pastures and farms. Mining at the Khaniara slate quarries in the Kangra district have stripped up to 60 percent of the forest cover, leading to innumerable landslides (CSE 2008).

Mining has completely devastated Goa’s pristine forests. Around 1,453 ha of forest land has been diverted for mining activities. Large areas of forests in the state are not classified under government records; these are private forests or community lands, and hence forest clearance is not necessary here. The economic survey 2005-06 mentioned in its report that, around 2,66,000 sq m of government land is being illegally encroached upon by mining companies. According to a report by The Energy and Resources Institute (TERI), at least 18 percent of Goa’s forests have been lost to mining. In most of the mines, the overburden and tailings are not properly stored and managed. This has hugely affected the forests in Goa.

In Bihar, mining has destroyed the forests of Ramgarh, Rajrappa, Giridih, Hazaribagh East and Lohargada (Vagholikar, Moghe and Dutta 2003). In West Bengal, about 276 ha of land has been degraded because of mining. The Buxa tiger reserve, located in Jalpaiguri district, and spread over an area of 76,000 ha has been the victim of dolomite mining till 1997. One public and several private companies were involved in the mining which caused soil erosion and deforestation. Coal mining in the Patkai hills of eastern Assam has not only destroyed the rainforests in this region, but also caused loss of wildlife, polluted waterways and silted and depleted the fertile agricultural land (Vagholikar, Moghe and Dutta 2003). However, loss of forest cover to mining is a minor issue in states like Arunachal Pradesh, Tripura, Sikkim and Punjab.

Mining and environmental degradation are directly related. A vast amount of cultivable and forested land is permanently rendered useless because of the pits and dumped overburden. This is accompanied by problems like land degradation, downfall in
agricultural production, reduced forest products, change in climatic conditions, higher rate of soil erosion, change in surface water courses and ground water resources. Due to open-cast mining, more than 100 sq km of forest is destroyed, and in addition, a vast area is also used up either legally or illegally by the displaced persons in the process of their settlement (Naik 1993). The following section discusses the impact of mining on forests.

III Impact of Mining on Forests

Mining in forest zones, is a factor of degradation. Deforestation, resulting in elimination of vegetation, is greater in the case of open-cast mines and has short, medium and long term impacts: Deforestation not only affects the habitat of hundreds of endemic species, but also the water bodies that flow from the forests towards other ecosystems and urban centers. Deforestation of primary forests causes a rapid and fluid runoff of rain water, increasing flooding in rainy periods because the soil cannot retain water as it used to when covered by forest (WRM 2004). Mining in forest areas has many direct and indirect impacts. This section discusses the important impacts in different states of India.

Deforestation

One of the major impacts of mining on forest is destruction of forests or deforestation. This is because mines are most often found in forest areas. In addition to the mining site, other related activities such as dumping of waste, construction of roads and colonies for miners, etc. also take up land and lead to deforestation (Ecological Economics Unit 1999).

The coal bearing area of eastern India formed a part of the Chota Nagpur Plateau, which was densely forested even until the early years of the 19th century. These sal (Shorea robusta) forests home to several tribes like the Kols, Santals, Mundas, Bhumijs, etc. Around 1830, as coal mining began to grow as an industry, these forests were cleared to make way for coal mines. The mining activity precipitated the cutting down of the forests in many ways. As the number of mines increased, the forest was indiscriminately cleared to build mining settlements. Further, the extracted coal had to be transported from the pitheads to the industrial areas where it could be used as a source of energy. Thus, in the wake of the coal mines entered the railways. The mines also required timber for the wooden props underground to serve as roof support. In this way, the Chota Nagpur Forests underwent such a rapid depletion that by early 20th
century, much of them had perished before the onslaught of settled agriculture and coal mining (Ghosh 1988).

Rapid environmental deterioration is fast engulfing the forestry belt in the district of Hazaribagh, Giridih and Palamau due to open-cast coal mining activity. The advent of heavy machinery in the open-cast mining activity since the 70s has been responsible for laying bare the vast forest landscapes not only within the mining areas but over the large peripheral zone surrounding such activity (Agrawal 1996).

