Budhpura 'Ground Zero'
Sandstone quarrying in India

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Introduction

This report, published by the India Committee of the Netherlands (ICN), is the result of independent research into sandstone quarrying in Budhpura village, Bundi district, Rajasthan state, India.

The report provides information on the quarrying of natural stone in India in general and in Rajasthan in particular as a background to the specifics of sandstone quarrying in Budhpura village. The report digs into the social, economic, and environmental impacts of quarrying for the local population, distinguishing between those who benefit most and those who hardly benefit. It turns out that huge profits are made in this business, but that those who do the hard work do not share in the generated wealth.

Budhpura village is the central focus of this study, but many of the findings apply to the entire natural stone production and export of Rajasthan. The choice for Budhpura as the main focus of this study was made since the Dutch town of Kampen has used sandstone from Budhpura for repaving its city centre. The report informs us that the export of sandstone to the Netherlands is considerable, and increasing.

In the context of its 'responsible business'- programme, the India Committee of the Netherlands, together with the Netherlands Society for Nature and Environment, is currently looking at the natural stone sector. ICN is attempting to engage the Dutch natural stone industry in dialogue and collaboration, in an effort to jointly address social and environmental issues associated with the production and processing of natural stone.

Objectives

Broadly, this study aims to provide an overview of sandstone quarrying in Budhpura village by sketching the situation and conditions under which sandstone quarrying and processing takes place in Budhpura village, Bundi district. This study critically assesses the economic, environmental and societal impacts of quarrying.

Methodology

The authors of the report are P. Madhavan and Dr. Sanjay Raj. Journalist-photographer P. Madhavan is connected to the Mine Labour Protection Campaign (MLPC)[1]. MLPC has its base in Jodhpur, Rajasthan. Dr. Sanjay Raj has a scientific background and is currently working as a consultant on mining issues.
In the spring of 2005, several visits were made to the quarries at Budhpura for first-hand experience of the industry and its problems. The authors have spoken with workers, quarry owners, as well as with government officials associated with the quarrying industry. The data collected by the field research are complemented by information derived from desk study. It has to be noted, however, that literature and specific data on quarrying in Budhpura are limited.

Reading guide

The first section, 'Value chain', explains where natural stone and specifically sand stone is found in India, details the value chain and provides figures on (export) revenue.

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The second section, 'Social-economic context', provides data and analysis of the administrative system of Budhpura village and its (migrant) population, and describes the changing economy, where agriculture is abandoned in favour of quarrying.

In the third section, 'Sandstone quarrying in Budhpura', data are provided on sandstone products and quarrying methods in use in Budhpura. Mechanisation of the quarrying industry is putting pressure on employment security.

The fourth section looks into labour and community issues; problematic phenomena such as bonded labour, child labour, the situation of women workers, poor wage patterns, failing occupational health and safety standards are analysed. The lack of organisations and representation of the mainly migrant quarry workers is described and explained in some detail.

The fifth section deals with environmental aspects of quarrying, specifically looking into the environmental damage done by careless waste disposal and the occurrence of fine quarry dust.

The first appendix lists the main natural stone products made in Budhpura.

The second appendix provides an overview of the relevant national and state legal provisions on community, labour and environmental issues relevant for the quarrying industry.

The cover photograph as well as the photographs on pages 8, 14, 19 and 22 are made by P. Madhavan. The photographs on pages 12 and 25 are made by P. Overeem.

1. Value chain

Sandstone as a resource

Sandstone is a sedimentary rock consisting of grains of sand ranging in diameter from 2-120mm. The colour of sandstone depends on the composition of the sand particles and the cementing material. India is rich in natural stone. A recent report released by the Centre for Development of Stone (CDoS), a Government of Rajasthan research unit, states that "there is an estimated reserve of 1,000 million tons of sandstone in the country". Natural stone, and specifically sandstone, is found in Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Meghalaya, Mizoram, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

In Rajasthan, sandstone is found in the Vindhyan and Trans-Aravalli regions comprising of 35,000 sq km. Nearly 8.37 million tons of sandstone have been quarried between 1999 and 2000 by over 1,700 companies in the districts of Dholpur, Bharatpur, Karauli, Sawai Madhopur, Tonk, Bundi, Jhalawar, Kota, Bhilwara and Chittorgarh.

India has two major Central Government organisations controlling the quarrying sector, namely: the Directorate General of Mines Safety (DGMS), previously known as Mines Inspectorate, and the Indian Bureau of Mines (IBM).

The DGMS implements the provisions of the Mines Act (1952) exclusively in the field of safety and labour welfare. The IBM operates primarily for the development of the

quarrying industry, under the statutory provisions of the Mines & Minerals (Regulation & Development) Act (MMRD), 1957. Under this act, the control of 'minor minerals', including natural stone, has been statutorily shifted by the central government to the state governments. The officers of IBM and DGMS have no authority to inspect and control the activities of 'minor mineral'-mines, and thus have no jurisdiction for collecting statistical figures of production, employment, number of quarries etc. on such quarries. They therefore depend upon the figures supplied by state governments, which are, unfortunately, not always reliable.

Possibly also owing to the abundance and easy availability of natural stone, not much importance has been given to estimate the resources. No comprehensive inventory exists, reliable statistical data are almost non-existent. This may also have to do with the absence of big companies involved in sandstone quarrying.

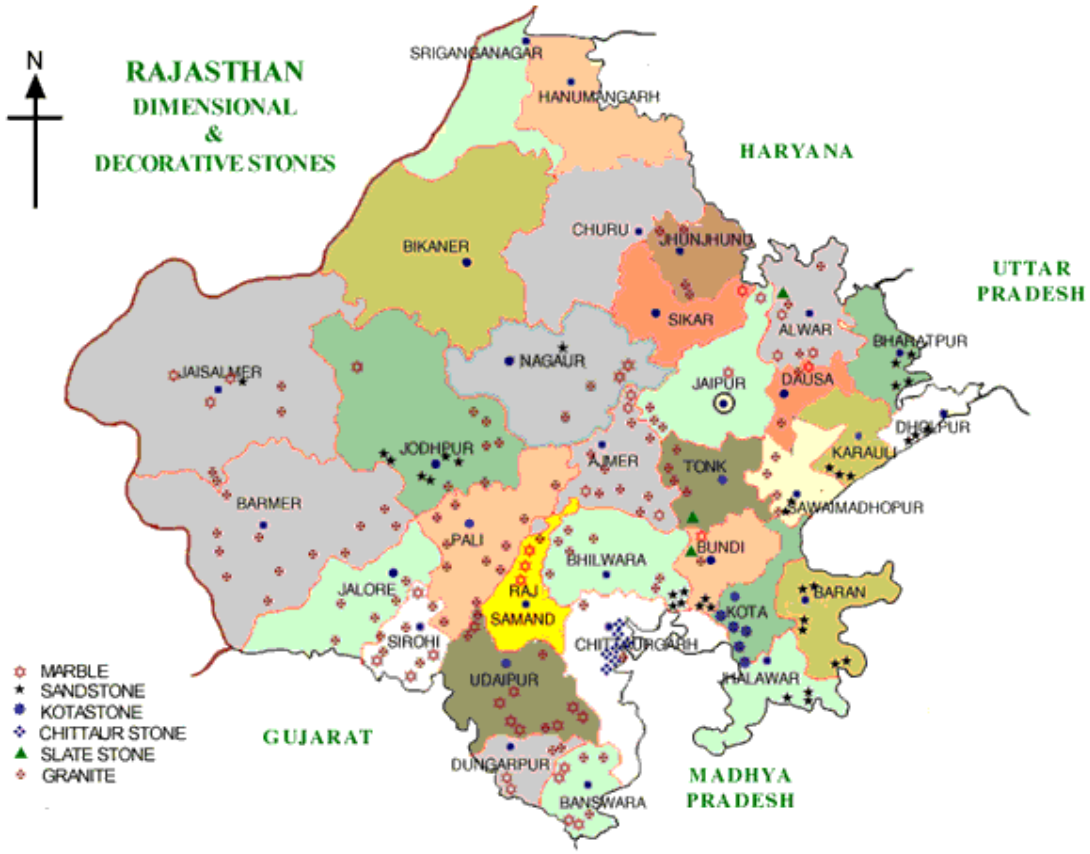

Table 1. Sandstone production in Rajasthan

year	*in million tons*
1995-1996	4,106
1996-1997	4,781
1997-1998	4,915
1998-1999	5,679
1999-2000	8,368

Revenue generation

India is one of the largest producers of dimensional stone - granite, marble, sandstone, slate and quartzite - in the world; India accounts for about 27% of the world's total natural stone production. Natural stone is hugely popular in India, as the following figures show. The domestic consumption of dimensional stone in India exceeds Rs50,000 million per annum or $1.163 million[2].

