ARTISANAL AND SMALL MINES:
BASALT AND BAUXITE IN MAHARASHTRA, INDIA

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INTRODUCTION

Informal and illegal mining especially in the ‘minor’ minerals sector continues on quite a large scale in states like Maharashtra, despite the entry of large India multinational corporate firms into prospecting and mining of mineral resources in India. While much of artisanal mining occurs in small scale mines for minor minerals such as basalt, and in sand mining and stone quarries, it is not unknown in the case of major minerals as well. Examples include iron and bauxite. The 

vaddera community, traditionally involved in construction, stone cutting and crushing, and mining is still present in this sector, though their presence is either declining, or some members have upgraded into the formal mining sector. Similarly adivasis (tribals) in the Vidarbha region of Maharashtra
are involved in extraction of iron ore as well as metallurgical activities using traditional techniques.

In India, minerals are mostly located in forested areas occupied by adivasi populations. Grant of mining leases in these areas has led to conflicts between governments, lease holders, and adivasis over ownership, access and use of natural resources. Recent debates have focused on enabling local populations to use, extract and economically benefit from these resources. Enabling an official policy requires a formal recognition of informal, illegal and artisanal mining, which in turn requires scientific studies of artisanal mining as a whole. While mining as a sector in India is often the target of environmentalists’ ire due to its effects on environmental degradation, the idea of sustainable small scale mining has rarely been given adequate thought. The fact that mining has been practiced on a small scale by large numbers of people in India using traditional techniques, and that this had and continues to have enormous potential for employment and income generation in rural areas has not been given adequate attention and thought. This is reflected in the fact that studies on this sector are practically absent especially in states like Maharashtra. An exhaustive review of journals, books, internet material and newspaper reports (including grey literature) revealed that apart from engineering and geological studies, there exist very few socio-economic, or cultural- anthropological studies on informal / artisanal mining in India in general, and in Maharashtra in particular. The few studies pertain to child labour in the mining sector and environmental issues and movement which are also mostly in the formal and organized mining sector.

There is thus an urgent and pressing need to document the issues and problems facing the informal or artisanal mining sector and identify areas for policy intervention. There is a feeling among many scholars and activists in India that current models of economic development based on specific modes of resource access and extraction leads to the ‘social exclusion’ of many groups and communities. In the era of economic liberalization and the entry of large Indian and multinational firms into the mining sector, is small scale, informal mining viable? What role can it play to promote sustainable development and offer employment and income generation options to the rural and urban poor? Who are the people involved in this sector? Can they be clearly delineated in terms of caste, class, ethnicity, tribe, region, and gender? What kind of policy interventions are required to make the mining sector more sustainable, and what role do small and artisanal mines have in this endeavour? What is the role of social scientists and researchers in studying small and artisanal mines? Which areas require urgent attention? Can social scientists and researchers help to improve the quality of the debate on the mining sector in general? These are some of the questions that require the attention of researchers in India. The present study is a small beginning in addressing a few of these issues.

This report presents an overview of selected areas in the state of Maharashtra where informal, small scale mining persists on a fairly large scale. The study was carried out in two areas focusing on two minerals. The Wagholi area near Pune was chosen since there is a large concentration of basalt mines in the area. Basalt is one of the minor minerals, and according to mining experts, it is a mineral which is largely extracted by small scale and / or illegal miners, usually
by small firms and contractors, rarely by individuals. Basalt mining is spread almost throughout the entire state, but is concentrated more in the Deccan area especially around the cities of Mumbai (Bombay), Aurangabad and Pune.

The second area chosen for study is the Shriwardhan – Harihareshwar belt in the coastal Konkan region of Maharashtra. Bauxite has been discovered in many places in this region. Bauxite is used for extraction of aluminium and is thus a major mineral. All over India, bauxite mining is the preserve of big government owned and more recently privately owned companies. However in this region, while in theory the resource processing, transportation and trading is managed by big privately held firms, in practice, there is a complex structure of small and big firms working together to extract and export the resources. Due to the activities of the vaddera community in mining of various minerals in the region for centuries, the mines are actually owned and operated by members of this community through small individual or family held firms, who supply bauxite extracted from mines usually located on hill tops in the western ghats area, to large and firms who actually process, and sell / export these resources.

through a number of site visits, and by talking to key informants in academia, mining companies, and other knowledgeable people locally. Focussed group interviews, semi-structured and informal interviews with key functionaries in the mines, and mine workers were conducted to obtain information. Observation techniques were used to gather information on working conditions, facilities available in and near mines, and other aspects. Visits to the Indian Bureau of Mines in Nagpur and other government offices yielded secondary data on the mining sector in Maharashtra. Given the short time available and the financial resources, it was not possible to carry out more detailed and in-depth studies.

Figure 1: Map of Maharashtra showing the location of the two study areas
Exploratory studies were carried out in these two regions in April – May 2005

In the sections below, the information gathered from the field studies are outlined for both the sectors researched, i.e., basalt and bauxite.

1. **NUMBER OF MINES IN YOUR AREA/REGION/COUNTRY**

1.1 What is ASM (Definition in Your Country, Region)

There is no official definition of Artisanal or Small mines in Maharashtra or even in India. Chakravorty (2001: p.7) defines small scale mining as “mostly organised mining carried on with acquired mining rights under some statutory control although unlicensed or informal activities are not uncommon on many occasions e.g. straying into unlicensed areas from existing mines and working in disputed territory”. He also states that “India has not adopted any formal definition of Small-Scale Mining and / or of Artisanal Mining”, and that even very small mines are referred to as small mines rather than as artisanal mines. The provisions of the Mines Act of 1952 are usually not made applicable to small and artisanal mines. These mines are usually involved in extraction of minor minerals and hence also do not come under the jurisdiction of the Indian Bureau of Mines.

While officials of the Indian Bureau of Mines (IMB), the Geological Survey of India, and other state and district level officials privately acknowledge the presence of illegal and informal mining, no official record is kept or available of such mines. Data for small scale mining as such is scanty since these do not usually come under the jurisdiction of the IMB. District Collectors grant licenses for mining of minor minerals in Maharashtra. However they do not have data regarding illegal / informal mines. The state government also does not maintain records of the number of small mines (for minor minerals) currently operational. There are also no unofficial or research based estimates of the number of artisanal and small mines in the state for all minerals put together. Informal numbers are available to scholars and experts working in specific regions on specific minerals and the estimates vary widely.

1.2 ASM Sector Units studied

In this report the ASM sectors studied include small and artisanal mining of basalt, and small scale mining of bauxite. Basalt is mined throughout the Deccan Traps in the Deccan region of Maharashtra. An estimated 5000 mines exist, apart from numerous individual or family based activities throughout the region for which no number can be hazarded, save to state that family or individual mining is on the decline.

Bauxite mining is usually the preserve of large public and private firms. However depending on the quantity of mineral deposits, small firms also are involved in this. There are around ten small mines located in Shriwardhan – Harihareshwar area of the coastal Raigad district in Maharashtra.

1.3 Structure of the Industry Concerned

Both basalt and bauxite in the study regions are extracted in quarries involving open cast non-mechanized techniques. In the case of bauxite some earth moving equipment is used to dig and sift the soil, but the mining itself is done with the help of hand tools by men and women. In the case of Bauxite, large
mining companies are involved in other regions with more extensive deposits, but in the study region, except for one company (the Ashapura group), all the others are small firms. No large firm operates in the basalt quarrying sector.

1.4 ASM Standing/Advisory/Controlling Body
There is no official policy or administrative structure for ASMs in Maharashtra. ASMs are generally neglected by official policy, including in amended mining policies post economic liberalization in India. Most environmental activists and organizations in the state regard mining, especially small scale mining as detrimental to environmental sustainability. Illegal mining in and around cities in Maharashtra have been blamed for landslides, deforestation, and flooding during rains.

While artisanal mines are not covered by any policy, small mines do come under the purview of different mining acts.

1.5 Local Context: Physical Extent of the Area, Administrative Units
Basalt
The basalt mines in Wagholi near Pune extend for around 100 sq.kms. While artisanal mining has been going on in the area primarily by members of the vaddera community, small scale formal and informal/illegal mining took off in a big way around 20 years ago with the real estate boom in Pune, Bombay and other cities in Maharashtra. While some of the mines are on government owned land, quite a few constitute farm land converted into mines after basalt was discovered to be present in the area in a major way. Being located in a dryland area without irrigation, mining was seen to be more profitable than agriculture.

The mines range in size from 3 to 15 acres. The smaller ones are mostly farmland converted mines, while the large ones are the result of prospecting on publicly owned land. The smaller ones are owned by erstwhile farmers, and are not professionally managed, with little or no concern for mining laws. The larger ones among the small mines are owned by traditional trading castes including Marwadi banias. These follow most of the mining laws and other laws except those pertaining to minimum wages which are widely flouted in India.

Administrative control over these mines rest with the District Collector of Pune.

Bauxite
There are ten mines located in the Shriwardhan – Harihareshwar area of Raigad district in the coastal belt of Maharashtra. These are located in ecologically sensitive and biodiversity rich Western ghats. All of them are located on mountain tops. Each mine extends for about 5 to 10 sq.kms. These are spread across an area of about 50 kms. Ownership is mixed, with some being owned by members of the vaddera community from the neighbouring state of Karnataka, and others being owned by small bauxite and aluminium processing and export firms.
Administrative control and legal supervision is by the District Collector, Geological Survey of India, and the Ministry of Mining, Government of India, as Bauxite is classified as a major mineral.

1.6 Previous Estimates by Others
No estimates exist of the extent of ASMs in basalt and bauxite in Maharashtra.

1.7 Your Estimates
Estimates can be done only through a visit to a large number of mines in the area which was not possible given the time and financial constraints. Locals and mine owners could not give any reasonable estimate.

2. ORIGINS/TRADITIONS
2.1 Local Economic Traditions

Basalt
The Wagholi area is located in the semi-arid tropics, with low levels of rainfall, poor access to irrigation, and thus practiced dryland agriculture over centuries. Members of the vaddera community have been prospecting for and mining basalt for construction purposes on a small scale on a community basis for a long time. This happened on a largely informal and illegal basis. The vaddears were mainly nomadic moving from place to place where basalt could be mined easily. They did not go to great depths and mined the mineral that existed just below the soil. Attempts by the government to regulate or control this sector were resisted as the vadderas saw it as their traditional preserve, and hence even refused to pay royalty to the government. It is reported that a few members at least of this community became quite rich by controlling this trade.

Bauxite
Agriculture and fishing have been the mainstay of the population in the coastal regions of Maharashtra. The mountain tops were usually not used for economic activities.

Itinerant vaderas and other stone cutters discovered the potential of these areas several decades ago. Some of them took sites on lease even before bauxite was discovered in the area. Upon discovery of bauxite they renewed the leases and outsourced bauxite to processors and exporters. Large scale discovery of bauxite in the 1990s prompted mining companies to enter this area and obtain leases. As the bauxite deposits are comparatively small, the big firms including public and privately owned ones did not enter this region. The onset of economic liberalization saw a large number of small mining companies being established with export links to China, Russia, and Eastern Europe which were hungry for minerals owing to rapid economic growth and expansion. These markets incidentally were not catered to by the big firms.
2.2 Present Power Structures

**Basalt**

The present power structure of mining in the region however has shifted away from the *vadderas*. The traditional Hindu trading community – the *baniyas* from different parts of the country, and a few big erstwhile landowners with kinship links to construction company owners control the industry. However they are unable to exercise complete control, as small mines undercut competition by offering low prices essentially by flouting most of the laws. There is a small but significant number of farm households in the region who carry out illegal mining on their land holdings.