The Orissa Remote Sensing Applications Centre (ORSAC) studied the impact of mining and related industries in the Sukinda Valley. A comparison of the spatial distribution data of 1994 with that of 1974 has shown that there has been a large-scale degradation of the forest land. Further, the net increase of the degraded forest area increased from 731.88 ha in 1974 to 1828.98 ha in 1994. It was also noted that more than 750 ha of forest land is under the mining activities of different companies. The large-scale deforestation in the area has also hampered access to medical herbs used by women for traditional health care.

A study by Sills et al. (2006) in the Iron ore mining district of Keonjhar, Orissa shows that both forest stock and forest diversity proxied by ‘percent forest around village’ and ‘percent of forest species collected’, respectively, are significantly correlated with the distance to iron ore mines, with correlation coefficients of 0.25 and 0.68, respectively. These correlation coefficients indicate that both quantity and quality of forest increase with distance to iron ore mines. Results on Non Timber Forest Product (NTFP) shows that, households further from mines obtain more benefits from forests compared to those living closer to the mines. The correlation coefficients for all these measures of forest benefits are positive and significant, indicating that benefits derived from forests are higher for villages further away from mines. The Ib Valley coalfield area of Orissa is presently moderate to thickly forested; it was, however, densely forested during the pre-independence time, especially with bamboo, which led to the establishment of a paper mill at Brajarajnagar and the consequent destruction of the forest (Naik 1993).

Rampant mining for decades has turned large tracts of forests in Jharkhand into wastelands. Agriculture has been completely ignored. During the 80s, coal companies acquired thousands of ha of forests in Jharkhand for mining operations in the Damodar Valley. In the Singhbhum district, a similar devastation of forest lands took place for extracting iron ore (CSE 2008). In order to protect the forests of West Singhbhum, not
only the tribals of the area, but also the forest department, are opposing the mining activity in Jharkhand. Forests of Saranda, Kolhan and Porhat divisions – home to Asia’s largest sal forest and an important elephant habitat are being targeted by various companies for their large iron ore deposits. Forest Officers have sent a proposal to the state forest department to declare the area as a ‘virgin forest’, since mining can take place in virgin forests only after exploring possibilities in non-virgin areas. However, illegal mining in and around the forest is rampant. According to the state of forest reports, between the years 1997 and 1999, about 3,200 ha of forest was lost in the Singbhum region. Between the years 2001 and 2003, about 7,900 ha of dense forest was lost in the East and West Singbhum districts (Bose 2006).

The MoEF, the Forest Department of the Government of Andhra Pradesh (2007) mentioned “the bauxite mining area contains moist deciduous type of forest with below 0.4 density with species like Yegisa, Nallamaddi, Chirumanu, Karaka, Jamun, Embalica, Jack, Hillmango and Marking Nut. In addition to it, medicinal plants like Sarpagandh, Nelavamu, Sugandhapala, Asparagus are available in plenty because this area is part of Eastern Ghats, which is a very important ecosystem”. The proposed uranium mining in Nalgonda falls under the Yellapur Reserve Forest, whose vegetation consists mostly of shrubs and bushes. The mining project will cover, in addition to government lands and private agricultural lands (and some non-agricultural) lands, 1,104.64 acres of forest land, including the ‘buffer zone’ of the Rajiv Gandhi Sanctuary, with a known habitat of around 150 bird species (Maheshwari 2003).

Kudremukh of the Western Ghats is rich in iron ore. However, iron ore mining has brought about an ecological disaster to the area. The Kudremukh region in Karnataka is well known for the Shola Forest. Extensive mining operations over the last 25 years have depleted the Shola Forest and replaced them with mountains of mined waste (Assadi 2002). Furthermore, Iron ore mining in Bellary has negatively impacted the Vyasankere Forest and Bellary RFs by fragmenting them. Dumping of waste material has led to loss of topsoil in Bellary Forest. A 2001 study by the Centre for Ecological Sciences of the Indian Institute of Science, Bangalore, pointed out that large-scale deforestation had resulted in an increased flow of silt and iron ore tailings into the Bhadra Reservoir.