Rajasthan is the largest producer of dimensional stones in the country and accounts for about 90% of the country's total natural stone production. Looking at sandstone, Rajasthan contributes around 10% of the total production in the world, and accounts for more then 70% of total production in the country, or 6,5 million tons per year[3].

Rajasthan obtains revenue from the sandstone industry in the form of royalties and taxes, including royalties on excised and dispatched minerals, sales–tax, surcharge on finished products, road tax, and taxes on machines used by processing units. Also, the state government and the local administration obtain revenue in the form of dead rent and surface rent.

According to the available data, sandstone quarrying in Bundi district alone generated Rs67,195,242 ($1,56 million) as revenue in 2003-2004[4]. The sales tax received by the Rajasthan Government is fixed at Rs1,500 ($34.80) per 20 ton truck for slabs, and Rs1,400 ($32.50) per 20 ton truck for blocks. The dead rent, or fixed annual rent exclusive of royalties, collected on the level of the Budhpura quarries, between 2003-2004 amounted Rs12,695,242 ($295,238)[5]. Collected royalties[6] amounted to Rs54,500,000 ($1,267,442)[7]. On a Central Government level, a 4% central sales tax, income tax and corporate tax are levied.

Earning foreign exchange

India is a leading exporter of natural stone and ranks third in terms of tonnage, after Italy and China.

Rajasthan is a leading exporter of natural stone and has earned Rs2,324 million ($54 million) in 2000-2001[8]. Rajasthan's sandstone conforms to the highest international standards and has been used in well-known buildings all over the world. The surge in exports in the last two decades has led to increasing numbers of sandstone quarrying and processing units in Rajasthan. The total quantity of sandstone exported from Rajasthan in 2003-2004 was 354,298 tons. Rajasthan's earnings amounted to around Rs1,994.13 million ($46.37 million)[9].

Sandstone export from Rajasthan to the Netherlands alone has increased from Rs24.65 million ($0.57 million) in 1999-2000 to Rs101.17 million ($2.35 million) in

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[2] Dimensional Stone - Need for specialised technical education, K. Virendra Singh, President, Stone Industries & Quarrying Development Society, Jodhpur.
[3] Centre for Development of Stones (CDoS) , India.
[4] Department of Mines and Geology, Government of Rajasthan.
[5] Mr A. K. Nanduwal, Quarrying Engineer, Quarry Office II, Department of Mines and Geology, Government of Rajasthan.
[6] A contractual arrangement providing a mineral interest giving the owner a right to a fractional share of production or proceeds. It does not contain rights and obligations of operating a mineral property, and that is normally free and clear of exploration, developmental, and operating costs, except production taxes.
[7] Ibid 4.
[8] Rajasthan State Industrial Development & Investment Corporation. Ltd.
[9] Director General of Foreign Trade, Shri K.T. Chacko, Ministry of Commerce and Industry, Delhi.

2003-2004. Compared to the previous fiscal year (2002-2003), exports have increased by almost 114%[10].

Sandstone prices are based on quality, colour or pattern, but foremost on availability.

Table 2: Export of sandstone from Rajasthan to The Netherlands, value in million Rupees

	Year	*1999-2000*	*2000-01*	*2001-02*	*2002-03*	*2003-04*
1.	Sandstone, crude or roughly trimmed	9.08	15.71	36.44	22.88	15.74
2.	Sandstone, merely cut by sawing/otherwise into blocks/slabs of rectangular (incl. sq) shape	15.57	6.34	30.87	39.91	85.43
3.	Total export to The Netherlands	24,65	22.04	67.31	62.79	101.18
4.	Total International export	504.24	538.12	1,108.67	1,604.88	1,994.14

Budhpura: mother, daughter and son loading cobbles on a truck.

[10] Ibid 8.

Supply chain, Budhpura case

Quarry owners obtain a lease license from the government to quarry a certain area. Generally, the quarry lease is obtained for a period of 20 years. There are four main agencies involved in the lease process: (1) the Department of Mines and Geology, (2) the Department of Forests and Environment, (3) the Revenue Department, and (4) local bodies like the *panchayat samitis*[11]. The quarry lease is cleared by Quarry Office II for Budhpura, which resorts under the Mines and Geology Department. The surface lease[12] is given out by the Revenue Department. Co-ordination among the four agencies is very weak.

For sandstone quarrying in Budhpura, quarry licenses are given out for quarries ranging between 1-2 hectares. Plots that are over five hectares are officially not given on lease in Bundi district following a judgment by the Rajasthan High Court. However, the law is easily evaded, since quarrying companies apply for several leases under different names, ending up with plots of over five hectares in size.

In Budhpura, as well as in other parts of Bundi district, quarry owners are generally not involved in retail selling, processing or exporting of sandstone. The quarried sandstone is roughly sized or trimmed as per the specification of buyers. These buyers are generally traders with collection centres or warehouses in Kota, Jaipur or in Delhi. The buyers-traders sell crude or roughly trimmed sandstone to domestic and international customers.

In Jaipur, the capital of Rajasthan, there are seven processing units, engaging in processing and polishing of sandstone for international customers. These units have agents in Budhpura and other quarrying areas, who purchase the desired type and quality of sandstone. Subsequently the stone is transported to the processing units for final operations.

Some sandstone exporters have purchasing offices in Budhpura and export directly from the quarries.

At the quarry, labourers turn quarry waste into cobbles that are sold to agents with collection centres in Budhpura. The cobbles are sold on to exporters and local traders.

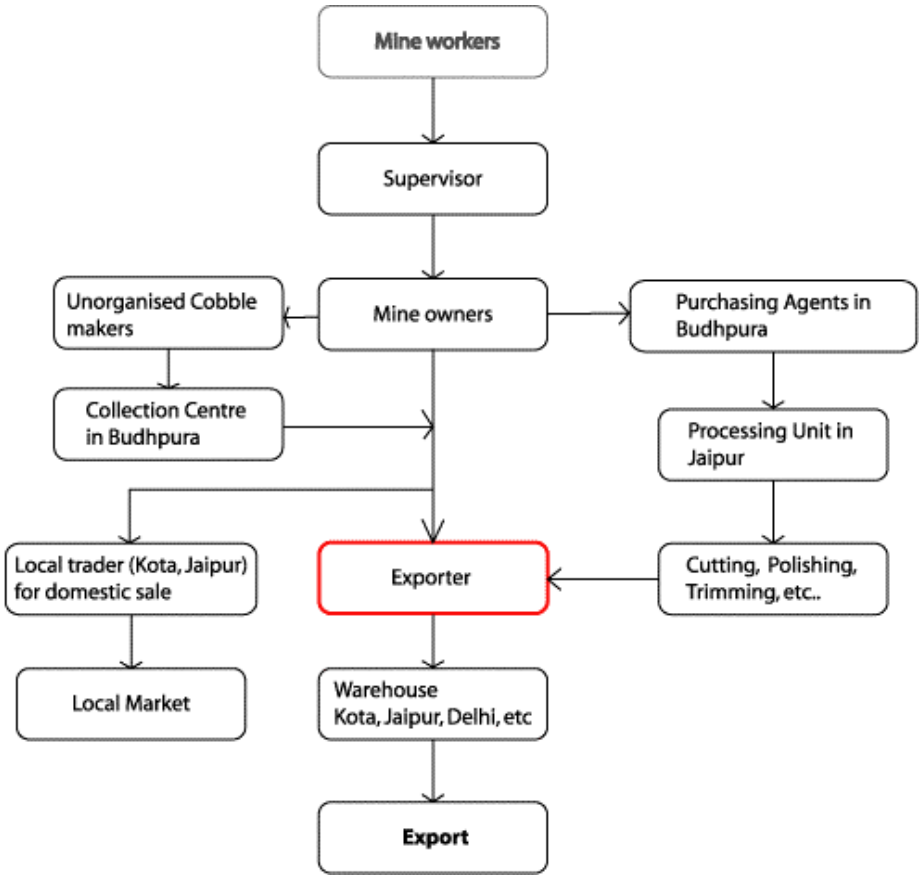
The Rajasthan natural stone industry alone employs about half a million workers[13].