Most of the mines being small and not having a lot of depth, the mineral resources get exhausted in a few years. The ones who have the ability to prospect and acquire other leases continue in this sector. It is estimated that only about 20-30 mine owners have this ability. The rest are temporary miners which results in a shift in the power structure in favour of the long time operators.

**Bauxite**

The power structure is controlled by the processing and exporting companies who are sometimes also lease holders of the mines. A few of the lease holders were observed to be absentee owners with the mines actually being operated by the processing and exporting companies. The *vadderas* who initially prospected and practiced informal mining in the area do control a few mines but have little direct influence in the mining. Being located on mountain tops where there few people live, mining companies have few contacts and influence with the local communities.

However it was observed that the mining firms are often at the mercy of workers who are essentially migrants from southern drought prone parts of Maharashtra and northern Karnataka. The workers go back to their villages at the time of agricultural operations and also during the marriage season and monsoons. The mines are operational for only around 7-8 months in a year because of this. Since the mines are not mechanized, the local population are not considered skilled enough, and so the miners are dependent on skilled workers to come from other places.

2.3 Local Stakeholders

**Basalt**

The Waghori area almost entirely consists of mines. The little agriculture that exists is mostly rainfed, and the agricultural economy is quite stagnant. The local economy is based on the mining and processing operations with employment being generated for quarrying, loading / unloading, machine operations, and drivers of trucks. The main stakeholders are the small mining firm owners, and the illegal miners on farm holdings. The itinerant or nomadic family based miners have almost completely declined. Construction firms in Pune, Bombay and other nearby cities also have stakes in the mines either as owners of mines, as processors, or as buyers of processed basalt.
A small but increasing stake is being acquired by a handful of firms specializing in export of extraordinary and exotic minerals such as apophyllite, cavansite, calcite, quartz and zeolite crystals which are being found in mines which are at the point of being exhausted. These have a high value in international markets for scientific / industrial use and among mineral collectors. The mine owners are largely ignorant of the value of such minerals and they are exploited by the traders who but them cheap and make huge profits by selling small quantities to international buyers. Prospecting and digging out such rare minerals is time consuming and needs care to avoid damage. Hence increasingly, the traders also influence the quarrying process for which they pay a small amount to the mine owners.

Being located close to Pune, Wagholi is in the process of becoming a suburb of Pube city as it expands. Real estate prices are going up and construction of apartment complexes have begun. These are located close to the mines and near abandoned mines. This has raised issues of environmental pollution affecting the middle class residents and there have been concerns regarding this expressed by them. As yet however this is minor and has not developed into an environmental movement or clash between environmentalists and mine lease holders and workers.

Bauxite
There are hardly any local stakeholders, as the mine lease holders as well as processing and export companies are from outside the region. They only have small offices near the mines with most operating from Mumbai and Pune. Since the workers also come from outside the region and there is no competition with local workers, the mining activity as such has very little connections with the local economy and society.

3. LOCATION AND DISTRIBUTION
3.1 Regional Distribution
Basalt
The Wagholi basalt mines are spread over an area of about 100 sq.mtrs. in the Pune district of Maharashtra The basalt quarries here are a part of the famous deccan traps spreading over the west-central region of India, and which constitute one of the largest volcanic provinces in the world. Basalt is an extrusive igneous rock, usually created from lava flows millions of years ago which created multiple layers of solidified flood basalt. The Deccan Traps in India are estimated to consist of over 2,000,000 cubic kilometers of basaltic lava flows, which reaches a thickness of over 2,400 meters in some places, but in the area under study is about 30 metres. It extends over approximately 500,000 square kilometer in western India, most of it in the state of Maharashtra. Much of the original quarrying of basalt took place in the Bombay region over the last two centuries. However quarrying for construction has been going on for centuries, with the more than one thousand year old famous Ellora temple being carved out of basaltic rock.

Bauxite
Much of the bauxite deposits in India are located in the states of Orissa, Andhra Pradesh and Jharkhand. However Gujarat and Maharashtra also have
significant deposits which are only recently being exploited. In Maharashtra the bauxite deposits have been discovered in the Western Ghats region bordering the coastal Konkan area districts. There are 12-15 leases granted for bauxite mining in this region with all except 2 being in the small scale sector. No approximate or accurate estimate of bauxite reserves in the state exist; however in the country as a whole bauxite reserves are to the tune of 2500 million tones, and current production is around 10-11 million tones annually of which around 1 million tones are more are exported.

3.1.1 Regional Distribution of ASM/Informal Hard-Rock Mining
The entire mining is in the form of hard rock mining. Basalt is available in the form of huge rock deposits, which are cut and then processed into stones and slabs of different sizes as well as coarse powder used as construction material.

3.1.2 Regional Distribution of ASM/Informal Placer Mining
No placer mining is possible and hence the sector does not exist in the case of Basalt, since the rock itself is quarried rather than a mineral embedded in basalt. However as mentioned earlier exotic minerals embedded in basalt have recently been discovered. These minerals such as cavansite, quartz, calcite and zeolite are chunks which are embedded in basalt rock and have to be carefully dug out. Neither their values are known to mining companies and workers nor do they have the expertise and contacts to sell them. Hence mining of these minerals is done by a handful of mineral traders with the necessary expertise to supervise their extraction. Porous basalt is usually not suitable for construction and is not mined despite the fact that it may yield other minerals which have scientific or industrial or rarity value. This is despite the fact that placer mining is possible in such areas. Local people and minor owners are not aware of the fact that rare crystallized minerals such as zeolites may fetch prices in the international markets which are several times the price of gold or diamonds.

3.1.3 Regional Distribution by Any Other Criteria
\textbf{Basalt}

The formation of basaltic rock from lava flows involved gas bubbles being formed in which over a period of time mineral rich water got trapped and over the course of millions of years formed crystallized minerals and other exotic and rare minerals such as vanadium, cavansite, zeolites, pentagonite etc. The distribution of these is yet to be formally surveyed, and these have been discovered by accident in mines whose resources are exhausted. A few traders of these minerals are now prospecting on a very small scale. Indian and International scientists have also been visiting these sites to carry out studies. However we do not as yet have a clear idea about the distribution of basalt mines based on the occurrence of other high-value minerals.
3.2 Causes of Regional Variations in Distribution

Basalt
Regional variation was primarily determined by the lava flows which occurred aeons ago. Much of the deposits are in the Deccan traps. High concentrations of deposits in the Bombay area have declined due to excessive exploitation to feed the continuous urban expansion of the Bombay Urban Agglomeration.

Bauxite
The Western Ghats being a densely forested fairly high-altitude area, not much prospecting was done for many decades. It is only recently that remote sensing and GIS techniques and tools have yielded information on mineral deposits. As yet no clear idea exists of the distribution of bauxite reserves in the region.

4. GROWTH
4.1 Introduction: History
A number of factors determine the growth, stagnation or decline of small and informal mining. While some of these are related to the quantum of reserves, social, economic and politico-administrative factors are also important.

4.2 Prediction of Growth in the Short-Run
Basalt
The organized, large scale mining companies have not yet entered basalt mining. This is probably because of several factors:

a. Investments on a large scale especially in terms of mechanization are not likely to yield adequate returns given the absence of basalt deposits on a large scale.
b. The small scale operators are too entrenched to give way to bigger companies.
c. Though basalt is processed into different kinds of construction material there is not much value addition and hence profit margins are thin.
d. Construction business is cyclical in nature, and steady revenue streams cannot be ensured.

For these reasons, basalt mining is not likely to grow much in the short run. It has been observed that mines being quite small in size, many of them started about 15-20 years ago have already begun to close down as mineral deposits are exhausted. Very small operators shut shop once the supplies run out. Only a few big ones move on to acquire other leases.

Bauxite
Much of India’s bauxite reserves are in the state of Orissa. Other major reserves are further down south near the Western Ghats. The area under study has relatively less reserves. Hence small companies using non-mechanized open cast mining operate. Essentially this area caters to low cost buyers in newly emerging economies and economies in transition, and not much scope for short term growth is perceived.
4.3 Long-Term Growth Outlook

4.3.1 Reserves of the Resource

**Basalt**
There seems to be no sustained effort by government agencies to assess reserves. However individual mining firms state that a lot of reserves do exist in the deccan traps especially around the Wagholi area. Individual prospecting efforts often of an illegal nature yield data on further reserves. In the area under study, there is a slow expansion in terms of area. However no expansion in terms of production in existing mines is possible owing to the dependence on physical labour for extraction and quarrying. It is possible that mining for basalt may take on a new dimension once the market for quarrying of extraordinary and precious minerals develops. With an expansion of scientific and industrial uses of these minerals, basalt quarries as well as exhausted quarries may be mined in a different way and their growth may be expected along different lines. Internationally technologies have been developed to convert basalt into steel substitutes. This may also impact the long term growth of this sector.

**Bauxite**
In the case of bauxite government agencies have been using remote sensing data to prospect for bauxite. However the Western Ghats being an ecologically sensitive region there is immense pressure from environmental lobbies to disallow mining in this area. Recently passed laws on tribal lands also discourage mining in areas where they inhabit. Unless large scale deposits are found in the Shriwardhan-Harihareshwar belt, it is likely that bauxite mining in this region will grow or expand in the short and long term. This is despite the fact that bauxite is one of the fasting growing sectors in India, and is reportedly the second most mined major mineral in India.

4.3.2 Rate of Consumption of the Resource

**Basalt**
Registered mine owners who hold leases are required to pay royalty based on the quantity of resources extracted. This data, while giving us an idea of the production, is however not available in a centralized office. Moreover this does not include the illegal miners' production. Figures regarding actual consumption of the resource are not available, since this happens through a large number of small scale construction firms, transporters and suppliers.

**Bauxite**
The mining firms involved refused to part with data on production. It was informed that bauxite mined in the study region were exported to eastern European countries and so no consumption figures are available.

4.3.3 Other Resources Outside Mining Areas

**Basalt**
Outside of the mining areas in Wagholi the population is dependent on small scale dryland agriculture. Increasingly however, all the resources are being
subsumed as part of the process of suburbanization of the nearby metropolitan city of Pune. These include agricultural land as well as small lakes and ponds.

**Bauxite**
The Konkan region is endowed with good soil and assured rainfall. The agricultural economy here is much more dynamic compared to the rest of the state. Rice / Paddy is the main crop. Horticulture is emerging in a major way. Fishing is one of the major occupations. There is also large scale seasonal migration to the city of Bombay for employment. The western ghats is a major biodiversity hotspot and is richly endowed with natural resources including flora and fauna and minerals.

**4.3.4 Potential Supply Constraints on ASM/Informal Mining**

**Basalt**
The lack of quality scientific / technical inputs in prospecting may mean that once existing quarries get exhausted, new sources and reserves may not be located early enough. Expansion of urban areas in the region, which is one of the most urbanized areas in India, may mean that on the one hand demand for basalt by the construction industry goes up while areas with basalt reserves may get covered by built environments, on the other. Signs of larger firms with higher technical capabilities and ability to invest in mechanized mining are absent.

Scientists estimate huge deposits of basalt in Maharashtra. Unless a clear policy is worked out with reference to mining and quarrying, access and control of these resources especially in tribal areas, forest policies, and environmental regulations, it is possible the existing conflicting objectives will prevent the sustainable extraction of basalt reserves in Maharashtra.