Mining, especially surface mining, is extremely devastating, as witnessed in the vast deserts capes created in the iron ore belts of Goa, the limestone belts of Rajasthan, the hills of Uttar Pradesh, and the coal belt of east India, among other areas. In Goa, to the
south of Mollem, the Verlem Forest block in the Netravali Sanctuary to the northeast of Cotigao is under pressure from manganese mining. Mountains of overburden are dumped on evergreen forests (Vagholikar, Moghe and Dutta 2003). A large number of pine trees have been damaged due to mining activities in the Jhirauli magnesite mines area near Almora, in Uttaranchal. Thick layers (4.5 cm) of magnesite dust can be seen from a distance of 6.7 km away from the mine at Kaphligair. The dust accumulations have drastically influenced the ground flora - the epiphytic cryptogamic vegetation like grasses, herbs, mosses and lichens have completely vanished. Roads connecting the mine sites to the main roads are extremely dusty. As vehicle pass, the dust particles blown in the atmosphere ultimately settle on the trees and grass leaves, causing severe physiological disorders (Upadhyaya and Pant 1988).

The lignite mining site located in close proximity to the Narayan Sarovar Sanctuary in Gujarat has resulted in the loss of 1800 ha of forest area and considerable changes in the tree and shrub diversity. The Banaskantha district is rich both in forests, and minerals such as granite, marble, limestone, etc. The MoEF has given approval for the diversion of 190 ha of forest land in the Ambaji range of hills, which has substantial reserves of marble. The Ambaji multimetal mine has already caused a loss of extensive forest area. The ongoing mining for road metal affects the Balasinor RFs in Kheda district. Mining for limestone and quartz in the Panchmahal district affects the Jhalod and Dahod RFs, and the quarrying for road metal affects regions around the Panagadh hills. The Chhota Udaipur RF in Vadodara district is affected by dolomite mining. The Kadipani fluorspar mine has resulted in the loss of 619 ha of forest area in addition to a significant loss of faunal diversity (Vagholikar, Moghe and Dutta 2003).

In Haryana, the Sterculia and Acacia Senegal forests of Khol block of Rewari district have been affected by the slate mining in this area. In December 1996, a Supreme Court judgment brought halt to extensive illegal mining across the country. It was found that in the state of Haryana alone, illegal mining was destroying about 1300 ha of forest land. The forest in the Khaniyara area of Kangra, Himachal Pradesh is sharply decreasing due to mining activities, which have not only destroyed agricultural lands but also disturbed the ecology of the area. (Vagholikar, Moghe and Dutta 2003). Forest Survey of India looking at ‘forest cover in metal mining areas’, shows a high degree of overlap between working mining leases and forest areas in the districts of Balaghat, Mandla, and Shahdol of Madhya Pradesh. Open-cast mining of coal has destroyed vast forest areas of Mirzapur district in UP (Vagholikar, Moghe and Dutta 2003). The coal-rich areas of the tribal state of Meghalaya are in the hands of private owners. The state
government has no control over these areas. Unscientific mining here is gradually destroying the forests causing soil erosion (Ghosal 1998).

**Wildlife**

Mining in forest areas has an important effect on wildlife. Before mining operations started in the hilly terrains of Aravalli Ranges at Zawar in Rajasthan, the area was thickly forested and was full of wildlife. However, with the increasing population in the mine colonies, the demand for domestic fuel, construction of roads, houses, etc., has led to extensive deforestation. The felling of trees and bamboo considerably affected the surrounding environment and wildlife. Presently, the entire hill range of Zawar area looks barren, with almost no vegetation and without wildlife (Paliwal 1985).

Sundargarh and Keonjhar district of Orissa have some of the best forests with abundant wildlife including elephants, tigers and leopards. Mining-related deforestation has led to shrinkage of elephant corridors and an increase in man-elephant conflicts in Keonjhar. The district has seen 61 elephant deaths in the past three years (Das 2005). The Barsua and Kolta iron ore mines and their allied activities have destroyed prime forests and wildlife corridors in the Bonai hills of Sundargarh district. (Vagholikar, Moghe and Dutta 2003). Similarly in Bihar, the Sikni Colliery of Bihar Mineral Development Corporation in Lather Forest Division is destroying the tiger habitat in a ‘rathole’ fashion, i.e., destroying the forest in a scattered manner. The Government of Karnataka, which once declared the rich wildlife habitats to be protected, is now sacrificing them for mining. The Kudremukh iron ore company was given a new lease to prospect for iron ore right in the middle of the Kudremukh National Park, one of the few remaining evergreen forest patches in the state (Kothari 1995).