[11] An administrative grouping of villages under constitutionally mandated elected councils.

[12] Lease collected by either the Revenue Department of the State Government of Rajasthan owning the surface of the land, in the case of government land; or by the land owner, in the case of private quarries. Usually a quarry owner buys land from a private land owner.

[13] Rajasthan State Industrial Development & Investment Corporation. Ltd.

Table 3. Supply chain from the Budhpura quarries up to the export levels



2. Social-economic context

Budhpura village falls under the *panchayat samiti* of Talera, in Bundi district. The Budhpura quarries are located in the southwest corner of Bundi district. The distance between the quarries and the district capital is approximately 55km. Bundi district capital is well connected by National Highway 76.

The total population of Budhpura is 4,387 people. The male-female ratio is around 1,000: 858. Nearly 45% of the total population is illiterate[14].

Caste and political relations

Gujjar, Bhil, Reghar, Chamar are the main caste groups of Budhpura. Bhil, Reghar and Chamar are listed as Scheduled Castes by the Indian Constitution. Gujjar is a low ranking Kshatriya sub-caste. A minority of the population consists of Jain, Rajput and Brahmins[15].

In Budhpura, as well as in the surrounding villages, the power of the *panchayat samiti* lays entirely in the hands of the dominant minority (caste) groups such as Jain, Rajput and Brahmin. The majority of the population, belonging to other ('lower') caste groups, is not represented in the *panchayat*. In the February 2005 *panchayat* election all the seats were won by candidates from the dominant 'high' (caste) groups.

Moreover, many quarry owners contested at the February 2005 local village elections and among this socio-economic group the postings of Village President (head of village) and Director (head of village parliament) were won. The obtained positions within the village administration reinforce the status of the quarry owners and provide them with the authority to exploit human and natural resources without being checked. This group enjoys political and government support to such an extent that it is difficult for others to assert their (legal) rights.

Changes in land use pattern

Traditionally, the economy of Budhpura village depends heavily on agriculture, dairy farming and connected activities. Nowadays, still nearly 70% of the population is involved in this sector, but increasingly part time only. The major crops cultivated in the area are paddy, jowar, maize, pulses and sesame. However, the harvest is often poor due to recurring drought. Farmers in Budhpura village, despite being landowners, earn very little. Many farmers are leaving their age-old occupation and handing over their

[14] Census 2001.

[15] Traditional Hindu society distinguishes four hereditary, endogamous social classes or subclasses, varna, stratified according to Hindu ritual purity: the Brahmin, Kshatriya, Vaisya, and Sudra castes. Besides this division into four varnas, (sub)castes or jatis are distinguished. Rajput and Gujjar are Kshatriya subcastes. Besides these groups, there is a large group of people generally known as 'outcasts' or Dalits. The Indian constitution allows the government to compile a schedule (list) of castes, races, or tribes …that are economically and socially disadvantaged and are therefore entitled to protection and specified benefits under the constitution. Dalits constitute the bulk of the Scheduled Castes. Also, the Indian constitution includes a schedule of tribes or tribal communities that are economically and socially disadvantaged and are entitled to specified benefits. The tribes are listed in the Fifth Schedule. Sometimes the term backward classes is used indicating citizens of India otherwise defined as members of Scheduled Castes, Scheduled Tribes, and other low-ranking and disadvantaged groups (sometimes referred to as Other Backward Classes). Discrimination against the Scheduled or Backward Classes is prohibited by Article 15 of the Indian constitution. The Scheduled or Backward Classes reportedly constitute an estimated 52 percent of India's population. Jainism is a separate branch of Hinduism. In Budhpura, Jains form an economically and socio-politically strong group.

lands to the Revenue Department, Subsequently, the land is leased out for quarrying. Farmers end up working in quarries as labourers or petty contractors.

The transformation of the land use pattern is not to the benefit of the inhabitants of the village. Analysis of *table 4* below reveals that the surface of irrigated land has decreased by almost 50%. Further, a considerable increase in cultivable wasteland has taken place. There is only a marginal increase (+9.88 hectare) in non-irrigated cultivable land and a 23% increase in the cultivable wasteland. While the village is totally dependent upon ground water for farming and for drinking water, the draining of quarries leads to siphoning off of groundwater from village wells.

Budhpura: agricultural lands make way for quarries and waste dumps.

Quarry owners are always keen to acquire new land for sandstone quarrying as export demand is increasing internationally. Since all revenue areas and government lands have been leased for sandstone quarrying, there is an increasing demand for agricultural lands to be turned into quarries. An acre of agricultural land in Budhpura is now priced at Rs1,500,000 ($34,884), an exceptionally high price for the region[16].

Quarrying is expanding along the length and breadth of Bundi district, and quarries are now found in adjoining districts as well, e.g. in Dhanesar, which is 13km from Budhpura, Gopalpura, Sutda, Dabi, and in Dhorela on the road to Bijoliya.

Cynically, with quarrying people earn not much more than with farming. There exists a huge disparity between the income of quarry labourers and farmers on the one hand, and quarry owners on the other hand. While the quarry owners are generally well off,

[16] Author's communication with farmers and villagers in Budhpura.

with hefty monthly earnings, quarry labourers earn between Rs1,200 and 4,000 per month ($27 to $93), depending on their skills.

Table 4. Changes in land use pattern

Village Dynamics	*Census 1981 (in hectares)*	*Census 2001 (in hectares)*
Total area of village	664.00	664.09
Forest area	150.00	159.07
Irrigated by source	39.00	19.95
Non-irrigated land	80.00	89.88
Cultivable wasteland	70.00	92.04
Area not available for agriculture	325.00	303.15

Quarrying and the death of agriculture

Agriculture is no longer a sustainable occupation for the Budhpura farmers. They are not able to reap a good harvest even when the rainfall is above average. The layers of quarry dust that settle on the leaves stall the growth and flowering of the crops.
The water level of wells and ponds in the areas has dropped drastically due to the frequent deepening of quarry pits around the village. The negligent disposal of quarry waste is aggravating this situation.

Expanding economy and corruption

As the economy in this small village is expanding, the level of corruption increases. Office staff in the Department of Mines and Geology in district capital Bundi demand RS5 ($0.12) for every single paper which is stamped officially[17].
There is a clear relation between the rampant violations of environmental and social norms, and the widespread corruption.

Twenty years ago, Budhpura was considered to be a punitive area for the government employees, because of its socio-economic backwardness. But this has changed. Nowadays, a police sub-inspector posted elsewhere is ready to pay Rs50,000 to 75,000 ($1,163 to 1,745) to get a posting in Dabi Police station[18].

3. Sandstone quarrying in Budhpura.

The general size of a quarry in Budhpura is 1-2 ha. According to the Department of Mines and Geology of the Government of Rajasthan there are 74 quarries in Budhpura. The real figure is much higher, due to illegal quarrying. Most of the quarries are partnership companies[19] and are controlled by landlords or their family members. Non of the quarries in Budhpura village are owned by local villagers. Outsiders own and operate the quarry companies.

[17] Author's communication with Mr. Pulchand, a quarry owner in Dabi.
[18] Author's communication with Dr. Siddiqui, journalist with the daily newspaper, Dainik Navjyoti.
[19] A partnership company is the association of two individuals or more, the purpose of which is trading under a corporate name.