**Bauxite**
Labour is an important constraint on enhancing production and supply. Non-mechanized mining has meant that the small firms are heavily dependent on skilled labour which is not abundantly available. Given the small scale of operations, mechanization is not economically viable except in initially earth moving operations. Labour comes from distant places, and they are also involved in seasonal agricultural operations. Hence because of this reason and the heavy rains in this part of the state, supply is limited to a few months in a year.

**4.4 Regional Growth Patterns**

**Basalt**
Basalt deposits occur almost throughout the state. However major deposits are in the deccan traps in the Bomba – Pune – Aurangabad belt. Growth is occurring mostly in this region. Rapid quarrying of basalt to promote the growth of the Bombay Urban Agglomeration over the last century has almost exhausted reserves in the areas in and around Bombay city. The growth has mostly been in the Pune, Aurangabad and Jalgaon areas in Maharashtra. In the Vidharbha (eastern parts of the state) region, deposits are in tribal dominated, thickly
forested areas, where forest and tribal related laws prevent quarrying and mining which however happens in an illegal manner on a minor scale. Growth is much slower in this region, and unless policies are recast, basalt quarrying is unlikely to pick up on any big scale.

5. GROWTH FACTORS
Growth factors are determined by resource distribution and availability, technical capacity of the main actors involved, government policies with regard to prospecting, licensing, R & D, and environment, and supply and demand factors.

5.1 Governance Factors
Post 1991, the Government of India, has opened up in a limited way foreign direct investment in the mining sector. A few of the large public sector mining companies and mineral companies have also been privatized. While policies have been initiated to support large scale mining in the case of major minerals, there is no recognition of the enormous income and employment potential of the small scale and informal mining sector. Conflicts in tribal areas over mining leases have not been resolved satisfactorily, and while legal changes to provide greater access over forest resources to tribal populations are in the offing, at the same time policy discussions in the government seem to favour entry of external agents into tribal areas for mining.

The world over, while there is a lot of emphasis and policy support for SMEs (Small and Medium Enterprises), such support is conspicuous by its absence in India, including for the small scale mining sector.

The vibrant and vocal environmental movement in India has largely focused on the environmental consequences of mining, which has in turn had the effect of the government turning a blind eye to potential advantages of policy support for ASMs.

There are hardly any NGOs in India which link rural and urban livelihoods to the mining sector. While the linkage between natural resources and livelihood security is well established, very few NGOs, government programmes and national and international aid agencies emphasize the importance of mineral resources for enhanced livelihoods and income security.

It is within this larger governance structure that various factors affecting the growth of mining in India operate.

5.1.1 Legal Environment and 5.1.2 Administrative Constraints

Basalt
Basalt is usually combined with other "Building Stones" as a minor mineral for policy and legal regulation. There is no national initiative, law or policy which regulates this sector. Having small numbers of workers in each quarry, mine owners manage to escape abiding by labour laws. Since basalt falls under the jurisdiction of the state government, procedures for prospecting, obtaining leases, and undertaking quarrying operations are fail simple, and royalties and taxation regimes are fairly simple. It is reported by informants that vaddera
community artisanal miners don't pay royalty as they claim a traditional right to mineral resources. However their numbers are now quite small compared to earlier times.

Laws relating to labour protection and pollution control are rarely implemented. To improve the condition of workers, and to enable a labour market to emerge, better implementation of these laws is required. Laws are also required to protect and improve the quality of life of migrant workers who constitute a large share of the workforce.

Increasing pressure from environmentalists is likely to close quarrelling in and near cities, as environmental norms are enforced. This will affect production to some extent. This is already happening in the cities of Bombay and Pune.

To ensure sustainable growth of this sector while improving adherence to labour and environmental norms, legal changes are necessary to formally recognize this sector, provide institutional credit, training and R & D facilities, and generate and make available information regarding mineral deposits and their distribution.

It is time that the government stepped in to regulate the extraction and trade of extraordinary and precious minerals, since large quantities are being exported out of the country without proper documentation, so that Indian national and scientific interests are better served. It is possible that this may emerge in the near future as a major income earner for artisanal and small miners and agriculturists and landowners in the deccan region.

Bauxite
While major bauxite mining companies in India are also into aluminium production, this is not the case in the study region, where bauxite is mined for export and sale to aluminium producers within and outside the country. This has given rise to a complex ownership and operation structure with multiple agents working in partnership to mine and export the resources. There is a need to simplify this structure so that small scale producers can effectively own, exploit and benefit from bauxite mining which is a fairly easy operation as the deposits lie just below the soil surface. As a major mineral, bauxite is governed by national laws which brings in a number of absentee owners who have little concern for local economic and environmental concerns. Grater say needs to be given to state governments where deposits are of a small quantity for major minerals and where local players can participate and boost local economies using mineral resources.

There is increasing pressure from national and international environmentalists to declare the Western Ghats as a World Heritage Site. This may even involve a complete ban on mining activities. Environmentally sustainable practices need to be spelt out and enshrined in law so that mineral resources can be extracted for maximizing benefits to the local people while at the same time meeting environmental goals. The mineral resource base can be used to diversify livelihoods so that local people do not overexploit other natural resources including, soil, forests, and water.
5.2 Socio-economic Factors
5.2.1 Socio-economic Environment
Wagholi is located in a typical dryland area in the deccan region of west central India. Agriculture is characterized by seasonality, poor rainfall, low or no irrigation facilities, and a predominance of subsistence agriculture.

Shriwardhan – Harihareswar is located in a coastal zone characterized by a lush environment. However due to poor resource management, heavy rains during the monsoons runs off into the sea, and the rest of the year is characterized by water shortages. Migration to Bombay results in a labour shortage. The area is also dotted with tourist and pilgrim sites. Manufacturing salt is also a major occupation.

In both the areas mining most workers are from distant places. Locals and others have taken up mining to exploit the resource for profit. A combination of lack of economic opportunities and the possibility of higher income have led to mining emerging as an alternative sector in the two regions.

5.2.2 Shortage of Herder Income Opportunities
Except for goat rearing, herding / livestock is not an important sector in Wagholi. In Shriwardhan – Harihareswar, livestock is mostly for subsistence and is not part of commercial dairying operations. It must be remembered that as a result of still prevalent occupational segregation derived from the caste system it is not very easy for people to shift from one occupation to another. Mining occupies a lower status in the social hierarchy as it involves much physical labour. Communities which have traditionally involved in construction, road – laying, stone breaking, and mining fully or seasonally (despite their participation in agriculture) are the ones who diversify into mining as a result of shortage of income in their original occupation – agriculture.

5.2.3 Shortage of Framework Income Opportunities
5.2.4 Shortage of Other Rural Income Opportunities
In both the areas mine workers migrate on a seasonal or permanent basis due to agricultural involuntion and decline of agricultural work and income in drought prone areas of southern districts of Maharashtra and northern districts of the neighbouring Karnataka state. This migration usually involves the entire family. In the Shriwardhan – Harihareswar belt the migration is largely seasonal, while in Wagholi, it is a combination of seasonal and permanent migration except for the small number of itinerant vaddera miners who are nomadic.

5.2.5 Desire for Higher Education
5.2.6 Awareness, Knowledge and Know-How
Migration in search of better opportunities, to escape oppression, for the sake of higher education etc. was hardly observed. Most migrant mine workers are distress migrants who came for survival and subsistence.

5.2.7 Reasons for Engaging in Illegal Mining
There is no illegal mining in Shriwardhan – Harihareswar. In Wagholi there is illegal mining of basalt which comes under two categories:
a. Small and marginal farmers who mine small quantities either for self consumption or sale from their farm lands.
b. Traditional miners such as the vadderas who quarry basalt usually from public lands or commons. It was reported that these miners refuse to involve in legal mining claiming mineral resources as their customary right.

5.3 Geological Factors
5.3.1 Combination of Special Geological Factors
In Shrīwardhan – Harihareswar bauxite deposits are not known to be very extensive, and there is a possibility of mining coming to a halt in the next few years unless new deposits are discovered.

In Waghōli some scientists aver that basalt is still being produced at great depths in the soils, while others point to the rapid exhaustion of the resource. However, the search for extraordinary and rare minerals in exhausted mines may result in mining for these and minerals other than basalt, which in turn may lead to growth in new directions.

5.4 Mining Sector Factors
5.4.1 Misconceptions about Tailings
There are no tailings in both the areas. The basalt is crushed into various sizes, and fine and coarse powder produced during the crushing is also used in the construction industry. Bauxite is not processed locally. It is just compacted and transported to ports and nearby cities for export.

5.4.2 Small Resource Deposits Ignored by Big Mining
In the case of basalt, the small scale miners are presently too entrenched for big mining to enter. Also the profit margins are not very high, and the construction industry being cyclical, profits are not stable. It is not very economical for big companies to enter since costs are likely to go up with mechanization which is preferred by them. In the case of bauxite, most companies in India are big except for this region where the deposits are small and hence big companies have not entered.

5.4.3 Resource Losses due to Mining Operations
5.4.4 Resource Losses due to Mineral Processing
5.4.5 Resource Losses due to Mine Closures
Despite the fact that open cast mining with labour intensive and unsophisticated techniques are practiced in both the places, resources are mined quite efficiently. There are hardly any resource losses as far as the resource being exploited is concerned. Mines are closed only after they fail to yield resources. In the case of basalt there is some porous basalt which persists once the hard rock is mined. However since this is not suitable for construction it is not quarried. If some uses can be found for this (extraordinary minerals can be found in this kind of basalt) on a large scale using simple techniques, this sector may see growth in the future.

Basalt is mined and processed at the same place, and there are no losses reported during the processing stage.
5.5.6 Resource Losses due to Site Security Difficulties
There are no thefts reported from privately owned mines. It is from the commons
that illegal mining takes place. All of bauxite is privately owned by small scale
mining firms.

5.4.7 Socio-economic Factors Specific to the Mining Sector
It is very important that environmental and economic / employment issues are
sorted out, that proper environmental guidelines are laid out and implemented,
and that the economic / developmental scope of small mining is recognized so
that the growth of mining in both the regions can take place in a sustainable
way. Environmentalists are especially bothered by mining in the ecologically rich
Western Ghats region. Formal mining companies as well as part time operators
and informal miners perceive a threat to their economic activities from
environmentalists as they are concerned primarily with enhancing their incomes.

As urbanization shifts towards mine areas, concerns about pollution emerge
among nearby residents. Land filling after mines are completely exhausted of
deposits is almost unknown. A proper strategy needs to be worked out in this
regard.

6. SOCIO-ECONOMIC CHARACTERISTICS

6.1 Who are the Miners?
6.1.1 Introduction to the Miners
The mine workers in both regions are mostly migrants from the drought prone
districts of Maharashtra and Karnataka. They usually come from agrarian
backgrounds and have been / are small and marginal farmers and landless
labour. A substantial number come from castes traditionally involved in stone
braking, road laying, construction, and mining. Probably without exception all
mine workers belong to scheduled castes and other backward classes (OBC).

The mine owners of Waghori are of two kinds: the smaller ones (3-10 acres)
were former agriculturists and cultivators who have taken up mining on their own
or leased lands; and richer landlords and bania caste traders from Gujarat and
Rajasthan who own the larger mines (10-15 acres).

In Shriwardhan – Harihareswar, leases are usually held in the name of small
mining companies owned by vadderas and others from communities with stone
breaking traditions. A few are owned by urban based mineral processing and
exporting companies.