Some of the most pristine forests in Andhra Pradesh are seen in the Eastern Ghats in the areas bordering Khammam, West Godavari, East Godavari and Vishakapatnam districts. Many of these areas have also been declared as scheduled areas, being home to a large tribal population. A study by the Bombay Natural History Society for the Singareni Collieries Company has looked at the impact of existing and proposed mining in the Manuguru area of the Ashwapuram range of the Paloncha Forest Division in Khammam district. The Manuguru forest is contiguous with Kinnersani Wildlife Sanctuary (WLS) and the Papikonda WLS. The Ashwapuram Forest block, along with the Gongigudem and Kondaiguda Forest blocks acts as a good buffer to Kinnersani and also serves as an ideal habitat for the survival of several species protected under schedule I of the Wildlife Protection Act (WLPA). According to the report, existing mining has caused the
destruction of wildlife. Regarding proposed expansions, it says that interfering with such kind of pristine forest habitat is a matter of high risk (Vagholikar, Moghe and Dutta 2003).

**River System and Water**

Deforestation has consistent effect on surface run-off because of the fact that evapotranspiration from forest is generally higher than that from other land types. This is primarily due to increased evaporation of intercepted water. Deforestation can also increase the amount of snow stored in a catchment in hilly cold areas. Flood magnitude tends to increase if forest cover is reduced. Soil, which is a rare commodity in the hills, has direct relation with deforestation. More deforestation means more soil loss and hence, greater influence on hydrological regime. Deforestation in the areas of mining also results in rapid erosion of the top soil, thereby aggravating problems such as landslides and silting of the drainage system (Rajashekhara 1992).

Almost all the mine areas in the Sundargarh and Keonjhar districts of Orissa are forested, and are major perennial sources of water. It is apprehended that open-cast mining would lead to the disappearance of the streams and pollute the major drinking water sources for the tribal people (Das 2005). The Bailadila mines in the tribal belt of Chhatisgarh have destroyed both forests and rivers. As a consequence of run-off from the mines, a 32 km. stretch of the Sankhini river is called ‘lal pani’, which means red water by the tribal people, as they feel that the earth is bleeding from the wounds inflicted upon it due to the mining activities.

A small project does not necessarily imply ‘less ecological impacts’. Illegal gold mining in the Nilambur Valley of the Karium Muriam RFs in Kerala, although very small in size, is harmful because of its location and the methodology used. The mercury used in the extraction process is poisoning the waterways in the forest. Also in Kerala, the Walayar forests have been extensively affected due to limestone mining (Vagholikar, Moghe and Dutta 2003). In its report to the MoEF, the Forest Department of the Government of Andhra Pradesh (2007) mentioned that bauxite mining in the natural forests of Visakhapatnam district will ruin the perennial water, which is the lifeline for the tribes which live below the proposed mining area.

**Tribal Livelihoods**

In India, most tribes inhabit forest lands that are mineral rich. Their livelihood and economy are closely intertwined with the fate of forests and water sources. Forest
degradation due to mining in addition to other development projects has significantly depleted the ecosystem, rendering the tribal population more socially and economically vulnerable. In the name of development, many mining companies started extracting mineral resources found mostly in tribal areas of the country, displacing nearly 40 lakh people, mostly tribals. Those who owned land became wage labourers. With the advent of mechanization and modernization, these jobs were lost too. Iron, coal, uranium, manganese and petroleum were extracted in large quantities for industrial growth without heeding the life and livelihood of the local communities (Sarangi 2004).