Sandstone products made in Budhpura include cobbles, tiles, slabs, strips, bricks, pebbles and raw blocks. For a more detailed description of these products please refer to Appendix 1.

Budhpura: boys posing by cobbles they have cut.

Quarrying methods in Budhpura

Geologically the Bundi district area is part of the middle sandstone horizon of Bundi Hill Formation. The grey and brown sandstone found here has a thickness of 3-8m and is suitably made into slabs 5-7cm thick. Open cast quarrying is practiced in the area as the sandstone is found at shallow depths over a large area. Quarrying is mostly manual and labour oriented. In open cast quarrying, loosening, loading and transporting earth and rock in surface excavations take place in varying combinations, depending on the shape, size and depth of the pit, the local topography and the output required. The output method is adjusted to the size of the deposit, to secure minimum cost of production and removal of overburden. Removing of overburden is sometimes completed before the start of the quarrying, sometimes quarrying and stripping proceed simultaneously after a sufficient area has been uncovered. Stripping is done in one or more slices.

According to regulation, the overburden should be deposited within a reasonable distance and at a point where the dumped material does not interfere with subsequent quarrying, other economic activities or habitation, but in practice these regulations are not strictly followed.

Generally, no exploration is carried out beforehand to demonstrate the extension of the dividable sandstone. Topsoil and sub-soil are removed manually or by excavators. Under the topsoil usually there is hard, thick-bedded sandstone in which holes are drilled by jack hammer drills. Subsequent blasting breaks up the sandstone. The beds of sandstone are split by driving holes using chisels and hammers along bedding planes at an interval of 5-7cm. The beds are split along bedding planes once the chisels penetrate 5-7cm followed by their resizing into different sizes, as per the market demand.

Mechanisation of quarrying and processing

Quarrying of sandstone, which started some 40 years ago in Budhpura as a purely manual industry, is becoming increasingly mechanised. Technological upgrading is taking place in the sandstone as well as in the marble industry throughout Rajasthan.

Over the years, the quarrying area has expanded, as modern machinery can break down even the hardest of stones, exposing the soft underbelly of sandstone. The harder stones are first separated by chisels or drilling machines. Then a crowbar helps to size and split the layer along its natural cleavage to give the sandstone slab/tile a ready-to-use shape.

Quarrying equipment like gang saws, circular saws for granite, tiling plants, polishing machines, pneumatic jack hammers, diesel operated compressors, hydraulic jacks, splitting equipment, winches etc., are increasingly used in sandstone quarrying. For loading and unloading of blocks at quarrying and processing plants – jib cranes, derricks, excavators and mobile cranes have been introduced. For removal of blocks and over-burden dumpers, trucks, tractor, trolleys etc. are used, also by quarry owners in Budhpura.

Most of the machinery being presently installed by the natural stone processing industry, especially in the marble and sandstone sector, is made in India.

In the export market machine-cut tiles are in greater demand. This is evident from the fact that in 2003-2004, foreign exchange earned for crude or roughly trimmed sandstone was around Rs444 million ($10.32 million), while the slabs made with the help of machines earned around Rs1,550 million ($36.04 million). In order to meet the present export demand, those quarry owners who are in the position to do so are opting for simple edge cutting machines with single or double cutters to produce the required tiles.

More than the quarry owners even, it is now exporters who are installing the modern processing units to cut the sandstone as per the export demand. Demand for tiles that are 10-12 mm thick, with one side natural and the other calibrated, has led to the establishment of sandstone cutting and polishing units. The export market also demands honed and polished sandstone pieces[20].

Nevertheless, the majority of the quarries still produce hand-dressed slabs and tiles in different thicknesses.

4. Labour and community issues in Bundi district, and the Budhpura quarries

The registered population of Budhpura village amounts to about 4,400 people. However, the Budhpura quarries employ about 25,000 labourers, coming from Budhpura village as well as from the surrounding area. In the entire Bundi district, an estimated 100,000 quarry workers are employed.

[20] Author's communication with Stone Track Corporation, a natural stone processing firm in Jodhpur.

Labour exploitation in Budhpura

Under the Constitution of India, labour is on the 'Concurrent List'. This means that both the Central and State governments can enact legislation in the benefit of the workers. Safety, health and welfare of workers in quarries are regulated by the Mines Act, 1952. Employment in quarries, trade union rights and liabilities, dispute resolution and contract labour are also regulated under different Acts and Rules. Despite all these safeguards, quarry workers are heavily exploited, in Budhpura, as well in other areas. For an overview of relevant labour and environmental laws, see section 6.

Labourers are exploited in a number of ways. Due to the difficulties to make a decent living in agriculture on the one hand, and the increasing mechanisation in the quarrying sector on the other hand, the livelihood of most of the quarry workers stands threatened. Job insecurity makes quarry workers accept the harshest working conditions.

While the work force has increased due to the continuing influx of migrant workers, the daily wages of labourers have decreased. The labour rates have come down 10 to 15%, according to cobble makers and quarry workers interviewed, even though the sandstone export has grown.

Workers are paid according to the type of work they perform. Lifting debris, loading, unloading, and cleaning is categorised unskilled work, and is mostly done by women and older people. Semi-skilled work includes making big boulders, making holes in the sandstone beds – which does not need much experience. Skilled work includes making slabs, blocks and is mostly done by young men of the age group 18-45 years. Operating cranes and compressor also comes under skilled work. Cobble making requires precise skills and is mostly done by children, but is not valued as skilled work.

No safety equipment (helmet, safety jackets, masks etc.) is provided to workers, neither by the owners nor by the contractors. Workers lack even a basic understanding of the need for protection and refrain from taking protective measures themselves.

Workers are entitled to daily wages only. They cannot claim any medical expenses, insurance cover, earned holidays or any other compensation at the event of accident or death. No records are maintained for labourers, making it difficult for them to avail or claim compensation or any other benefits accrued on the quarrying company or from the government. Workers never work directly under the quarry owner – most of the time they are hired and paid by the contractor.

Recruitment mechanisms

Recruitment for quarry work is done not through conventional methods like advertising. Quarry labourers and other staff are found by word of mouth. The employer does not ask for any documents for identification or security deposits (though truck and tractor drivers have to submit their driving licenses to the quarry owner). Most of the reshuffling and new appointments happen soon after the rainy season when quarrying activities start again.

Migrant labour

Workers from other states are flocking to Budhpura because of the available work in the sandstone quarries. Most people come from Tamil Nadu, Kerala, Madhya Pradesh, Orissa, as well as from other parts of Rajasthan.

In 1962, when the Jawahar Sagar Dam near Kota was being built, numerous people migrated to Bundi district to be employed as construction workers. After the dam was completed in 1972, these people settled in Budhpura to work as quarry labourers. Today, there are second and third generations of these workers living and working in Budhpura. Despite of their long inhabitancy, they are not officially registered as residents of Budhpura, or of Bundi district, and are still regarded as outsiders and second rank citizens.

Most of the migrants in Budhpura are from Scheduled Tribes from Baran district in Rajasthan itself, or from Southern Uttar Pradesh, Orissa, or Jharkhand, as well as from Scheduled Classes from backward areas of Tamil Nadu, Andhra Pradesh, Bihar and Madhya Pradesh. On a seasonal basis, more migrant workers keep coming to Rajasthan. Especially at the end of the rainy season, when quarry activities pick up again, migrants arrive in big numbers.

The author estimates that between 80-90% of the quarry workers of the Budhpura quarries are regular migrants.

Bonded Labour

The Government of India recognizes bonded labour as a gross infringement of the fundamental human rights and is committed to its total eradication in the shortest possible time. India has ratified ILO Convention No. 29 (Forced Labour Convention 1930)on 30th November 1954. Following the ratification, the Bonded Labour System (Abolition) Act, 1976, was passed by the Parliament. It freed unilaterally all the bonded labourers with simultaneous liquidation of their debts. The State governments are supposed to implement the Act. Though not much quantified information is available on the extent of bonded labour in sandstone quarries, there are ample indications that the practice is still prevalent in Rajasthan.