6.1.2 Previous Employment of Males
6.1.3 Previous Employment of Females
Male and female mine workers either worked on farm prior to working in mines,
or worked as stone breakers, road layers, and construction workers. Many
continue to work as agricultural labour or work on own farms during a part of the
year when they go back to their native villages.

We did not observe any workers who worked on farms in the same locality.
In general males outnumber females in all mines as they are involved in more operations. While some of the workers work together in the same mine as families, this is not true of all. Among the poorer ones, both male and female members of the family work. Among those families who are able to meet their basic needs comfortably, women take care of household work.

6.1.4 Classification of Miners by Age
Mine workers (both male and female) are in the age group of 16 to 50. Some older workers gradually move to supervisory positions. The younger ones are involved in digging and transportation, as well as operation of processing machinery in the case of basalt.

6.2 Categories of Miners
6.2.1 Actively Involved in Alternative Occupations (farming, herding...)
6.2.2 Formerly Involved in Alternative Occupations
6.2.3 Unemployed Workers
Those who are unemployed owing to drought conditions in agriculture migrate on a permanent or semi-permanent basis. Owing to the possibility of only one crop in a year, agricultural workers who face seasonal unemployment work for a few months in the mines. Other than agriculture the mine workers also come from backgrounds of stone / cutting, construction, and road building. But the majority have agricultural backgrounds, owing to the seasonal nature of the above occupations similar to agriculture.

6.2.4 Itinerant Miners: Migrants
In the case of basalt, a majority in the legal small scale mines are migrants who have settled down. A small percentage (around 10%) constitutes seasonal migrants. No estimate is available regarding itinerant miners who move from place to place. However they do have a presence in the deccan region comprising mostly the vadodas. In the case of bauxite, almost the entire workforce consists of seasonal migrants.

6.2.5 Criminal Miners
6.2.6 Alcoholism
6.2.7 Pensioners
6.2.8 Professionals
6.2.9 Students
6.2.10 Service persons
These categories are not present in the areas studied.

6.3 Socio-economic Influences
It is interesting to note that the mining workforce for basalt and bauxite in the study region reflects strongly India’s traditional social structure, especially its caste system. Small mines for minor and major minerals which are not very economically profitable, and which ignored by big business are completely worked upon by people belonging to OBC castes, scheduled castes, and scheduled tribes. The few owners belong to the dominant bania (Vaisya) and
maratha\textsuperscript{1} castes. This has meant that the workers are more easily exploited, they can be paid lower wages, and the traditional social relations of dominance continue to be maintained. This has also meant that mining is almost always viewed from the perspective of urban upper caste / class people, with a greater focus on the adverse effects of mining rather than the employment and income it provides for thousands of families, despite the poor wages and working conditions.

The class and caste biases also have resulted in low levels of policy formulation for this sector and lack of technological development and R & D efforts for small mines. Virtually no change in process or techniques have occurred over the last three to four decades, with quarrying and processing being done with the help of primitive tools and outdated and obsolete machinery.

7. GENDER AT WORK
7.1 Women’s Work Participation: History of Region/Country

7.1.1 Women and work in the country context
In India, women’s work participation outside the household presents a complex picture. While women are largely involved in household work and in work in family based economic activities including own farm work, their labour force participation is based on class, caste, religious and regional considerations. While women from poorer families generally need to and do involve in paid work outside the household, an improvement in status often leads to withdrawal from the workforce. Availability of work in nearby locations also makes a difference, as do issues such as physical security. Overall proportion of women in the workforce continues to be low as measured by the various censuses.

Non-household work by women is largely characterized by their participation in family and household based activities especially in small scale agriculture. In the case of mining, construction, and road building, women participate and work alongside other family / kin group / community members as part of mobile work groups.

7.1.2 Women and work in the mining industry as a whole
Women are particularly identified as being at the receiving end of exploitation in mines in terms of wages, working conditions, and physical exploitation including sexual exploitation. Mining also impacts women by destroying their resource base and taking away access to resources such as water, fuelwood, food, and fodder, since most mining projects have come up in forested areas. Some researchers have also pointed out that mining is inherently masculine in nature (Bose, 2004). Reviewing impacts of mining on women as a whole she argues that “In many mining areas, women suffer the double jeopardy of dispossession (of land, traditional work, labor, social and sometimes marital status) and are discriminated against (by not being allowed to work for ‘their own safety’)—and in the very operations, which usurped their territory and resources.” (Bose, 2004: p.4). In most mines women are usually assigned, low paid, low skilled, degrading jobs.

\textsuperscript{1} The Marathas are the dominant caste in Maharashtra.
7.1.3 Changes in women’s roles in national/regional/local contexts
Through a fairly long history of social reform, struggle, and legislations, as well as processes such as modernization and urbanization, women’s role within the household and in the economy are gradually changing. Women’s participation in political affairs is also increasing particularly after the 73\textsuperscript{rd} Amendment to the constitution providing for reservations for women in local bodies. However oppression and violence continue and women rarely are empowered to make and implement their own decisions. The rise of religion based political mobilization, and identity politics tend to reinforce women’s traditional roles.

Migrant women, as in the mining sector lack social support and networks from family and community members and are under pressure to conform to traditional roles while at the same time deal with pressures of eking out a living. Finding, negotiating and accessing resources in remote places is a much more difficult task to which women have to adapt. Despite the fact that Maharashtra was at the forefront of women’s struggles and social reform, except in urban areas, not many changes have occurred to women’s traditional roles.

7.2 Gender Roles
7.2.1 Overview: Traditional Gender Roles in the Region/Country
In general women do all household work including cooking, washing, child rearing, and participation in work within / outside the household especially among the rural poor. Resource gathering – water, fuelwood, fodder, and food is also the usual preserve of women.

7.2.2 Recent Changes in Gender Roles
Most changes have occurred in urban areas where more women are educated and literate. However while women’s proportion in the urban workforce especially in better paid jobs are increasing, large proportions of women are either left out of the workforce are face the double burden of household work and paid work. Expansion of education opportunities has meant that to some extent young girls are spared of both household and non-household work to some extent, but in rural areas and in cities they continue to help in household work much more than boys.

Introduction of new technologies especially in agriculture has restructured gender roles by mechanizing some roles which are now performed by men, and by generating new roles, and also by eliminating some roles (eg. weeding, threshing) done exclusively by women earlier.

While factories employ women in work related to packaging, loading and unloading etc., global outsourcing of the manufacturing sector has also opened up new kinds of paid work for women in household based and informal sector manufacturing especially in leather and garment industries.
7.3 Gender Roles in Mining and Processing

7.2.1 Division of Labour in Mining
In the two areas studied, women are hardly involved in the actual mining process. In a few cases women are involved in digging along with their male counterparts, but these are rare. Mining in both areas is opencast, using handheld tools, though some basic digging is carried out with earth moving equipment in the case of bauxite.

Actual digging and quarrying for basalt is done by men, as are other operations such as transportation, supervision, blasting (which is infrequent).

7.2.2 Division of Labour in Processing
Processing is essentially a male job since it involves machinery. However women are involved to the extent of about 25% in the feeding process of cut basalt rocks into the processing machines. Trucks dump the raw material near the machines where two people (sometimes a male and female married couple) physically feed the rocks into the machines. Actual operation of the machinery is done by men. Making the processed basalt in the form of various grades and types of construction material (murum, kankar, shingle etc.) are done by both men and women. Overall supervision is by men.

7.2.3 Division of Labour in Transporting
Most of the loading / unloading is done by women. This includes loading cut basalt onto pans, dumping them on to trucks and trailers, and unloading in the case of non-mechanized trucks which cannot automatically dump the transported material.

The actual transportation – driving of trucks, pickups, and tractors attached to trailers is done by males exclusively.

7.2.4 Division of Labour in Marketing
Most of the small mines are owned by upwardly mobile families from agricultural and trading castes. In these families women are confined to the home and have no part in business operations. All marketing work is done by men. There is no small scale trade of a street vending / hawking type, considering the nature of the minerals studied in this case.

7.2.5 Division of Labour at Home
We found that around 25% of families have women working in the mines, while in the rest of the cases women stay in shanties nearby and carry out household tasks. Household work such as cooking, washing, child-rearing, fetching water and firewood, shopping for groceries and other necessities – all of these are done by women. Construction of shanties or temporary shelters are done by men and women together.

7.2.6 Conflicts in roles
Conflicts arise in the case of women who do both mining and household work since men do not help in household work. Work in the mines starts early to escape the searing heat during most of the year, and with a break in the
afternoon continues till evening. This leaves very little time for women for their household tasks. This has led to children not being sent to schools so that they can provide support at home. There were no reported conflicts over role allocation within the mines.

7.4 Wages
7.4.1 Wages in Other Activities
In India villages and in the informal sector in cities, gender based wage differences exist both in the case of same jobs done by men and women as well as for gender differentiated roles. Women are usually assigned non-mechanized roles of a degrading kind, which involves drudgery, and which is not done by men. These are usually used as a justification for wage differences.

7.4.2 Wages in ASM/Informal Mining
In the case of artisanal mining, there are no wages paid to individual members. Instead the final income from sale of basalt to contractors in shared by families and is usually in the hands of men.

In the case of small scale mining, women are paid between twenty and thirty rupees per day for loading / unloading while men’s wages range from Rs.40 to Rs.100 per day for a range of operations from mining to transportation and supervision. Among those involved in non-supervisory operations, drivers are the best paid, since driving is regarded as a higher status, skilled job.

For bauxite, wages are between Rs.40 and Rs.50 per day for women involved in sifting the deposits and loading / unloading, while men are paid between Rs.50 and Rs.60 for the same jobs. Compacting work is done mostly by men and they are paid the same wages. Again transportation is better paid with drivers earning around Rs.100 per day.

It was reported in the case of basalt that wages are paid to some migrant families in advance, and they have to work for the contracted period. This is done to enable some families to pay off debts, but in some cases result in bondage. The advance payment is usually given to men. However in most cases wages are paid once in a week separately to men and women.

7.4.3 Women’s Views on Wages
Overall both and women were unhappy with their wages, and usually spoke in terms of not being able to meet their basic needs. However a few of the respondents also spoke of the regular incomes they get in mining as opposed to agriculture. While women wanted higher wages, they justified the gender disparity in wages by stating that their work was of a different kind than the ones performed by men.

7.5 Working conditions
7.5.1 Provision of toilets, crèches
There are no toilets or child care facilities in the quarries. Drinking water arrangements are however made by quarry owners. Men and women used open spaces in and near the quarries as toilets. Children were rarely brought to the
quarries. If women were working, other family members, especially older children looked after the younger ones. There was a tendency for members of the same community usually from the same village or region to live together in a cluster of houses. This provided social capital to provide support including child care.

7.5.2 Household chores, family support
As stated above household chores were performed by women before and after work in the case of those women who worked in the mines. In the case of around 75% of the male mine workers who were married, women stayed back at home to take care of household work. Support for families in child care, short term financial help, and other assistance came from kin and community members living close by.

7.5.3 Sexual harassment
These are extremely rare and occur more in the residential areas than at the work place. Work at the quarries is done in groups with men and women present. This perhaps makes it difficult for sexual harassment of an open nature to take place. In general violence against women is lower in Maharashtra compared to other states for historical reasons.