The Keonjhar district in Orissa is a part of the iron ore belt of the country, which has the largest iron ore mines in Asia. The South Asian steel giant POSCO (Pohang Steel Company) has signed a MoU with the Orissa government to set up a steel plant in Jagatsinghpur and for mining iron ore from Keonjhar. The proposed area for mining is covered with dense forests, inhabited by a wide variety of wildlife as well as flora. The tribal communities, which form 74 percent of the population in the surrounding area, are completely dependent on these forests for fuel, fodder, fruits and medicinal plants. The water spring in the area provides water for drinking as well as irrigation. This area was home to several indigenous tribal communities like the Bhumiyas and the Juangs, but many of them disappeared after the mining operations were started. There whereabouts are not known, and is assumed that they had to move away after being robbed of their land and forests (Asher 2006). A satellite picture of mining areas in schedule V areas of Keonjhar district shows the massive impact of mining on forests and environment, which were originally inhabited by scheduled tribes such as Paudi Bhuiyas and Juangs, who are now totally marginalized and whose livelihood has been destroyed completely (Kumar 2004).

Women have no legal rights over land and natural resources. The lives of women living in the coalmining areas of Orissa (Talcher Coalfield) have been seriously affected as not only their livelihood, but also economic and social status, health and security depend on land and forests. Mining has resulted in the complete destruction of traditional forms of livelihood and women’s roles within subsistence communities. Women, when displaced due to mining, also lose the right to cultivate traditional crops; and due to forest destruction, they are unable to collect forest produce for sale or consumption. Abundant medicinal plants are lost due to forest destruction, leaving women without a natural health support system (Bhanumathi 2003).

The Niyamgiri Mountain in Orissa is of exceptional environmental value. In spite of being a rich bauxite reserve, most of its summit, is primarily forested. The local Dongria Konds, who live only in the Niyamgiri Range, have a taboo on cutting forest on the summit. They carve fields on the mountain sides, but do not touch the top, believing it
to be a prime source of fertility. They have kept the summit inviolate, as the abode of Penu (spirits), in particular of Niyam Raja (Lord of the Law). It is the Dongria spiritual values, therefore, that have preserved this forest (Padel 2007).

For centuries, the indigenous people of Jharkhand lived in a harmonious relationship with their environment. Since their lives are closely related to nature, any adverse impact on the environment in which they live will adversely affect their lives also, and vice versa. The large-scale mining and allied activities going on in the Jharkhand region have caused severe damage to the land resources of the area. Vast areas of rich forests and agricultural lands belonging to the indigenous people have been laid waste due to haphazard mining. The North Karanpura Valley contains some of the best rice lands and forests in Hazaribagh district (Areepampil 1996).

The impact of mining is most in areas inhabited by tribal and other forest-dependent communities. Besides physical displacement, mining activities can destroy sustainable livelihoods based on harvesting renewable forest produce and subsistence agriculture, both linked to wild and domesticated biodiversity; cause a loss of traditional knowledge related to the biodiversity due to change in livelihoods; destroy areas having significant cultural, religious as well as biodiversity values (such as scared groves); etc. For example, the coal belt of central India overlaps with forests and tribal India, and has caused tremendous impact on both biodiversity and the local communities. In the coal-belt of Jharkhand, large scale mining activities have affected the traditional lives of the tribals in many ways. Amongst other things, their sacred groves (sarnas), usually one in each village, have been destroyed in large numbers.

Mining projects can displace local communities by limiting their access to or use of traditional lands and forests. This has led to loss of knowledge related to biodiversity and traditional healing systems, which has been handed down from generations. For many communities, the livelihoods which depended upon sustainable biodiversity based on extraction of renewable resources from the forest, such as Minor Forest Produce (MFPs), were replaced by a mining-related job. This positive impact of mine development turns out to be negative impacts towards the end of the mine's life.

Mining causes deforestation, which destroy the top soil and water shed system of the locality, thus affecting the livelihood of the farming community in the area. The displaced people who lose their land are usually compensated by cash instead of some other cultivable land. Furthermore, mining cannot provide employment to all the affected
throughout the year (Development Initiative 2001).

