Stone mining and environmental hazards around Jodhpur

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Western Rajasthan is well known for its wealth of nonmetallic minerals. In the mineral industry, bentonite, sandstone, fuller's earth, gypsum, salt, etc. hold the most important place in this part. The geological history of Jodhpur stone goes back to Cretaceous Period of Mesozoic Era. The construction of buildings seems to have started around 1450 A.D., just before the city was founded in 1459 A.D. Most of the old buildings, many of which have become monuments now, were constructed using brown stone from exposed rocky outcrops. There is no evidence of commercial stone mining till 1920. Infrequent mining went on till 1940 for the construction of local houses, State buildings, etc. This mining was in proportion to population increase of the city. After independence commercial mining started picking up. In early sixties, with easy availability of heavy-duty trucks for quick transport, the stone mining recorded tremendous growth around Jodhpur. This unsystematic, unchecked and unprecedented rise in mining have brought about extensive damage to natural environment of Jodhpur, the impact of which is now felt in a variety of ways.

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THE MINING BELT

The Arna-Daijar plateau- a diagonal ridge running about 30 kms long and 4-6 kms wide constitutes major mining belt. The important locations like, Chonka-Barli-Kadamkandi-Kaliberi-Chopasani-Kailana-Soorsagar-Jodhpur Fort-Kaga-Bhadasia-Balsamand-Mandore-Beri are some of the well known locations dispersed in about 140 sq. km. in northeast, north and west of Jodhpur city. Of this, about 110 sq. km. of area is under excessive stone mining operations for the last 3 decades.

MINES AND CITY'S WATER CATCHMENT

The mining belt around Jodhpur is also the city's water catchment. All tanks, water reservoirs and lakes of the city are linked with this catchment through efficient water canal system, many of which are over 100 years old. The water collection system is so planned that no rainwater could go waste. The waster has to travel through these canals to fill only the water bodies. Unfortunately, the whole catchment has been mutilated now. The canals have been broken, damaged and dumped with rubble blocking the flow of water mainly because of over mining. Considerable amount of rainwater is often logged in the mines with the result that our permanent water bodies receive less water leading to water shortage every now and then. For example, the Balsamand lake, which is city's second largest lake, had gone dry twice in the last 4 years. This applies to all water reservoirs of the city. There are about 10,000 stone mines. nearly 80% of these mines are in operation while 20% are either abandoned because of economic reasons including poor approach and mine depth. These mines are about 35 X 70 m in dimension with a variable depth of few meters to 15 m. Our survey suggest that most of these miens become water tanks after heavy rains and bulk of rain water is thus trapped inside the mines in absence of any system to allow this water to travel to canals. Some of these mines are 10-15 m deep. Few owners do use water pumps to deflood their miens but this water always go waste as it does't make a continuous flow to canals. Where mine depth is less, the rubble around these mines turns them into mine wells. There is hardly any clearing of rubble from mine sites, which should be effectively done. The result is, total loss of habitat beyond repair.

AIR AND NOISE POLLUTION

There are about 325 trucks operating exclusively for the purpose of transporting variety of sandstone (brown, red and white) items like, ceiling slits, pillars, slabs, wall stones and road concrete. On an average these trucks runs for about 270 kms daily of which about 100 km within the city's populated area. These trucks burn about 12000 litres of diesel every day within the city and spread about half a ton of pollutants daily. The mining belt is devoid of coaltar roads. Each mine is linked with 'kaccha' approach road. The area is full of pollutants like smoke, sand, dust and other particulates. In a sample survey it has been found that the human habitation adjoining mining strew has six times suspended dust and other particulates compared to other parts of the city. This is 10 times more than the prescribed limit.

The nonstop noise pollution in the mining region and in the areas through which trucks pass is a big nuisance and a potential health hazard to city dwellers. It is often as high as 60 decibels (db) and above.

Mining Mirror

Mining area	:	110 Sq. Kms
Number of mines	:	10,000 (at Jodhpur)
Mine size	:	200 X 100 ft.
Mine depth	:	6-35 ft.
Annual mining	:	30 lac Mat. Ton
Houses built (in Jodhpur)	:	1,20,000
Brisk mining months	:	November to July
Origin of workers	:	90% rural, 10% from around city
Workers strength		*Wages per day*
1. Men : 16,000		Rs. 12
2. Women : 4,000		Rs. 10
3. Children : 1,000		Rs. 6
Workers caste	:	Predominantly Scheduled Caste
Common diseases	:	Tuberculosis, Silicosis
Injuries and casualties	:	Most frequent
Intoxicants used	:	Alcohol, Opium
Welfare Scheme(s)	:	None
Implements used	:	Traditional & Primitive
Transportation	:	Road & Rail
Trucks used	:	320 +
Annual Consumption of Diesel	:	10 Lac litres
Supply to	:	Jodhpur, other districts of State, Haryana, Punjab, Delhi and Gujarat
Govt. Revenue (April 85 to March 1986)	:	Rs. 1,18,87,000/-
Environmental Hazards	:	Air and Noise Pollution. Destruction of Water Catchment and Forests.

HEALTH HAZARDS

Besides air and noise pollution, the mine workers are exposed to injuries because of the complete manual operations employed in the mining. There is hardly a day without any accident in these mines, many of which are fatal. We did not find a single mine with even basic occupational health hazard preventive measures. We also came across cases of tuberculosis and silicosis but the aetiology has to be established since they were habitual alcohol consumers. We also found a considerable number of workers mostly scheduled castes consuming alcohol and opium. They attribute their intoxication habit is very hard work and physical labour and strength required in this work. About 21,000 workers engaged in this work

does't have any support through welfare schemes, health clinics or vocational guidance. A clinical survey can provide lot more on the health status of these mine workers.

DEFORESTATION IN THE MINING BELT

The present day mining belt around Jodhpur was a well-wooded country, evidence of which can be traced in several old writings. Till 1940 it was a favourite habitat of variety of wildlife, especially the large mammals. The area encompasses some 27 groves of different sizes most of which are now turned barren in the wake of uninterrupted and reckless mining operations.

This rocky area was fully covered by indigenous species like *Acacia senegal* (Kumbat), *A. nilotica* (Banwal), *Capparis deciduas* (Ker), *Euphorbia caducifolia* (Thor), *Maytenus emarginata* (Kankero), *Salvadora persica* (Pilu) and *Ziziphus nummularia* (Bordi). These species have virtually disappeared in the most parts of the mining area. However, at places exotic species i.e., *Prosopis juliflora* (Anjreji Banwalia) has take over. The top soil has been completely washed away and only naked outcrops of rocks can be seen intercepted with large mine pits. In contract, the Central Arid Zone Research Institute (CAZRI) experimental plot in the mining belt where no outside interference is allowed remains an excellent open scrub forest and meadow. This plot can serve as a good control model to show that the habitat can be maintained if wise monitoring and only limited mining is allowed.

It is quite likely that this mining belt is adversely affecting rain-cycle, wind movements and temperature of Jodhpur, besides several other hazards stated above. It is unfortunate that the existing laws are not enforced to any extent. At places the forest land is being used as mining sites with no respect for our degrading environment.