7.7 Women in Servicing and Ancillary Jobs
There were only a few small shops in the Wagholi area providing essential grocery items. More shops and other ancillary services were in Wagholi town which depending on the location of the mines was 3 to 10 kilometres away. Pune was about 30 kilometres away, and as a big city had all services, goods and amenities. The small grocery shops and a few eateries were family owned and managed. The grocery stores as is common in India were run by Marwadi baniyas, while the eateries were managed by some of the mine owning families. It was found that women and children manage and provide these services when the men were away on occasion. In the eateries both and men women did the cooking, while it was mostly young boys and men who did the serving.

Bauxite mining occurs on isolated mountain tops and is away from human settlements. There are practically no services or amenities nearby. One has to climb down the mountain to go the villages, though some cultivation does take place on hill slopes. The mine workers have very little to do with the village life and provisions are brought once in a while during the mining season. There is no social, physical, or economic integration of mine workers in the local society and economy.

Mining being a polluting activity, few live close to the quarries to provide ancillary services. Except for the mine workers who cannot afford to commute, mining areas are pretty isolated and are located at a distance from human settlements – whether these be villages or towns.
8. CHILD LABOUR ISSUES
8.1 Introduction
8.1.1 Overview
8.1.2 Children of Miners OR Child Miners?
8.1.3 Opinion of Parents
There are no children working in the mines in both the areas. This was confirmed both by talking to key informants as well as through direct observation. In the case of bauxite, the material handled and processes before transporting is of a bulky kind which children cannot handle. In the case of basalt, small trucks and tractor-trailers come right into the quarries where loading is done by adults. No quarrying is done by children.

8.1.4 Findings of ILO/Other Studies
A number of ILO studies have confirmed use of child labour in mines – large, medium and small across the world including in India. An ILO study on small mines (ILO, 1999) also reflected this trend. In India also, studies have indicated the large scale use of child labour in mines. A major study on child labour in slate mines in Andhra Pradesh showed that over 5000 young children worked in these mines and slate processing factories under exploitative conditions. However for reasons stated above child labour is not involved in the both the sectors studied, despite the fact that children are very much part of migration along with their parents, and stay near mining sites, and moreover a majority do not go to school. Further study is required to understand why child labour is not present in these sectors.

8.2 Child Labour and Child Rights in the Region/Country
8.2.1 Differences in Different Situations
8.2.2 Impacts of Mining upon Children
8.2.3 Children in Mining Settlements
Child labour in hazardous industries, especially in the mining sector is banned in India. However this is observed more in the breach than implemented. In the formal large scale mines for major minerals such as coal, iron ore etc., child labour is practically absent. However in the case of minor minerals and small scale / informal mining, child labour – both male and female – are widely used. These usually are not covered by some of the labour laws being small in size, or get away with flouting the law. Slate mines in Andhra Pradesh (Markapur) and Rajasthan (Mandsaur) are reputed to have large numbers of children working, though the numbers have declined in recent years in response to an ILO initiative.

Wherever children work, these are usually in opencast mines involved in loading / unloading work. They are rarely involved in actual mining operations.

Scholars such as Myron Weiner have shown that child labour directly leads to reduced school enrolment. Further children are exposed to a lot of pollutants living in the vicinity of mines and develop respiratory and other diseases. In the regions studied, it has also been found that even when children do not work in the mines, they do not go to school, usually because of the absence of schools in these areas, and there is little or no transportation to travel to distant schools.
9. LABOUR PROTECTION, HEALTH AND SAFETY ISSUES

9.1 Labour Protection

9.1.1 Initiatives

9.1.2 Labour Protection in Mining

In India the Directorate General of Mines Safety is responsible for overall safety and labour welfare in the mining sector. However mines which are very small in size and most minor minerals except those whose operations are large are exempt from the supervision of the DGMS. While accidents are reportedly rare in this sector, pollution is a major issue and has severe health impacts. Most of the labour welfare measures including minimum wages, working conditions (toilets, crèches), and provident fund / gratuity etc. are not implemented in the case of small mines. Provisions regarding use of explosives are also not properly regulated with large scale illegal use reported by some of the smaller and informal mines.

No form of compensation or social security provision for injury or death exists in the areas studied.

9.1.3 Labour Protection in Processing

In the case of basalt quarries in Wagholi and elsewhere in Maharashtra, to minimize the transportation costs, all processing units are located close to the quarry sites. Processing generates much more pollutants in the form of noise and dust compared to the actual quarrying since it is done using hand tools.

The size of the units in terms of the number of employees is kept below 20 so that they do not come under the purview of the Factories Act. Due to his many labour protection measures are not applicable to processing units. Even measures like minimum wages are rarely implemented by Labour Inspectors and other government officials.

Both in the mines and processing units, there are no trade unions operating in the area. Wages are below minimum wages prescribed for both men and women despite the fact that processing involves working on machinery.

In the case of bauxite, no processing is done on site, as minerals are exported to distant places.

9.1.4 Protective Clothing

While a few workers were observed covering their faces to prevent involuntary inhalation of dust in the basalt processing units, in general no protective clothing is provided or worn by any worker in the mines or processing units.

While major accidents are rare, minor injuries such as cuts and bruises, skin diseases resulting from frequent contact with basalt dust, and respiratory diseases caused by inhalation of dust can be easily prevented with the help of protective clothing and masks. However these are completely absent in the study area. It is found that even supervisory staff do not have access to protective clothing.
In the case of bauxite mining as well no protective clothing is worn by workers who mostly work in open cast mines. Due to the nature of bauxite which is not present in the form of hard rock in the area, injuries are minimal.

9.2 Working Conditions
9.2.1 Opinions of Miners on Working Conditions
Since most mine workers are migrants who have escaped harsh economic conditions in their native villages, they mostly feel grateful for income earning opportunities, despite the fact that they are not happy with the working conditions. Most are not even aware of government guidelines regarding working conditions and wages. A few did speak in general terms about the long hours and heat, but few mentioned the need for amenities such as toilets and crèches. This could be because most workers hail from rural areas and the mines themselves are located in rural areas and in the absence of trade unions awareness levels are quite low.

9.2.2 Labour Pressure
As mentioned in the earlier section, there are no trade unions in the two areas studied for this report. A labour market also does not exist / has not emerged, which further depresses wages. Migrant labour is insecure lacking access to social and political networks, and is dependent on employment providers for monetary provisions. In such situations workers find it difficult to put pressure on employers to improve wags and working conditions.

Many workers also take cash advances from employers further tying them into exploitative and dependent relations.

In the case of vaddera itinerant miners, since mining is done by families and kin groups, income is theoretically shared by all but usually vests in the hands of male members, with females usually providing free labour.

9.2.3 Mining Season
9.2.4 Annual Cycle
The Wagholi area being located in a dry region with scarce rainfall, and hard rock basalt not liable to damage due to rains, mining goes on throughout the year. While most mine workers have permanently migrated, a small proportion consists of seasonal workers who seek work during the post-monsoon season when no cultivation takes place in the dryland areas. Therefore intensity of mining is greater during the December to May period.

Bauxite deposits once they are uncovered by the removal of surface soils however can be damaged due to the heavy rains typical of the Konkan area in which it is located. Hence all mining is stopped during the monsoon season. Prior to the monsoon season, during the summer for about two months workers go back to their villages to participate in family and community rituals and ceremonies, as well as to assist in the agricultural sowing operations. Hence bauxite mining mostly is restricted to the September March period.
9.2.5 Working Hours
Working hours are long both for basalt mining with normal working hours being 8.00 A.M. to 5.00 P.M., with a small half an hour break for lunch and water breaks and rest for about 10 minutes once in two hours. There are no formal rules regarding this, and the hours and periods of rest are by mutual agreement. Since payment is on piece rate basis (number of truck loads) workers tend not to slack off in order to maximize daily incomes.

9.3 Health and Safety
9.3.1 Opinions of Miners on Health Conditions
Basealt
Processing units are located close to the quarries generating a lot of dust which is continuously inhaled by people living and working in the vicinity. Long hours digging and loading/unloading using hand tools and equipment is also physically very tiring.

Workers and a few medical practitioners in the area mentioned a number of health problems including respiratory disorders, and water borne diseases, apart from cases of malnutrition especially among women and children. However most workers perceived the health problems as inevitable given their lack of choice as far as work is concerned. Income seems to be their primary concern rather than health issues.

While no formal safety measures and guidelines are adopted in the workplace, the low level of accidents has meant that workers really do not give much importance to safety issues. Safety is seen in terms of accidents and injuries and not in terms of health issues arising from working conditions and pollution.

Bauxite
Pollution levels are much less owing to the lack of bauxite processing in the vicinity of the mines. The bauxite mining itself generates some amount of noise and dust but on a limited scale when done with earth moving equipment. The actual breaking and sifting is done by hand and does not generate pollutants. Unlike basalt, bauxite mines in the study region are small mountain top deposits surrounded by forests and agricultural fields. Workers have no complaints regarding safety issues, especially since quarrying is done at shallow depths. However even here, no formal safety guidelines are followed or implemented.

9.3.2 Findings of ILO/Other Studies in Comparison with Present Reports by ILO (ILO, 1999), National Institute of Small Mines (2001), and NGOs suggest that there are health concerns but details are not available due to lack of substantive studies on this issue. The ILO report suggests that accidents and injuries in small scale mining are underreported. The reports also suggest that rather than direct work related accidents, what is more pervasive is long term health effects on workers and people living in the vicinity due to environmental pollution and resource degradation arising from mining and processing activities.
Apart from failure to follow safety and environmental regulations, illiteracy and lack of awareness, lack of formal training, and inadequate or obsolete equipment are also blamed on lack of safety in the mines and in processing.

Accidents are more frequent in underground rather than opencast mines.

Lack of access to potable drinking water, absence of sanitation facilities, and inadequate or non-use of protective clothing have huge health consequences as mentioned by these reports. In addition uranium mining and a few other minerals also pollute water and soil in nearby areas.

In the two study areas, accidents were found to be rare. However basalt processing is a highly polluting activity and causes immense harm to the health of individuals exposed to dust. Processing equipment were quite obsolete but were of the types that usually do not cause major injuries, since no small parts exists, and no worker actually get close to operational parts of the machinery.

10. SETTLEMENTS AND HOUSING OF MINERS

10.1 Pre-Existing Settlements
10.1.1 Introduction
Basalt in Wagholi
Basalt mining is mostly carried out in erstwhile uncultivated barren lands are in existing agricultural areas converted into quarries. There used to be agricultural settlements in the area, but they have declined in proportion to the expansion of mines, with most people shifting away or getting subsumed by the suburbanization process of Pune city.

Bauxite in Shriwardhan-Harihareswar
Except for some terrace farming on mountain slopes, there have been no settlements in these areas in the recent past. All settlements are lower down in the valleys nestling in the Western Ghats.

10.1.2 Pre-existing Towns, Villages and Settlements
Wagholi lies on the highway connecting Pune to eastern parts of Maharashtra. It has a very old temple which is many centuries old, and has been an important regional pilgrim centre. Being located close to Pune, it is becoming a part of Pune’s suburbs.

Villages in the area were practicing agriculture until the early 1970s when the mining sector expanded corresponding to the construction boom in western India.

Likewise Shriwardhan-Harihareswar has been an important pilgrim centre on the Konkan coast and is currently becoming a tourist hotspot functioning as weekend getaway for Bombay’s citizens, owing to its pristine beaches. Agriculture was and is the mainstay of the population living in these areas. mining is yet to affect the local people in a big away owing to its mountain top location.
10.2 Miner Settlements

10.2.1 Size

Wagholi
Settlements of mine workers are quite small ranging from 500 to 1000 square metres. There are two to three clusters of housing in each location covering 10-15 quarries.