In the bauxite mining area of Visakhapatnam there is profuse growth of Phoenix humilis, whose leaves are collected by local tribals and sold for Rs. 3000 per load. They sell about 300 loads of these leaves every year. In addition to this, the area yields about 50 tonnes of Karaka, 20 tonnes of Emblica fruits, Kurrya Patha, Marking Nuts, Sarapappu and honey. However, the incursion of rural and industrial advancement in the South-West frontier of Bengal disturbed the balance of the ecosystem. The tribals increasingly got displaced from their natural habitat. Their symbiotic relationship with the forest, which provided a large part of their subsistence needs through hunting, gathering and primitive agriculture, was severed (Ghosh 1988).

Tourism

The North Karanpura Valley in Bihar is unique in its archaeological significance. Recently, exquisite pre-historic rock paintings have been discovered in cave shelters at Isco and Thethangi in the eastern part of the valley. Further, ancient stone implements, iron slag and burial grounds have been found at several places close to the Piparwar mine site in Bihar. All these remnants of a rich and long cultural history are threatened by the imminent destruction due to mining (Areeparampil 1996). Iron ore mining in Keonjhar district of Orissa would also affect the Khandadhar waterfall which is a famous tourist destination in the state (Asher 2006).

Climate Change

Deforestation in the coal region also brought about a drastic change in the climate. The moist climate of Ranchi and Hazaribagh in Jharkhand, which was conducive for the development of tea plantations in the area for over 120 years, has now been transformed into a hot dry climate. Deforestation as a result of limestone mining in Mussoorie hills led to depletion of wildlife and climate change. The temperature of Dehradun has increased by 10 degrees Celsius in the last 75 years. Owing to the loss of forest cover, the average ambient temperature of Mussoorie has risen from 26 degrees centigrade in 1960 to about 32 degrees centigrade in 1980 (Thadhani 1993).

IV Mining Legislation in Forest Areas of India and its Violation

Mining requires forest and environmental clearances from the Central Government. On paper, this is an excellent way of preserving forests and safeguarding the environment. However, today, mining is taking place in every ecologically sensitive area. Wildlife
sanctuaries and reserved forests have been denotified to allow mining, while some have not been notified at all because they hold prospective mining sites (CSE 2008). The basic laws governing the mining sector in India are the Mines and Minerals (Development and Regulation) Act, (MMDR Act), 1957 and the Mines Act, 1952. Besides, all mining projects have to also obey the Forest Conservation Act (FCA), 1980, the Environment Protection Act and Rules, 1986, and the Environmental Impact Assessment (EIA) Notification, 2006. The FCA, 1980 provides for the protection of two classes of forests: reserve and protected. For any change in the status of RFs or for non-forest use of protected forest land, prior approval of the Central Government is required. Surface and underground mining are non-forest activities and, therefore, Central Government approval is required for mineral concession in any forest area.

According to the FCA, if the mine lease area covers forest land, then the mining project has to apply for both environmental clearance and FCA clearance separately. All mining, including underground mining, requires prior approval by the Central Government (MoEF). The FCA applies not only to the surface area that is used in mining but also to the underground mining area beneath the forest. Renewal of an existing mining lease in a forest area also requires prior approval of the Central government (Government of India 2006). It also mentions that proposals for diversion of forest land should be accompanied by an approval from the local body. The guidelines issued under FCA stipulate that compensatory afforestation should be carried out in exchange for the area diverted for non-forest purposes. However, this has been widely criticized by both the civil society and forestry and wildlife experts, who believe that compensatory afforestation, cannot be a substitute to diverse natural forests (CSE 2008). Western Coalfield Limited (WCL), a subsidiary of Coal India Limited (CIL), has been encroaching forest land, despite court orders in 1996 to the state government to check violations of the FCA.

Mining in forest areas also violates the National Forest Policy (NFP), 1988. According to the policy, “diversion of forest land for any non-forest purpose should be subject to the most careful examinations by specialists from the standpoint of social and environmental costs and benefits. Construction of dams and reservoirs, mining and industrial development and expansion of agriculture should be consistent with the needs for conservation of trees and forests. Projects which involve such diversion should at least provide in their investment budget, funds for regeneration/compensatory afforestation. Beneficiaries who are allowed mining and quarrying in forest land and in land covered by trees should be required to repair and re-vegetate the area in accordance with established forestry practices. No mining lease should be granted to any party,
private or public, without a proper mine management plan appraised from the environmental angle and enforced by adequate machinery”. In Rajasthan in 1996, the Supreme Court banned all non-forest activities on forest land; the order covered 2,000 mines and quarries over 50,000 ha. Mining continues despite this, on 53,000 ha of forests; the industry allegedly has footed the bill for compensatory afforestation (CSE 2008).