During the rainy seasons (from July to September) there is no quarrying activity in the area and hence no employment nor revenue. Labourers are forced to take an advance of Rs10,000 to Rs15,000 to meet their needs and requirements in the period where they do not have any regular income. The borrowed amount has to be returned to the lender with due interest, within a certain period of time. Since there are no fixed interest rates, the borrower is forced to pay whatever the lender asks to pay. Illiteracy plays a major role as the borrower seldom cross checks or asks for the accounts from the lender. Often labourers have difficulties in repaying all debts before the start of the next monsoon. In this way debts are accumulated. Gradually, the cycle of debt turns the worker into a bonded labourer. Bonded to a particular quarry owner or contractor. This is common practice in Budhpura and surrounding areas[21].

The money disbursed to quarry workers during accidents or deaths is also regarded as loans that need to be repaid. Often, the children of indebted workers are forced to take over debts of their parents and are sucked into the bonded labour system.

[21] Author's communication with bonded labourers.

Also, there is a crude form of recruitment that leads to bonded labour. Agents in the villages of Madhya Pradesh, Uttar Pradesh, Orissa and Bihar bring villagers for excursions to Rajasthan, especially to Bundi and Kota. The agent sponsors the trip covering all the expenses for the trip. This includes travel, food, accommodation, sight seeing etc. Once the trip is over, the ignorant villagers are told to return huge amounts of money spent on them. Unable to return the amount these people are forced to work as bonded labourers in the Bundi and Kota quarrying areas.

Labourers and their families are sometimes tempted to buy televisions, DVDs and other luxury items by the contractor or the quarry owner. The price of these items is then deducted from the wages of these labourers at an inflated rate[22].

Alcoholism is another way of retaining bonded labour in Budhpura quarries. Illicit liquor is made and supplied to labourers at a subsided rate i.e. Rs10 per 180 ml. The lack of entertainment in Budhpura village promotes alcoholism, especially among male workers.

A bonded labourer can not freely decide to work for another quarry owner, unless the new employer agrees to pay off the worker's debts to the previous employer. The new employer than 'takes over' the labourer as his.

Child labourers, a curse on Budhpura

Children are considered to be the most important asset of a nation, yet they are often the most exploited segment of the population. The UNDP's Human Development Report puts the number of child workers in India at about 10% of the total labour force[23]. India has the largest number of non-school going children workers in the world.
The Constitution of India prohibits the employment of children below the age of 14 years in factories, mines or hazardous occupations. The National Policy for Children, compiled in 1974, envisages adequate services for children during their period of growth in order to ensure full physical, mental and social development. Child labour deprives children of educational opportunities, obstructs chances of vocational training and hampers their intellectual development.

The author estimates that out of the 100,000 quarry workers in Bundi District, roughly 15,000-20,000 are children. There are an estimated 8,000 child labourers involved in making cobbles in Budhpura alone[24]. Moreover, the author discerns a growth in child labour in the Budhpura sandstone quarries. This phenomenon is explained as follows:

- According to quarry workers, the low wages of parents (a daily average of Rs40-50) is one of the main reasons of increasing child labour[25].
- Alcoholism of male adults pushes children to supplement their father's earning.
- There is a severe lack of schooling facilities, especially to cater for the specific needs of the migrant workers. Migrant workers do not live permanently in the area, during the rainy season they return to their home villages. This makes it difficult for children to enrol in school. During the quarrying season, migrant

[22] Author's communication with bonded labourers, including Mr. Papu.
[23] Sontakey DR, Pathak SS. Combating child labour practice. Central Board for Workers Education under the ILO/IPEC/CBWE Action Programme, 1996.
[24] Author's communication with cobble makers in Budhpura, including Mr. Sivpaul.
[25] Author's communication with workers.

workers live close to or even at the quarries, which are 4-5km away from the main village where the schools are situated.

- Many children of quarry workers are born at and grow up around quarrying sites. These children get habituated while playing or helping their parents with quarrying activities. Psychologically, they get moulded and tend to develop a natural disinterest in studies even when educational opportunities would occur.
- Bonded labour remains one of the prime causes of child labour in Budhpura. At any time when debts exceed the parents' repaying capacity, they tend to induct their children into work in order to supplement the income of the family. In case of death of a labourer who has borrowed money for medication, the entire debt burden falls upon his or her children.

Budhpura: women with her child.

Children are mostly engaged in making cobbles and small blocks from sandstone quarry waste. There is quarry waste in abundance that does not directly bring substantial revenue to the quarry owner. At the same time, there is an increasing demand for cobbles for the export, used for pavement. Exporters or quarry owners employ children directly at their collection centres. Children are known to deliver a good job because of their flexible hands and gentle pressure. For a 12x12x8 cm piece of cobble a child is paid between from Rs0.40 to Rs1.25. Theoretically, a child can make up to a 100 pieces a day. However, this largely depends on the type of stone, the quality of the waste available, and the demand for cobbles. It is very difficult to set a daily or a monthly average[26].

Quarry owners make money out of quarrying waste. Even though quarry waste is often dumped, workers have to pay Rs500 for a two tons tractor load of sandstone quarry waste.

Despite of the rampant practice of child and bonded labour in Budhpura and a well informed public, not a single case gets reported at Dabi police station[27].

[26] Author's communication with child workers in Budhpura and Dabi.
[27] Author's communication with Mr. Siddiq, Sub-Inspector of Police.

Women workers: worst sufferers

Women have a huge presence among the workforce in the Budhpura quarries. But sadly, they are deprived of even the minimum wages, welfare and other aspirations. Women have very little statistical existence in the employment records of quarries, whether with the government or with the quarrying companies. They are never employed on a permanent basis. The basic nature of their work requires strenuous physical labour in heat and dust. Women work in the open, braving sun, rain and heat waves. There are no public utilities like toilets at the quarry sites.

Women are employed both on daily wages as well as on piece rate. In a daily wage system a woman may earn between Rs40-60 per day, for a full working day starting at 8am in the morning and ending at sunset. However, women will only find work on a daily wage basis for a limited number of days per month.
In the piece rate system, the women are paid anywhere between Rs0.80-1.20 per piece of stone they shape (differs with size). Women may make between 50 and 100 pieces per day (differs with size). However, not all days are the same, and a rate of 100 pieces per day for Rs1.20 a piece is not met throughout the month.

There is no concept of paid leave, be it maternity leave or medical leave. However, according to the Maternity Benefits Act, 1961, "every woman is entitled to the payment of maternity benefit at the rate of the average daily wage for the period of her actual absence immediately preceding and including the day of her delivery and for the six weeks immediately following that day. To be eligible for maternity benefit, a woman should have worked in an establishment for not less than 160 days in the twelve months immediately prior to the date of her expected delivery"[28]. The practice at the Budhpura quarries is in stark contrast with the provisions of this Act, as women labourers, even those who have been working for several years, are not entitled to any maternity benefits.

Increasing mechanisation has affected the livelihood of women since most of the work done by them like loading of waste rocks and clearing places in quarries is increasingly being taken over by machines. The women are losing their jobs at an alarming rate in the Budhpura quarries. This is leading to drastic economic and mental pressure on the women because they need to earn for their households. Maintaining a family is very difficult work for women in the quarrying area. During off-days, women travel at least 6-7km to get firewood from the forest. Most families entirely depend on firewood for cooking, while some families use dried cow dung as a fuel.

Workers organisation - trade unions

There is no union or association of labourers in Budhpura. In 1957, the Congress Labour Union was formed and became active in Kota and Bundi districts. However, it never got extended to Budhpura village. There are several reasons for the failure of unions. Since an estimated 80-90% of the labourers are migrants who constantly keep moving it is almost impossible to form a permanent union. Also, the labour force is very heterogeneous, with many people originating from different regions and with diverse cultural backgrounds. Migrants are not integrating into the resident population. As a result, different migrant workers tend to live in their respective cultural clusters, which curtails communications with other workers or inhabitants of the village. In addition,

[28] http://www.womenexcel.com/law/maternity.htm

the low wages have a negative impact on the morale of the labourers– they feel insecure and spineless. Then again, the confusing (sub)contracting system leaves labourers clueless about which authority to report to. Finally, bonded labour is another important reason for the unorganised labour force.