Houses are basically huts or shanties built from a combination of basalt stones, tarpaulin, plastic and tin sheets and local vegetation. There are no permanent structures. Houses are low with no standing space (See picture).

Shriwardhan-Harihareswar
Workers here being seasonal, temporary housing is obtained in the villages below the mountain. These are temporary shelters built of vegetation, stone and mud.

10.2.2 Site Selection
In Wagholi, housing clusters are all located close to mining and processing units. They are located either on land acquired for processing and mining, or in nearby agricultural land converted into housing clusters by farmers who perceive greater profits from housing rent than from farming activity. Usually a group of mine workers negotiate with owners of mining / processing units or local landowners for establishing housing clusters.

In the case of Shriwardhan-Harihareswar, housing is located in nearby villages and the mining sites are reached by walking a distance of 3-5 kilometres.

10.2.3 Mobility
Basalt mine workers are mostly permanently migrated families. However traditional itinerant miners are nomadic but their numbers are declining. As mentioned earlier, there are agricultural workers from drought prone areas who migrate temporarily during the off season for agricultural operations. However the majority have migrated permanently.

Bauxite workers stay a part of the year in their native villages with and come to the mining sites after the end of the monsoon rains. Lack of other employment opportunities and tying of labour through cash advances prevents mobility to some extent.

10.2.4 Voluntary or Enforced Nomadic Character

For traditional mining communities such as the vadderas, migration is largely voluntary, though originally it was the lack of economic opportunities in their villages that prompted them to adopt a nomadic life. Both profits and traditional skills have led to some families still maintaining this life. However as members improve their economic status, they tend to settle down in order to avail amenities such as education and other needs.
Permanent and temporary or seasonal migrants are forced by economic circumstances to move from place to place in search of income generating activities by selling their labour.

10.2.6 Clusters of Settlements
Clustering of settlements have already been discussed in an earlier sub-section of this section.

10.3 Housing
10.3.1 Established Settlements – Commuters
10.3.2 Established Settlements – Process Workers
All mine workers and process workers commute short distance ranging from a hundred yards to 3-4 kilometres to their place of work. Usually they walk to work. Occasionally they may be transported back to their place of residence in the evening by trucks and pickups.

In Wagholi, despite the temporary nature of housing, the housing clusters have now become established as workers are staying here fore many years now.

10.3.3 Specific characters of Housing: Owned
10.3.4 Rental
10.3.5 Tent Housing
We did not come across any case of houses actually being owned by mine workers. All houses are either rented from landowners or erected on public land. Houses are built with a combination of material including stones, bricks, mud, vegetation, plastic, tin, and asbestos.

11. MINER SERVICE SECTOR
11.1 Pre-Existing Settlements – Activities
11.1.1 Good Buyer Shops
11.1.2 Mercury or Equipment Shops
11.1.3 Crushing of Hard-rock Ore
11.1.4 Milling of Hard-rock Ore
11.1.5 Sluicing of Milled hard-rock Ore
11.1.6 Gold Smelting
11.1.7 Manufacture of Wash-Plants
11.1.8 Manufacture of Mining and Separation Equipment
11.1.9 Manufacture of Gold Jewellery
11.1.10 Retailing to Ninjas
11.1.11 Transport Services
Bauxite is mined for manly for export and before the discovery of bauxite deposits in the region, no service sector existed relating to bauxite or any other mining.

In the case of basalt, traditional stone breakers worked to quarry basalt and sell them to small scale building material contractors and builders for several decades over the last fifty years. Currently they are mainly sold to wholesalers in the building material industry and directly to large building firms. No sale takes place at or near the mines and processing units.
Manufacture of mining and processing machinery takes place in the industrial cities of Maharashtra. Repairing is done at workshops and foundries in Pune city.

Transport services are not contracted out. Instead mine owners have their own or hired transport services to take the basalt to the nearby processing units.

Crushing, milling, and processing of basalt into different sizes is done at the processing units nearby. The large mine owners (among the small ones i.e. 10-15 acres), have their own processing units. The tiny ones (less than 5 acres) deliver basalt to these processing units. Processing units are usually located at the top of a quarry. A few have conveyor belts to take the basalt rock upto the units from the mines below. However most units get the material transported by trucks and tractors.

11.2 Settlements – Services from Local-Shops
11.2.1 General Provisions Store
11.2.2 Cafés, Karaoke and Bars
11.2.3 Slaughterhouses
11.2.4 Hairdressers/barber shops
11.2.5 Pharmacy Gers
11.2.6 Computer Games/cyber café, Phone Booths
11.2.7 Videos, Cinemas or other entertainments

While Wagholi is gradually becoming a part of suburban Pune, the middle class residential housing colonies are mostly located along the Pune highway from Wagholi, while the mines are located in the interior parts of Wagholi. Wagholi town has shopping facilities and other services, including fuel, pharmacies, small restaurants, provision stores, textiles, barbers etc. However it has no entertainment facilities for which one has to go to Pune city.

In the actual mining areas, few services or shops exist, except for an occasional grocery shop or home based restaurants. There is one clinic in the area we visited which has a part time Ayurvedic doctor.

The bauxite mines being located on mountain tops, there are no shops or any other service provider near the mines. These are located in the nearby villages and tourist (beach) resorts. The villages only have basic provision stores, and for most other services people need to travel to the nearest town which is between 10 and 20 kilometres away.

11.3 Settlements – Other Services
11.3.1 Rental Service
11.3.2 Financial Service --Buying/Marketing
11.3.3 Energy Supply Service – Electricity
11.3.4 Fuel Supply Service – Timber
11.3.5 Fuel Supply Service – Coal
11.3.6 Fuel Supply Service – Animal Dung
11.3.7 Fuel Supply Service – Rubber
11.3.8 Fuel Supply Service – Diesel and Petrol
11.3.9 Transport Service – Passengers
11.3.10 Transport Service – Placer Delivery

Wagholi
The nearest petrol bunk and bus station is in Wagholi which is at a distance of 3 to 10 kilometres from different quarries and mining settlements.

None of the other services are available in the area. Cooking is done mostly with the help of fuelwood collected from nearby rural areas. While electric supply is provided and available in the processing units and offices, none of the workers settlements have individual electricity connections. There are some street lights though which are in poor condition.

Shriwardhan – Harihareswar
Mine workers live in the villages and not close to the mines. Most cooking is done with fuelwood. Petrol bunks are in the nearest towns or highways. Most villages have formal electricity connections, but the mine worker settlements usually do not have electricity as they are seasonal workers, and have temporary shelters. Bus services connecting the villages exist but are quite restricted. No transportation exists from villages to the mining sites save for private transport of mining company officials and supervisors.

11.4 Settlements – Mining and Mineral Separation
11.4.1 Mining
11.4.2 Planning and Wash-Plants
11.4.3 Planning Gers
11.4.4 Contract Wash-Plants

11.5 Settlements – Manufacturing
11.5.1 Gold Jewellery Manufacturing
11.5.2 Wash-Plant Manufacturing
11.5.3 Furniture Manufacturing

11.6 Pitched Shops and Mobile Shops
11.6.1 Pitched Shops
11.6.2 Mobile Shops
11.6.3 Mobile Gold Buyers

11.7 Gender-Based Services
11.7.1 Ancillary Services Provided by Women
Wagholi
The grocery or kirana stores in the mining settlements were mostly managed by women and children. The accounts and relations with suppliers were managed by men. Men owning these shops usually had other smaller businesses to manage. Shops were mostly owned by Marwari banias.

In the home based restaurants near the quarries, cooking and cleaning were done by women while the serving and overall supervision and accounts were looked after by men.

Cleaning of small onsite offices were usually done by women.

Shops selling and providing all other goods and services in nearby villages and Wagholi town were usually run and managed by men.

Shriwardhan-Harihareswar
No ancillary services are provided in the actual mining sites.

12. Grades of Minerals Produced
12.1.1 Grade of Placer Deposits
12.1.2 Grade of Placers Washed
12.1.3 Grade of Hard-Rock Deposits

The basalt that is found in the Deccan Traps is a relatively uniform tholeiitic basalt. The depth of hard rock basalt goes down up to 50 feet. At lower levels once the hard rock deposit is exhausted, soft or porous basalt (vesicularbasalt) is found in which are embedded rare and extraordinary minerals such as cavansite, zeolite, apophyllite, vanadium, calcite and quartz.

13. Methods and Equipment
13.1 Tasks
13.1.1 Mining Tasks
Basalt
The major mining task is to excavate, and dig chunks of hard rock basalt. Once the solid basalt is completely exhausted, vesicular basalt is excavated carefully for other minerals including vanadium, cavansite, zeolite etc.

Once basalt is dug out, bigger chunks are cut into smaller pieces. The third stage is to transport them to the processing units.

Bauxite
The initial excavation is done with the help of small earth moving equipment. Once the soil is excavated, bauxite is dug out in the form of large chunks. This is transported by hand and trucks to points outside of the excavated area from they are loaded and transported to processors and exporters in India and abroad.
13.1.2 Processing Tasks
Processing involves crushing the basalt rocks into smaller pieces as per requirements for the building industry. Rocks are first fed into crushing machines. Crushed rocks come out through a conveyor belt into a collection spot, from where they are transported with the help of hand tools to a dumping spot nearby. From this place the shingle, kankar, fine powder etc. are loaded onto trucks for transportation. While some machinery crushes the rocks into different sizes at one go, others have to be adjusted each time to obtain material of different sizes. Fine dust generated from the cursing is also usually collected for mixing with sand during the construction process.

No processing of bauxite is done on site.

14.2 Equipment
14.2.1 Mining Equipment
Mining is done with the help of hand tools such as crowbars and picks in the basalt quarries. To extract rare minerals from vesicular basalt, delicate tools including picks and smaller crowbars are used.

Shovels and pans are used to load basalt onto the trucks for transportation.

Earth moving equipment are used in the bauxite mines in combination with hand tools for sifting, digging out, and moving bauxite deposits.

14.2.2 Processing Equipment
Basalt processing requires the use of simple but fairly large sized machinery most of which are made locally in Maharashtra. Machinery consists of crushers functioning with the help of conveyer belts to convey solid basalt into the crushing parts and then conveying the crushed mineral to a collection point. Some machines also sift and sort the crushed minerals by size.

No processing of bauxite is done on site.

14.3 Methods – Mining
14.3.1 Mining Methods of Hard-Rock Ninjas
14.3.2 Mining Methods of Placer Ninjas

Itinerant vaddera miners use hand held tools in quarrying and crushing of hard rock basalt. These include crowbars, pick axes, and shovels. Traditional mining does not extend to great depths. They usually prospect for areas where basalt outcrops exists on the surface, or take up quarrying on hill slopes where basalt is to be obtained, especially in Deccan region extending upto Bombay.

14.4 Method – Transport
Transportation of minerals to processing and / or export sites is done by pick up trucks, and trailers attached to tractors
14.5 Method – Processing
14.5.1 Mineral Processing Methods of Hard-Rock Ninjas
Please see 14.3.2 above.

14.5.2 Processing Methods of Placer Ninjas
14.5.3 Low % Gold Recovery of Traditional Wash-Plants
14.5.4 High % Good Recovery of some Modern Wash-Plants

14.6 Methods and Equipment in One or Two Case Study Village(s)
The information presented above in Section 14 pertains to two villages visited in
the Bauxite area and a rapid assessment tour through several villages in the
Wagholi area for basalt. All the information has been collected from primary
sources in the study villages and not from secondary sources.