The Supreme Court of India has also appointed a body named the Central Empowered Committee, which looks into encroachments on forests. The Forest Advisory Committee (FAC) of the MoEF looks into diversion of forest land for non-forest purposes. The provisions of the Panchayats (Extension to the Scheduled Areas) Act, (PESA), 1996, states that “the recommendations of Gram Sabha or the Panchayats at the appropriate level shall be mandatory prior to grant of prospecting license or grant of concession for mining lease for minor minerals in the Scheduled Areas”. Iron ore mining area in Keonjhar, Orissa, is a fifth scheduled area, 90 percent of which is dominated by tribal communities. However, the provisions for PESA for transfer of land have been completely violated here. Most of the mining area in Singbhum, Jharkhand, falls under Schedule V (tribal) areas, where land transfers are restricted. Two old laws, the Chota-Nagpur Tenancy Act (CNTA) and the Santhal Parganas Tenancy Act, restrict the sale, purchase and transfer of tribal land to non-tribals. However, Between 1951 and 1991, over 34 percent of land acquired for development project was for mining in Jharkhand, displacing about seven percent of Jharkhand’s population of which nearly half were tribals (Bose 2006).

Bauxite ore is extensively available in a belt stretching from southern Orissa to northern Andhra Pradesh. The whole of it is in scheduled areas. It is also being mined vigorously by Orissa in the districts of Rayagada, Kalahandi and Koraput. Except the National Aluminium Company’s (NALCO) project at Damanjodi, all the others are in the private sector. This is contrary not just to the law, but the Constitution as well, for the grant of mining lease in the scheduled areas to non-tribals amounts to transfer of land from the government to non-tribals, which the fifth schedule of the Constitution prohibits, as upheld by the Supreme Court in Samatha vs. State of AP(1997). Not only mining of ore, but its processing to produce alumina for export is also being undertaken in the scheduled area. Any unilateral decision of the government in these matters without reference to the Gram Sabhas of the affected villages is contrary to PESA, but Orissa is going ahead. In A.P the mining leases have been given to the public sector APMDC, which will mine the ore and sell it to the private concerns that will process it outside the scheduled area. Thus, the APMDC is a benami for the private concerns. The Land
Transfer Regulation (LTR) specifically bars benami transactions in favour of non-tribals. Andhra Pradesh has perhaps the most stringent law prohibiting alienation of tribal land to non-tribals (AP scheduled area land transfer regulation, LTR). Quite extensive displacement and severe pollution of water sources are certain (Balagopal 2007).

Vedanta Alumina Ltd. is setting up an alumina-refinery plant in Orissa without obtaining environmental clearance for the entire project – a blatant violation of the Environment (Protection) Act, which stipulates that a project cannot be subdivided in order to ease the clearance procedures. The company and the government in tow submitted the refinery project for clearance without mentioning the mining project integral to the refining activity. Thus, large-scale destruction of forest land essential to the survival of two wildlife sanctuaries was omitted from the application for clearance. Additionally, the tracts of forest falling in the refinery site were also not stated (Union for Democratic Rights 2005).

Orissa lacks a comprehensive policy on rehabilitation. No compensation is being offered for the forest resources produce that villagers presently depend upon for a substantial part of the year. The ‘dangar’ lands which are the only means of livelihood for the landless are not being compensated for—a violation of the National Policy on Rehabilitation, 2003 (Union for Democratic Rights 2005).

The Planning Commission constituted a high level committee under the chairmanship of Mr. Anwarul Hoda, member, Planning Commission, to review the National Mineral Policy and recommend possible amendments to the MMDR Act (Ministry of Mines 2006). The committee recommends opening up more forest areas for mining. It wants the government to spell out in advance the conditions to be met during mining so that forest clearance can be granted without any delay. This recommendation is based on the belief that “the miner eventually leaves the land and can recreate or improve upon the forest as it existed before commencement of operations”. This recommendation stands in direct contradiction to global best practices, under which forests are not allowed to be diverted without undertaking detailed ecological assessment (CSE 2008).