Wage pattern in Budhpura

In Budhpura, wage patterns differ for different quarries. The average wages are as follows:

- ✓ For chiselling one foot of sandstone slab, a labourer is paid Rs1 ($0.023). An experienced adult worker may chisel 100 feet a day, thereby earning a maximum of Rs100 per day (ca. $2.3).
- ✓ For chiselling one foot of sandstone block, a labourer is paid Rs4 ($0.092). An experienced adult worker may chisel 25-30 feet of sandstone per day, thereby earning Rs120 or $ 2.76 per day.
- ✓ Women and children are employed for making dimensional stones. E.g. in order to make one stone sized 12x12x8cm Rs1-1.25 is paid per person. One can make a maximum of 100 pieces a day.
- ✓ A female worker gets Rs40-60 ($0.93-1.3) for working minimally 8 hours as a loader in the quarries.
- ✓ A supervisor gets a monthly salary of Rs4,000-6,000 (($93-140) depending upon his experience and closeness to the quarry owner.
- ✓ Truck and tractor drivers get Rs2,500-4,000 ($58-93) per month[29].

It is important to bear in mind that it is extremely difficult to calculate a monthly income on the basis of these daily earnings since work in the quarries depends on a number of variable factors. Besides quarrying being a seasonal employment, possibilities to earn a decent income depend on the availability of the stone, the quality of the stone, the cut, the demand, the weather conditions, etcetera.

Most of the mechanical jobs are on a contractual basis. It is difficult to estimate the average income of contractual labourers, but it is clear that their salary is higher than what the informal quarry labourers earn. Informal wages are settled every Monday of the week, while contractual salaries are settled between the 5th and the 7th of each month. In some quarries, salary disbursement is organised in such a way that workers draw small amounts every week, with the balance settled at the end of the month. This, however, enables quarry owners to exploit illiterate quarry workers who rely on the calculations of the contractor or the quarry owner and never dare to cross check the amount.

As pointed out above, during the three months of rain the seasonal labourers have no work and are not paid. In this period, most labourers visit their native places. The rainy season provides employment opportunities for just a few people, often at only half of their actual wages. Quarry activities that continue during the rainy season include chiselling of stocked stone to make slabs and cobbles, as well as the splitting and sizing of rocks. During the dry seasons, quarry owners engage in reckless quarrying, sometimes quarrying is even taking place during the night hours. Stone is stockpiled in order to maintain constant output during the rainy season. So while quarry labourers are badly affected by the off-season, the quarry owners are hardly at a loss.

[29] Author's communications with workers in the Budhpura quarries.

Holidays

There is no marked holiday system in force in Budhpura village and the neighbouring quarrying area. However, Amavasya (the monthly no-moon day) and the two yearly prime Hindu festivals Holi (festival of colours) and Diwali (festival of lights) are observed.

Poor housing

Migrant labourers make their own houses near the quarrying sites. Usually the quarry owner demarcates some part of the quarrying area for constructing houses. The houses are mostly temporary and unplanned. Labourers are allowed to live in such houses as long as they work in the quarries and have to vacate them once they quit. There are no proper sanitation or water facilities available in the quarrying areas. Most of the people use quarry water for washing clothes and bathing. Women walk up to 1-2km to either Budhpura or Parana village to get drinking water. The houses of workers do not have a legal electricity connection. Illegal (and dangerous) connections are rampant.

Phalna, Pali district: typical housing at the quarry site.

Alcoholism in Budhpura

The growing trend of alcoholism has brought more misery to the lives of labourers and their families. Women and children are the worst affected. As much as 85% of the quarry workers are alcoholics, guesses the Dabi wine office[30]. Between February 2004 and February 2005, alcohol worth Rs32 million ($0.74 million) was sold in Budhpura and its surrounding villages, which is Rs4 million ($0.093 million) more than 2003-2004[31]. A local brand called *Sada* (country made liquor), manufactured and sold by the government of Rajasthan, is very popular among the workers. A 180ml bottle costs a mere Rs27 ($0.62), compared to branded liquor that costs at least Rs50 ($1.16) for the

[30] Wine office, Dabi, Bundi District.
[31] Ibid 29.

same quantity. Illicit liquor is also popular with the workers. A 180ml bottle of illegal liquor is sold for Rs10 ($0.232). Apart from alcohol, marijuana and other drugs are also available in the market. These goods are not very popular because of the high costs[32].

Failing health standards

While death is sudden in accidents, it can be slow and painful for workers afflicted by occupational diseases. Silicosis, tuberculosis and bronchitis due to inhalation of dust are common among quarry workers. Mechanisation generates finer dust particles. Finer dust particles remain suspended in the air for longer periods and are therefore more easily inhaled by the quarry workers. The absence of safety equipment increases the vulnerability of the workers.

Silicosis, the killer disease

Workers in mines and quarries form a high-risk group. They inhale minute dust particles (varying in sizes from 0.1 micron to 150 microns). The average life of a quarry worker is estimated to be between 40 to 50 years. Inhalation and deposition of silica particles in the lungs result in silicosis, which leads to pulmonary fibrosis and premature death[33]. Quarry owners are insensitive to the situation and not keen to provide safety equipment to the workers. Lack of awareness and the poor nutritional status of the labourers worsen the situation. This problem is particularly serious in Budhpura and surrounding quarrying areas since there is no hospital or well equipped healthcare centre. The primary healthcare centre in Budhpura does not have a doctor. In the absence of qualified doctors, the people of Budhpura, including the quarry workers, have to rely on unqualified local doctors for treatment. Quarry owners or the contractors do not take responsibility for any treatment or healthcare facility either for minor or major accidents. Labourers pay for their own medical expenses. Moreover, workers are not paid for the days they are absent from work due to accidents or sickness. The vulnerability of quarry workers, reflected in the accident rate, is compounded by the fact that the quarry owners do not implement the Workmen's Compensation Act.

Malaria in Budhpura

Malaria in Budhpura is a man-made disaster. The water that is collected in pits of the quarries is ideal breeding ground for mosquitoes. Delay in seeking medical help, poor observance to complete a course of drugs, emergence of multi-drug resistant strains of the disease, discontinuation and repeated resumption of treatment for short periods, malnutrition, socio economic factors like unawareness, poverty, overcrowding, poor housing, all these aspects play a role in the slow progress in achieving control over malaria.

[32] Ibid 29.
[33] Health for the Millions, Volume 25, No. 4.

5. Environmental and ecological issues

Waste disposal

The quarrying industry in general and the stone industry in particular, are yet to learn how to tackle air, water and noise pollution. Even the state is not willing to monitor the pollution level in Budhpura. The Rajasthan State Pollution Control Board (RSPCB) does not have data on air and water pollution in the region, despite the fact that the RSPCB's regional office is located in Kota, only 45 km from Budhpura.

In the Budhpura quarries, the mineral recovery, or the amount of usable stone, has never been more than 25% of all the material upturned. The material covering a mineral seam or stone bed that needs to be removed before the stone can be quarried is called *overburden*. This includes the topsoil. The usable stone-waste ratio has varied between 1:10 to 1:8[34]. Quarry waste consists of overburden plus production waste. There is a considerable amount of waste generated from trimming of edges of the slabs. Broken pieces, irregular and odd shaped blocks lie scattered in the quarrying areas as well as in processing units. The quarrying waste is dumped in forest areas as well as on land belonging to the revenue department, generally without permission, destroying the natural vegetation and ecology of the area. There are many waste dumps of 5-20 meter in height around the Budhpura quarrying sites. Owners dump wherever they find empty areas. It is very difficult to accurately estimate the number of dumps, but the scattered debris seems to occupy a much larger area than the actual quarrying territory.