15. TECHNOLOGY OF PRODUCTION
15.1 Overview
Technological dynamism is rarely observed in small and artisanal mines. In
general mining is done with hand held tools. Except in the processing units, no
energy source is used other than human energy. Tools used are unchanged for
several decades sometimes for more than a century. Lacking both official
support and the interest of the large scale sector, few advances take place in the
technologies used, as small miners do not have the capital required to invest in
technology upgradation. Cheap labour also prevents technological advances
being made.

Normally quality considerations, cost escalation, and the need to achieve
efficiency in the production process motivate technological changes. In the case
of basalt, processed basalt is mostly used by the local building industry within
the state. Quality norms are yet to be formally applied in much of the building
industry in India. For bauxite, since the raw mineral is exported, there is no need
for technology upscaling. This is in contrast to large bauxite mines which are
owned by large public and private companies which are also into processing and
exports and hence continuously upgrade their technologies. The large
availability of cheap migrant labour acts as a dampener on any technology
adoption by providing cheap labour in most sectors in India.

Concern for worker safety is also minimal and this also contributes to the
general apathy towards new technologies.

15.2 Technology Ladder
15.2.1 Advances in Clothing
As mentioned earlier no protective clothing is worn by the mine workers
anywhere in the two areas studied. No clothing is provided by mine owners
either. Miners wear their regular clothes usually consisting of traditional Indian
clothing, though there is an increasing tendency to wear western types of
trousers and shirts among males. No masks are worn to prevent inhalation of
pollutants, especially dust. Some work in a semi-naked fashion, and most are bare footed.

15.2.2 Advances in Mining, Panning
Hand held tools in the form of shovels and pick axes are the most common tools for basalt. In the case of bauxite, again as mentioned earlier, earth movers dig and excavate in the initial stage and further digging and sifting is done with the help of hand held tools. No panning is done at any of the mines visited.

15.2.3 Advances in Shaft Haulage

15.2.4 Advances in Crushing, Wash-Plants and Milling
The declining number of traditional artisanal basalt miners do the crushing by hand using hammers. Most crushing however is done with the help of simple machinery run with the electricity and diesel. These machines are manufactured locally in the state and incorporate basic grinding techniques. Machines are usually in a run down state. The use of modern techniques is conspicuous by its absence.

15.2.5 Advances in Washing Technology
15.2.6 Advances in Water Pumping

15.4 Technology Potential
15.4.1 Local Technology Transfer
India's public sector building material research organizations have developed technologies for production of construction material. However in the absence of government support and extension services, as well as the financial inability of small mining firms to invest in new technologies, these remain on the shelf. Much of the technologies developed are in the areas of cement and bricks. Not much work has been done on innovative uses of basalt rock.

Likewise technologies exist in the public and private sector for bauxite mining and processing. However in the case of the study area, since the mineral is exported and the size of the mines are small, a need for new technologies is not felt.

15.4.2 International Technology Transfer
UNIDO has supported R & D to use and develop basalt as a substitute for steel in construction to reinforce concrete. However the technology is fairly expensive and needs financial support from funding agencies or governments to be used by the mining sector, processing units, and the construction industry (UNIDO Annual Report, 2003). The technology offers an immense opportunity to move up the value scale for the basalt sector in India. India's Building Materials and Technology Promotion Council is a partner of UNIDO, but technology transfers are yet to take place from UNIDO to the basalt sector in India. A unified, industry wide initiative supported by sound government policies can help to revolutionize this sector. Despite the expense of the technology, it may be used by small miners if provided on a centralized basis to many miners in a locality or used on a cooperative basis.
16. INCOME AND FINANCIAL FLOWS

16.1 Income
16.1.1 Daily Income
Male workers on average get a daily income of Rs.100, while for female workers it ranges between 40-60. Skilled workers such as drivers and machine operators and supervisors make around Rs.200 per day.

16.1.2 Monthly Income
16.1.3 Annual Income
No estimates are available for the average income of mine owners. However informal and unscientific estimates put the annual income at Rs.500 million for the basalt mining and processing combined in the entire Wagholi region.

There are a number of illegal dealers and processors of basalt which makes it difficult to arrive at an accurate estimate.

The bauxite mine owners are secretive and refuse to part with income figures.

16.2 Financial Flows
16.2.1 Estimation of Financial Flows
16.2.2 Scale of Financial Flows
16.2.3 Expenditure on Goods and Services
16.2.4 Imports
16.2.5 Local Goods and Services

16.3 Legal Financial Flows
16.3.1 Legal Sales of Minerals by Mining Companies
16.3.2 Legal Sales of Informally Mined Minerals

16.4 Illegal Financial Flows
16.4.1 Leakage of Minerals from Mining Companies
16.4.2 Laundering Illegal Minerals by Mining Companies
16.4.3 Illegal Sales of Informally Mined Minerals
16.4.4 Channelling of Illegal Minerals
The bauxite minerals are all sold and exported legally. However basalt is mined and sold illegally, but the extent is not known. Leakage is not possible from the mines due to the close supervision, small size of the mines, and the nature of hard rock mineral which cannot be sold in small quantities or secretly taken away. Illegal sale takes place usually from illegal mines.

The extraction and sale of rare minerals excavated from the basalt quarries has not yet come under formal legal regulation.

17. FINANCIAL SECTOR ISSUES

17.1 Policy Options for Channelling Mineral Routes
17.1.1 Option 1: Via Mining Companies to Bank
17.1.2 Option 2: Via Authorised Buyers to Bank
17.2 Financial Benefit from Legal Channelling
17.2.1 Balance Payments – Official Exports
17.2.2 Balance Payments – Informal Exports
17.2.3 Central Government Revenue
17.2.4 Local Government Revenue
17.2.5 Smuggling and Organised Crime

18. LEGAL AND ADMINISTRATIVE ISSUES
18.1 Law and Order and Human Rights
18.1.1 Law and Order
18.1.2 Human Rights

18.2 Overview of Legal Issues
18.2.1 Exploration Licences
18.2.2 Mining Licenses
18.2.3 Central Government Measures to Legalise Informal Mining
18.2.4 Local Government Measures to Legalise

The present policy in India directs the Central Government to grant licenses for major minerals and state governments to grant licences for minor minerals. Licenses are given for prospecting, mining, and disposing of minerals. The policies regarding grant of licenses, and various rules and regulations pertaining to area, royalty, license fees, renewal, lease period and conditions, lease termination, transfer and sale – all of these are not uniform and differ by state.

Since most of the informal mining in Maharashtra pertain to minor minerals, leases and permits are granted and other rules framed by the state government working through the District Collectors. Currently there are no moves to legalize informal mining by the Central or State Governments. While the official view of the state government is to prevent informal mines from operating, unofficially officials benefit through bribes. In general, the attitude towards informal mining and small scale mining in general in Maharashtra is one of benign neglect.

18.3 Conflicts with Traditional Rights
18.3.1 Conflicts with Traditional Land Use Rights – Pastures, Forestry and Farming

In both the sites studied, there were no conflicts reported between previous land use and current land use for mining. In the Wagholi area, it was reported that agricultural land owners either converted them into quarries or sold of their land to miners and left the area.

In the bauxite mining area on mountain tops, terrace farming is practices side by side with mining in some areas in a limited way.

The important issue with reference to traditional rights pertains to traditional quarrying and stone crushing communities claiming the right to quarry basalt without permits and licenses, and without paying royalties. However the
presence of these communities in mining is declining as small firms are gradually taking over the mining sector for basalt.

18.4 Conflicts with Formal Legislation
18.4.1 Conflict with Minerals Laws of the Country
18.4.2 Conflict with Law on Subsoil Usage
18.4.3 Conflict with Environmental Protection Laws of the Country
18.4.4 Conflict with Water Laws of the Country
18.4.5 Conflict with Law on Environmental Impact Assessment

The Indian law officially does not define small, tiny, or informal mining. However indirectly by taking the small mines out of the purview of the Directorate General of Mines Safety and the Indian Bureau of Mines, a situation as emerged wherein neither do we have adequate policies and laws to deal with small and informal mines, nor do we have data and information on them.

From time to time environmental NGOs raise alarms about the environmental damage caused by the mining sector in general. However these are usually related to large scale mining, and mining of dangerous minerals such as uranium. Environmental NGOs in general have yet to formulate their views and strategies on the complex issues surrounding ASMs.

19. Self-Regulation and Co-operation Issues

19.1 Self-Regulation and Co-operation at Local Level
19.1.1 Unwritten Laws, Customs, Rituals and Taboo
For a long time communities such as the vadderas have claimed customary rights over mineral resources as well processing in terms of stone crushing, to the extent of preventing other castes from entering this sector.

This has however changed, and mine owners and workers now come from predominantly lower castes other than vadderas.

Through an unwritten law, it is reported that the government permitted the vadderas to carry out limited quarrying and also did not charge royalties and license fees.

All the quarries operated now however are predominantly licensed are illegal quarries, and there are few quarries set up based on customary rights.

The vadderas today are mostly stone crushers of small outcrops of basalt rocks on private or common lands.

19.1.2 Individual and Groups
19.1.3 Origin and Evolution of Mining Groups
19.1.4 Social Organisation of Mining
19.1.5 Social Organisation of Processing
The basalt mining was earlier controlled by traditional stone breaking and crushing communities, and others involved in construction. This was the state
before and during the British period. In the case of bauxite as well these communities had taken leases of small deposits.

Currently however mines are largely owned by bania caste owned firms or by dominant peasant castes of Maharashtra such as the Marathas.

The basalt mine business is closely linked to processing and construction. Some of the larger firms within the small scale category have interests in all three sectors, though the common phenomenon is for processing units to have captive mines. Most of the tiny quarries supply to the processing units owned by large mine owners.

Linkages through kinship and caste are quite common. Due to internal rivalries, there is no permanent or coherent association / organization to protect the interests of quarry owners. Similar is the case with itinerant and informal miners. The illegal miners for fear of attracting official attention, do not usually come out in the open in an organized way. there are no unions working in this sector for the workers.

19.2 Self-Regulation and Co-operation at National Level

20. ENVIRONMENTAL ISSUES
20.1 Environmental Factors
20.1.1 Negative and Positive Factors
Both the basalt and bauxite mines do not generate much air pollution. There is a certain amount of noise pollution which is mitigated by the fact that except for the workers' settlements there are no residential areas quite close to the quarries. No attempts are made to control or mitigate this pollution.

The environmental consequences are more in terms of degradation of arable land, and in some cases of lands rich in biodiversity.

The basalt processing units generate a lot of air pollution with a thick haze of dust hanging around the whole area almost permanently.

20.1.2 Growth of Impacts
The failure to restore degraded land caused by mining, the absence of any action to fill abandoned mines, and the future expansion of mining areas – all of these are likely to generate substantial future impacts. It is imperative that environmental norms are implemented and pro-active action is initiated to prevent further growth of adverse environmental impacts which may have adverse health consequences for workers as well as the expanding rural and urban settlements in the areas studied.