Such violations of laws take place not only in India but around the world. The Government of Indonesia has issued several laws to protect forests, including Forestry Act No. 41/1999, which prohibits open-pit mining in protected forest areas. However, according to mining companies, such regulations imply missing very good opportunities of investment in the mining sector. As the government is desperate for foreign investment,
and is under severe pressure from foreign governments, mining companies easily override the environmental protection law and grant mining permits (WALHI 2009). On 11th March, 2004, President Megawati signed Perpu\(^9\) No. 1/2004 to amend Forestry Law No. 41/1999 allowing 13 mining companies that had been given permits before 1999 to continue mining operations in protected forests. The Perpu was followed by a Presidential Decree (Keputusan President, Keppres) No. 41/2004, which permitted for mining operations in several protected forest areas around Indonesia. Both the examples show how public policy can relate to the interests of private capital, in preference to people's livelihoods (Bachriadi 2004).

Ghana's law prohibits mining in forest reserves to protect globally significant biological diversity, conserve fresh water resources, and prevent toxic contamination of water and agricultural lands. The 1994 Forest and Wildlife Policy of Ghana aims at “conservation and sustainable development of the nation's forest and wildlife resources for the maintenance of environmental quality and perpetual flow of optimum benefits to all segments of society”. Mining, especially surface mining, in forest reserves has no place in this policy objective because surface mining does neither conserves and sustains the use of water resources and the environment, nor preserves, biological diversity. However in 2003, the Government of Ghana has declared its intention to release portions of Ghana's closed forest reserves for mining (National Coalition of Civil Society Groups against Mining in Forest Reserves 2003).

According to Section 6 of the 1989 Mining Act of Guyana, the state is the owner of all mineral resources. The government's official policy on mining states “Government is committed to the principle of multiple land utilization, and to this end encourages both mining and forestry (or any other land uses) on the same area of land” (Government of Guyana 1997). The 1995 Mining Code of Philippine gives companies secure rights to log forest within their concession.

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9 Peraturan Pemerintah Pengganti Undang-undang, Perpu is a shortcut executive regulation called a Replacement Regulation, which can override laws passed by parliament. Under Indonesia’s constitution the President is given emergency power to Perpu in situations where the government must take swift and decisive action to guarantee security. The President still needs approval from parliament before the Perpu can be passed. The parliament still has control over the executive, but once passed, a Perpu has the same legal status as a law made by the parliament.
V Conclusion

From the above discussion, it is evident that mining is both a direct and an underlying cause of forest loss and degradation. Policies that favour mining in forested areas more than likely drive deforestation. Mining in forest areas is extremely destructive to the environment, affecting not only the very existence of forests, the quality of soil and water sources, but also the survival of indigenous populations (Contreras-Hermosilla 2000).

Over the last few years, several international initiatives have been taken to address mining along with its social and economic impact. The IUCN and the International Council of Mining and Metals (ICMM) agreed for a dialogue to improve the performance of the mining industry with respect to biodiversity conservation in protected areas. Dudley and Stolton (2002) identified criteria and indicators for designating “no go” areas for mining. They proposed decision-tree filters, focusing on (a) protection status; (b) potential threats to biodiversity and the environment at both the site and landscape (downstream level); and (c) potential threats to vulnerable human communities. Principle 9 of the Forest Stewardship Council’s (2002) Principles and Criteria introduced the concept of “high conservation value forest”. These forests are not “no go” areas according to the principle, but any industrial use of these forests must maintain or enhance their conservation value.

The Government’s moves towards diversion of land for mining have been strongly opposed by environmentalists and local people, especially tribals to save their lands and livelihoods. Though mining needs to be continued in a sustainable manner, critical ecosystems like forests should not be sacrificed, for short-term gains. As the rest of the world is doing, India can, and must, demarcate “no-go” areas for development projects (CSE 2008).
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