A number of new mines is coming up at the moment around Budhpura village, as well as at Dhanesher, which is 15km from Budhpura. The owners of these quarries have so widely spread out their dumps that waste has been piled up around a temple built by Dalits from Tamil Nadu making it inaccessible for visitors. The National highway 76 carries a board displaying a message: "*Any one dumping quarry waste within a boundary of 100 meter on either side of the road is liable to be punished under section 132 and 133 of Indian Penal code*". Despite of the displayed warning one can see quarry waste dumped next to the road itself i.e. within 5 to 8 meter on either side of the road.
Though aware of the violations taking place, the government and the quarrying department hold a lackadaisical attitude towards this situation.

[34] Regenerating a clean and green environment in dimensional limestone quarrying: a case study, by S. C. Agarwal

Budhpura: freshly cut slabs and quarry waste hills.

Erosion of Budhpura water regime

Unsustainable quarrying for over four decades has created a severe scarcity of drinking water for humans and livestock in the Budhpura quarrying area. Despite 76.41 cm of average rainfall in Bundi district, water is scarce especially from January to June till the time for the next rainfall in July, August and September. Persistent excavation to a depth of over 30 meter has disturbed the water regime. Indiscriminate draining of deep quarries after rains, leads to siphoning of groundwater from adjoining wells. Fast

depletion and degradation of the topsoil due to dumping of quarry waste has hampered water percolation leading to scarcity of groundwater in the area. Budhpura village is one of the worst affected villages compared to other nearby villages, due to the fact that this area hosts the oldest (and deepest) quarries in Bundi district. This leads to excessive pumping of water by the quarrying companies in order to reach the lowest sandstone seams. The village has 109.83 hectares of agricultural land, mainly dependent on groundwater[35]. Due to the scarcity of water farmers have given up sowing water-intensive crops like rice and wheat. Instead, they are growing mustard crops in all seasons, which, however, never yield an encouraging harvest.

Dust and noise pollution

Open cast quarrying, drilling, screening, blasting, sand transportation, sandstone preparation and other quarry activities are leading to air pollution. Budhpura is facing a serious problem of sand dust particles and suspended particulate matter. The dust generated by sandstone quarrying concentrates near the ground level and this leads to breathing problems, which aggravates during windy conditions. Concentration of suspended particulate matter exceeds the national ambient air quality standards. The Kota data on national ambient quality of suspended air particles (of less than 10 microns in size) is 96.2 microgram per cubic meter for the year 2003. According to the Central Pollution Control Board (CPCB) classification system, this falls into critical pollution level, as the safe level is 60 microgram per cubic meter[36].
The dust generated from sandstone quarrying severely affects crops.

Impact of quarrying upon local wildlife, biodiversity

In total disregard of the Explosives act, 1884: "No person shall use explosives for blasting purposes unless he employs a qualified shot-firer holding a short-firer's permit granted under Mines act, 1952", untrained quarry workers at the Budhpura quarries regularly detonate explosives to break down the rocks. The vibrations caused by detonations, apart from generating noise, are opening up joints, fractures and fissures already there in the hill slopes. Budhpura villagers report that the milk production of cows has also reduced drastically[37]. Noise from vehicular traffic, including off-road vehicles, has the potential to disrupt wildlife, sometimes preventing normal reproductive processes. Although some wildlife may become accustomed to blasting noises, others will move from the area, potentially reducing the population of that species[38]. The deep bore blasting in Budhpura mines, which are done even during the nights, disturbs the breeding cycle of wildlife like black bears, panthers and wild bears. Over the years, the numbers of animals like the black buck, Indian gazelle or chinkara, bakra, nilgai or blue bull, sambhar, common Indian hare, red lynx, hyena and cheetah have been declining[39].

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[35] Ibid 34.
[36] National ambient air quality status, 1998-2003, Published by Central Pollution Control Board, New Delhi. Potential Environmental Impacts of Hard Rock Quarrying, http://books.nap.edu/html/hardrock_fed_lands/appB.html
[37] Author's communication with villagers.
[38] Potential environmental impacts of hard rock quarrying, http://books.nap.edu/html/hardrock_fed_lands/appB.html
[39] Author's communication with forest ranger, Dabi Circle, Bundi district.

Rehabilitation schemes for abandoned quarries

Before a quarry is closed, the local government requirs to be informed under Rule 23 of the Mineral Conservation and Development Rules, 1988. Among other things, it is stipulated that the quarry workings should be fenced, in order to avoid any untoward incident. In Budhpura this is far from common practice. If a quarry is no longer economically profitable, the owner abandons the quarry like that, to move on to new areas, without any reclamation or restoration carried out. There is no specific legislation in India, which covers the requirements for environmental protection during the closure of a mine.

Appendix 1. Sandstone products made in Budhpura

Cobbles
Cobble stone sizes lie anywhere between a boulder and a pebble. Cobbles are hand made from quarry waste. Cobbles are widely used for decorative purposes. Cobbles are fireproof, require little maintenance and need not be painted.

Tiles
Sandstone tiles are emerging as an important building material. The tiles are mostly four-sided, but vary in size as well as in thickness. Sandstone tiles can have either surfaces rough, one surface sawn (polished), or both surfaces sawn. Sandstone tiles are mostly used for flooring and (wall) cladding. A large variety of household artefacts is created from tiles.

Slabs
Slabs are flat, broad moulds of sandstone, available in various shapes- square, rectangular, round, oval, etc. The size of sandstone slabs varies from normal size of 1'x1', to 10ft x 2ft. The thickness supplied ranges from 1-10cm, or above. The stone can be both rough surfaced, or one surface polished, or both surfaces sawn in the desired thickness. Again, a large variety of household artefacts is created using slabs as a basis. Sandstone finds many other applications like making of tables, benches, gravestones, and so on.

Strips
Widely used in construction industry worldwide, sandstone strips are long, narrow pieces with uniform width. Sandstone strips have become important components of any construction project using sandstone. Sandstone is cut into strips of varying lengths and widths, as per requirement. These can be custom-designed or made in different dimensions for varied applications. The highly durable sandstone strips are used for wall cladding, roofing and flooring purposes. Differently coloured strips are used to make varied designs on walls.

Bricks
Sandstone bricks are used for walls and paving hard surfaced floors. Walls made of sandstone bricks need not be painted. Sandstone is quite hard, compact, fine, and possess good compressive strength and low absorption property.

Pebbles
Pebbles are small, often round, sometimes somewhat square stones that are naturally available or mechanically created in various sizes. Pebbles are decorative stones mostly used in houses, artificial ponds, fountains, lounges, open-air theatres, aquaria, parks, out-houses and gardens.

Raw blocks
Raw sandstone blocks are large pieces of sandstone without a fixed shape that are chiselled and cut into different forms. Raw blocks are often used for carving out statues and monuments, or sawn into slabs or tiles with the use of a cutter or a gang saw.

Appendix 2. National and State legal provisions on community, labour and environmental issues

The main law applicable on labour aspects of natural stone quarrying is the Rajasthan Minor Mineral Concession Rules, 1986. Environmental aspects are dealt with in respectively the Environmental Protection Act, 1986; the Forest Conservation Act, 1980; the Air Act, 1981 & Rules; and the Water Pollution Act, 1974 & Rules.

Environment (Protection) Act, 1986

Under this measure, the central government has responsibility for deciding standards, restricting industrial sites, laying down procedures and safeguards for accident prevention and handling of hazardous waste, oversight of investigations and research on pollution issues, on-site inspections, establishment of laboratories, and collection and dissemination of information. Samples collected by central government officials can be admissible in court. The Department of Environment, Forests and Wildlife, which is within the Ministry of Environment and Forestry, was designated as the lead agency for administration and enforcement. The bill also sets standards on specific pollutants in specific industrial sectors. The measure provides guidelines for location of industries and quarrying areas, for permitting and restricting industries in environmentally sensitive areas, coastal zone regulations and Environmental Impact Assessments (EIA) of development projects. Committees convened to conduct EIAs must have disciplines in eco-system and water resource management, air and water pollution control, flora and fauna conservation, land use planning, social sciences, ecology and environmental health. Public hearings are also pre-requisite for project clearance. The measure also delineates a system where a manufactured product can receive certification as environmentally friendly or compatible.