20.2 Activities Causing Impacts
20.3 Key Impacts
20.3.1 Air Quality
Basalt processing is the major polluter. The process of crushing basalt rock into construction material of various sizes and types generates a high amount of air pollution in terms of suspended particulate matter.
20.3.2 Water Quality
Water availability has actually increased in basalt mining areas. As minerals get exhausted, water emerges from springs and aquifers in dug up mines. Abandoned mines are providing water to local communities almost throughout the year whereas earlier there were hardly any lakes and ponds, and the few that existed dried up soon after the monsoons. The abandoned mines function as rain water harvesting structures, recharge ground water and with the help of underground springs provide water almost throughout the year including the usually dry summer months.

20.3.3 Local Ecosystems
20.3.4 Entire Ecosystems
20.3.5 Forests
20.3.6 Biodiversity
In the Wagholi area semi-arid agricultural tracts have been largely converted for mining purposes. Tree and plant species have dwindled as have animal and other non-floral species.

In Shriwardhan- Harihareswar, as yet the impacts have been minimal and restricted to a few parts of mountain tops in Western Ghats. A more through and detailed study is required to understand actual ecosystem impacts since the Western Ghats is a biodiversity rich region and new species are discovered here on a frequent basis.

20.3.7 Cultural Heritage
20.3.8 Indigenous Peoples
Indigenous people are involved in a major way either directly in mining or as people displaced by large mining projects in Maharashtra. However they don’t live in the areas studied living more in the eastern parts of the state and northern areas.

21. COMMUNITY ISSUES
21.1 Community Benefits
21.1.1 Poverty Reduction and Employment Generation
21.1.2 Local Economy
Poverty reduction by providing an additional source of income especially during the lean months has mainly occurred for migrants from poorer, drought prone areas. As many as 5000 people work in the mines in Wagholi area alone. The supervisory staff and drivers, technical workers are mostly from the local community but these jobs are few. The presence of quarries does not seem to have made much of an impact on the economic status of the region as observed by us. This could be because of the low wages of the workers. The owners all live in nearby urban settlements and not in the area itself.

Local communities have gradually become absorbed in the urbanization process in both areas. In the case of bauxite mines, the communities live at a distance from the mines, and since no processing is involved, there has not been much of an impact on the local economy.
A few enterprising landowners have rented out land for quarry workers and have become part of the rural rentier class from being cultivators.

21.1.3 Transport
Transport services for the minerals quarried are usually provided by locals who owned and operate tractor-trailers and trucks, and a few earth moving equipment.

21.1.4 Consumer Choice
21.1.5 Raising Revenue

21.2 Community Conflicts
21.2.1 Law and Order
21.2.2 Environment
21.2.3 Herders
No conflicts were observed in the areas studied. Interviews also did not yield much information on this. More detailed and indepth studies involving longer stay in the field is required to understand this aspect.

21.2.4 Health
21.2.5 Children
21.2.6 Prostitution

22 Public Services Issues
22.1 Public Services in Rural Areas

22.2 Public Services in Mining Settlements
21.2.1 Public Services in Pre-Existing Settlements
21.2.2 Public Services in Mining Settlements
No public services are available in the mining areas and settlements. There are no proper roads, and hence no public transport. Some areas have electricity but mine workers are too poor to avail these. All public hospitals also are located in nearby towns and large villages and none exist in the actual settlements. No schools or crèches exist for the children of mine workers.

23. Urban Settlement
23.1 Categories of Mining Settlements
23.1.1 Pre-Existing Settlements
23.1.2 Settlements
All the settlements are in rural areas but close to small towns and large villages.

23.2 Synergy with Other Settlements
23.2.1 Synergy with Nearby Settlements
23.2.2 Synergy with Large Urban Settlements
Wagholi has a good amount of synergy with nearby small towns and with the large city of Pune which is 30 kms away. The mines feed into the construction business in Pune and other cities in the state including Bombay whose own basalt quarries are now almost completely exhausted.
The bauxite mines however have almost no links with nearby villages and towns, since the minerals from the mines are directly sent to ports for export.

24. GOVERNMENT POLICIES TO STRENGTHEN THE RURAL ECONOMY

24.1 Rural Economy of the region
24.1.1 Miners and Rural Development Strategy
The government as such has no policy regarding the small mines and their role in the local economy and in bringing about sustainable development and reduction of poverty. Most policies in rural areas focus on agricultural development. Recent developments in the micro-finance sector also have bypassed mining areas perhaps because of the migrant nature of the population. Considering the current large numbers and the potential, it is important that ASMs are integrated into decentralized development strategies for rural development. This was stressed by a few of the key persons working in the sector.

24.1.2 Miners and the Sustainable Livelihoods Project
Mining provides an alternative livelihood strategy for most workers from the agricultural strategy and as such reduces the vulnerability context of these households. Hence there is a very good fit with the Sustainable Livelihoods framework of development. However workers situation is likely to improve in the long term only if suitable and appropriate measures are implemented with reference to education, health, pollution control, improved working conditions, and better wages.

25. IMPACTS ON OTHER/BIG MINING, EXPLORATION AND INVESTMENT

25.1 Interactions between Formal and Informal Miners
The mining sector as such in India is in the process of a major expansion, with the government permitting limited investments by foreign companies. The private sector has also been allowed to play a role in prospecting and mining to a much greater extent than was earlier possible. However this is happening mostly in the major minerals sector.

Basalt quarries in Maharashtra are almost exclusively in the hands of small companies, illegal miners, and small and artisanal miners. Given the nature of the building industry in India, no change is envisaged in this scenario in the near future.

Bauxite however is mostly in the hands of big mining companies. Prospecting in the Western Ghats area for minerals is still at a preliminary stage owing to the ecological sensitiveness of the entire region. It is possible that big companies may enter this region if larger deposits are found, provided they are able to overcome environmental guidelines and objections. The basalt deposits in Shriwardhan – Hariwardhan seem to spread over different parts of the mountain ranges across valleys and dips, and it may be difficult for big companies to acquire licenses to operate across such a vast area. Given the ecological importance and biodiversity of the area, it may be wiser to continue with the existing small scale mining arrangements.
25.2 Impacts
25.2.1 Impacts on Legal Mining
25.2.2 Impact on Legal Exploration
25.2.3 Impact on Investment
Government efforts in enhancing exploration and investments in the mining sector focus almost entirely on the major minerals. In the case of basalt while there is competition between legal and illegal mining it is not a major issue. Since production technology and working conditions are not very different in legal and illegal mining in basalt, there are few impacts of ASMs on legal mining.

Since small scale basalt mining mostly caters to the export sector, (newly industrializing countries and countries in transition), they may pose some competition to big companies. However big companies also tend to invest in value addition and processing and hence have a different market. The dynamics of small scale bauxite mining are not yet fully understood.

26. Synergy Between Informal and Formal Mining
26.1 Asymmetry
No informal mining exists for bauxite. A synergy exists in the case of basalt since they both cater to the same markets. The lack of quality consciousness among end users has meant that buyers do not have a preference for either formal or informal miners and suppliers. Cost considerations are the major issue rather than legal issues. However increasingly formal small scale companies are expressing their unhappiness with the cost cutting methods of informal miners who don’t pay taxes, royalties, and license fees.

26.2 Opportunities
26.2.1 Types of Opportunity
26.2.2 Mutual Advantages
26.2.3 Mining Company Advantages
26.2.4 ASM Miner Advantages

26.3 Policy Options
26.3.1 Fundamental Policy Options
26.3.2 Evolution of Choice
26.3.3 Discussion of Policy Options
26.3.4 Potential Gains
Basalt mining in Maharashtra has a long history of over 2000 years and so has emerged organically rather than through policy interventions. By generating and providing employment year round and seasonal employment it acts as a safety and coping mechanism for the rural poor in the agricultural sector. Essentially if working conditions are improved, labour laws are implemented and gender disparities in wages are removed or reduced, basalt mining is likely to provide immense gains in terms of employment and income generation in vast areas of the state. The market will take care of other technology, and business related issues with some support by government in terms of technology transfer.

As mentioned earlier, given the ecological importance of the Western ghats, small scale mining is a more sensible option and should be encouraged rather
than big mines, since impacts on local communities and displacement is also not an issue.

26.4 Elements Required for Synergy
26.4.1 Organising at Local Level
26.4.2 Organising at National Level
The relative advantages of formal and informal sectors must be recognized with reference to developmental issues such as poverty reduction, employment and income generation, and sustainable development. Policies addressing synergy issues must be based on an evaluation of these objectives and the contribution of ASMs to these. A formal recognition of the importance of ASMs, and their role in the economy is required for this both at the state and national level. It is also important that NGOs, CBOs and social movements adopt a more rational approach to mining activities and the involvement of the rural poor in these activities. A combination on biocentric and anthropocentric approaches are required for this to occur.

26.5 Permits
26.5.1 Permits for Individual Miners or Groups of Miners
26.5.2 What Should permits be granted for?
There has been a long history of informal and artisanal miners of basalt mining without permits and without paying royalties to the government. Pending legislation in the India Parliament regarding providing usufruct rights to tribal people in forest areas should be extended to provide mineral resource rights for local communities and smaller groups to extract minerals in a regulated way. Rather than individual small scale mining firms benefiting from mining activity, it would be more beneficial if mining was carried out by cooperatives of mine workers as has been tried out in the slate mines of Markapur in Andhra Pradesh.

This would recognize the traditional skills of artisanal communities and prevent their further marginalization, while at the same time bringing them into the mainstream and increasing their incomes and access to modern technologies.

26.6 Market Access
26.6.1 Shortcomings of the Temporary Regulations
26.6.2 Potential of Independent Legal Commercial Buyers

26.7 ASM Sector Management
ASM sector management is mostly restricted to giving permits and collecting royalties, and is highly decentralized. Greater management and regulation may lead to bureaucratization. In line with the guidelines and objectives of the 73rd Amendment to the India Constitution, it may be better to transfer management to local government bodies which supported by BGOs and mining community organizations can play a better role in the sustainable exploitation of mineral resources and development of local communities.

26.8 ASM Environmental Management
The most important requirement for ASMs in Maharashtra is capacity building to implement environmental norms and regulations. Environmental management is
conspicuous by its absence. While the bauxite mines are not very polluting, basalt processing is heavily polluting in terms of generation of dust.

Both in the case of basalt and bauxite mines, the long term consequences of mining in terms of land degradation have not been given attention. The turning of agricultural and forest land into quarries has implications for land quality, species diversity, and ecological balance. Reclaiming barren mines not just for landfills but for other economic, social, and recreational purposes should be considered.

27. CONTACT LIST OF NGOs, RESOURCE PERSONS AND GOVERNMENT OFFICIALS

1. Geological survey of India
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2. Indian Bureau of mines
   http://ibm.nic.in/
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Manoj Mitta, “Displacement is not the issue” New Indian Express 21 September 2000

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Images from the field: basalt and Bauxite mining in Maharashtra

1. A panoramic view of the stone crushing units from a quarry at Wagholi
2. A view of stone crushing units with the quarry in the foreground: Wagholi

3. Basalt quarrying: Wagholi
4. Basalt rock being loaded on to truck for transportation to the crushing units: Wagholi

5. Loading activity in a quarry: Wagholi
6. Another view of loading activity in a basalt quarry: Wagholi
7. A stone crushing unit: Wagholi

8. Stone crushing units: Wagholi
9. Stone crushing machinery: Wagholi

10. An abandoned / exhausted quarry next to an operational one: Wagholi
11. Women working in one of the bauxite mines: Shriwardhan

12. A bauxite mine at Shriwardhan
13. A close up view of a bauxite mine at Shriwardhan

14. Excavation of bauxite in an open cast mine
15. A housing colony of quarry workers in Wagholi