Forest Conservation Act, 1980

The Forest Conservation Acts gives the State jurisdiction over both public and private forests, and facilitates the extraction of timber for profit. Public forests, in which State governments have a proprietary interest, are divided into three categories:

- reserve forests,
- village forests, and
- protected forests

In extending to forests land which is not the property of the Government, the Indian Forest Act represents strong governmental intrusion into private rights. The Act also authorizes State Governments to acquire private land for public purposes under the Land Acquisition Act. These Forest Conservation Acts also provides protection and compensation for legally recognized individual or community rights to forest land or forest products.

Indian Forest Act, 1927

This Act deals with four categories of forests, namely, reserved forests, village forests, protected forests, and non-government (private) forests. Any unauthorized felling of trees, quarrying, grazing and hunting in reserved forests is punishable with a fine or imprisonment. The Forest Act is administered by forest officers who are authorized to compel the attendance of witness and the production of documents, to issue search warrants and to take evidence in an enquiry into forest offences.

Forest (Conservation) Act, 1980

This act was as a result of rapid decline in forest cover. Until then, deforestation averaged 1 million hectare a year. The Act prohibits the deletion of a reserved forest, or

the diversion of forest land for any 'non-forest' purpose, and prevents the cutting of trees in a forest without the prior approval of the Central government. Contravention of the Act attracts up to 15 days in prison.

Air (Prevention and Control of Pollution) Act, 1981
This act aims at prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the purposes of the boards, for conferring on and assigning to such boards the powers and functions relating thereto and for matters connected therewith.

The Air (Prevention and Control of Pollution) Act, 1981 was amended by the Amendment Act in 1987. The Air Act framework is to enable an integrated approach to environmental problems. The Air Act expands the authority of the Central and State boards established under the Water Act, to include air pollution. States not having air pollution boards were required to set up air pollution boards.

Under the Air Act, all industries operating within designated air pollution control areas must obtain "consent" (permit) from the State boards. These States are required to prescribe emission standards for industry and automobiles after consulting the Central board and noting its ambient air quality standards.

Water (Prevention and Control of Pollution) Act, 1974
The Water (Prevention and Control of Pollution) Act of 974 was amended in 1988. The legislation establishes a Central Pollution Control Board, and State Pollution Control Boards for Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tripura and West Bengal, as well as for the Union Territories. Each board, Central or State, consists of a chairman and five members, with agriculture, fisheries and government-owned industries all having representation.

Some of the main responsibilities of the Central Board, pursuant to promoting cleanliness and pollution abatement of streams and wells, include: co-ordinating activities of State boards and resolving disputes among them; providing technical assistance; conducting investigations; opening laboratories for analysis of samples; establishing fees for different types of sample testing; researching issues and problems; training personnel; conducting media and public awareness campaigns; collecting and disseminating data on water pollution; and working with State boards to set standards by stream or well.

The State boards have similar responsibilities, although they also play an important subsidiary role of doing plant-level inspections and monitoring, and advising the Central Board of problems and trends at the local level. Plants can be required to provide the State with information on their pollution control technologies, and the State may acquire effluent samples, which are admissible in court. State board members also have unfettered access to any plant site at any time. In situations where a State board believes immediate action is necessary, it has the authority to prevent further discharges, and can also apply to a Judicial Magistrate for a restraining order. In the case of an emergency, State boards are empowered to take whatever measures they deem necessary.

Other acts and rules regulating aspects related to the quarrying industry are:

Noise Pollution (Regulation and Control) Rules, 2000
These Rules aim at controlling noise levels in public places from various sources, inter alia industrial activity, construction activity, generator sets, loud speakers, public address systems, music systems, vehicular horns and other mechanical devices. It is assumed that such noise can have deleterious effects on the human health and the psychological well being of the people. The objective of the rule is to regulate and control noise producing sources, with the objective of maintaining the ambient air quality standards in respect of noise.

Indian Wildlife (Protection) Act, 1972
The Wildlife Act provides for State Wildlife advisory boards, regulations for hunting wild animals and birds, establishment of sanctuaries and national parks, regulations for trade in wild animals, animal products and trophies, and judicially imposed penalties for violating the Act. This act also prohibits harming endangered species, hunting other species like those requiring special protection, big game, and small game (though licensing few species classified as vermin may be hunted without restrictions). The amendment to the Act in 1982, introduced provisions permitting the capture and transportation of wild animals for the scientific management of animal populations. Comprehensive amendments to the parent Act in 1991 resulted in the insertion of special chapters dealing with the protection of specified plants and the regulation of zoos.

Workmen's Compensation Act, 1923
The Workmen's Compensation Act, 1923 provides for payment of compensation to workmen who suffered injury by accident. The Workmen's Compensation Act, 1923, aims to provide workmen and/or their dependents some relief in case of accidents arising out of and in the course of employment and causing either death or disablement of workmen.

As per Section 1, the Act extends to the whole of India and it applies to railways and other transport establishments, factories, establishments engaged in making, altering, repairing, adapting, transport or sale of any article, mines, docks, establishments engaged in constructions, fire-brigade, plantations, oilfields and other employments listed in Schedule II of the Act. The Workmen's Compensation (Amendment) Act, 1995, has extended the scope of the Act to cover workers of newspaper establishments, drivers, cleaners, etc. working in connection with, motor vehicle, workers employed by Indian companies abroad, persons engaged in spraying or dusting of insecticides or pesticides in agricultural operations, mechanised harvesting and thrashing, horticultural operations and doing other mechanical jobs.

Maternity Benefits Act, 1961
Under this law, no employer can knowingly employ a woman in his establishment during the six weeks following the day of her delivery or her miscarriage. However, if the pregnant woman herself makes a request, she should not be forced to indulge in work of an arduous nature, or be forced to stand for long hours, since such work might adversely affect her pregnancy or health or the normal development of the foetus or cause a miscarriage.

Every woman is entitled to the payment of maternity benefit at the rate of the average daily wage for the period of her actual absence immediately preceding and including

the day of her delivery and for the six weeks immediately following that day. The average daily wage is calculated on the basis of the amount payable to her for the days on which she has worked during the period of three calendar months immediately preceding the date from which she has absented herself on account of maternity. To be eligible for maternity benefit, a woman should have worked in an establishment for not less than 160 days in the twelve months immediately prior to the date of her expected delivery. The maximum period for which any woman can be entitled to maternity benefit is twelve weeks. This includes six weeks up to and including the day of her delivery and six weeks immediately following that day.

Bonded Labour System (Abolition) Act, 1976

This Act seeks to provide for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of the weaker sections of the people. It is an attempt on the part of the State to extend an umbrella of protection over the poor and needy workmen who may accept any terms for pledging their labour in order to stave off hunger and destitution.

Section 2 (e) of the Act defines "bonded labour" as any labour or service rendered under the bonded labour system and "bonded labour system" as the system of forced, or partly forced labour under which a debtor enters, or has, or is presumed to have, entered, into an agreement with the creditor to the effect that, (i) in consideration of an advance obtained by him or by him or by any of his lineal ascendants or descendants (whether or not such advance is evidenced by any document) and in consideration of the interest, if any, due on such advance, or (ii) in pursuance of any customary or social obligation, or (iii) in pursuance of an obligation devolving on him by succession, or (iv) for any economic consideration, received by him or by any of his lineal ascendants or descendants, or (v) by reason of his birth in any particular caste or community. The Act abolished the bonded labour system in the country and every bonded labourer stood freed and discharged from any obligation to render any bonded service. The Act also prohibits (I) making of any advance by any person under or in pursuance of, the bonded labour system, and (ii) compelling any person to render any bonded labour or other form of forced labour.

Child Labour Act of 1986

The Child Labour Act bans the employment of children, below 14 years of age in specified occupations and processes which are considered unsafe and harmful to child workers and regulates the conditions of work of children in employments where they are not prohibited from working. It also lays down penalties for employment of children in violation of the provisions of this Act, and other Acts which forbid the employment of children; The Act extends to the whole of India. The Child Labour Act of 1986 applies to all establishments and workshops wherein any industrial process is carried on. An "establishment" includes a shop, commercial establishment, workshop, farm, residential hotel, and restaurant, eating house, theatre or other place of public amusement or entertainment.