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Socio-Economic impacts of Iron Ore Mining activities around Hospet area, Karnataka, India.

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ABSTRACT: Mining industry is the second largest industry after agriculture, playing an important role in the development of civilization from ancient days. Since mining has come to stay as major activity, all efforts must be made to make mining least dangerous for environment. Mining industry while improving the quality of life also brought pollution. Pollution unfortunately has been an inseparable shadow of industrialisation, and the future generation will not leave our approach with approval unless we give them a cleaner environment. In this article we are discussing about the direct and indirect impacts due to mining to the environment in and around Hospet region. A comprehensive strategy and appropriate regulations are indispensable to alleviate the negative impacts of the mining activities on the environment to make mining sustainable.

KEYWORDS: Mining activities, community, environmental impacts, health hazards, pollution

I. INTRODUCTION

Mining, tourism and agriculture are the three basic industries on which the economy of Hospet town stands. Hospet area is endowed with large reserves of iron ore of reasonably high grade hematite and has a prominent place in the mineral map of the country for its rich quality and quantity. The increase in demand for iron ore is the major reason for the increased mining activity, which in turn affects the ecosystem. Environment setup in the Hospet region is gradually deteriorating and the ecological balance is getting disturbed day by day. Once the Sandur valley adjacent to Hospet was densely forested but present day picture is altogether different. There is lot of deforestation and climate during summer is harsh and dry. Open cast mines as destroyers of environment came into focus for three main reasons. They require felling of trees and excavation caused land degradation. Thirdly creation of ore fines and waste dumps (phyllitic clays) occupying hill slopes and valleys which wash out affecting neighbouring agricultural land productivity and reducing the river reservoir capacity of Narihalla and Tungabhadra Dam due to silting.

II. STUDY AREA

The Sandur schist belt has rich iron ore and manganese deposits in the Bellary district, Karnataka, India. The Schist belt trends North North West-South South East, with a length of about 53 kms spreading over an area of 930 square kilometres. The hills of schist belt are "Canoe" shaped, due to the valley on either side of the hill ranges, which extends towards each other with diminishing width, in an attempt to close up at both ends, resulting in the formation of a boat shaped structure. The iron ore deposits of the area fall within "Survey of India" toposheet number 57/8 and 57/12, falling between the longitude 76.5436 to 76.66840 E and latitude 14.9832 to 15.08810 N.

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III. DATA COLLECTION AND ANALYSIS

Data for the study were obtained from both primary and secondary sources. Primary data were obtained using a combination of methods, self-observations, field sample collection and informal and formal surveys. To assess the situation the author's collected some sample of accumulated sediments along the stream courses and also reservoirs. Locations of the sample collection sites are indicated in Figure 1. Majority of the mines employ highly mechanised machinery to remove the overburden and gangue material. The dumping of iron ore fines, gangue and overburden material into the valleys (Figure 2 A and B) has led to siltation in the stream courses and also in the Narihalla and Tungabhadra reservoir. Siltation also is affecting the drainage pattern of the region.

IV. EXPERIMENTAL RESULTS AND DISCUSSIONS

Chemical analysis results of the samples of accumulated sediments along the stream courses and reservoirs analysed for their Fe content and the data is given in Table 1. From the table, it is seen that in the stream sediment Fe content ranges from 9.7 to 38.90%. These values are really alarming. Dumps of iron ore fines at the mines must have contributed a lot. During rains these fines are flown along streams and finally into the reservoirs. This not only affects the quality of reservoir water but also reduces the capacity of the reservoir.. Biotic life of the reservoir also gets affected. Iron ore dust is also carried away by wind and spreading of these fines on agricultural land has destroyed the fertility.

IV (a) Land use:

It is very clear that, without disturbing or damaging or interfering with the Earth's surface, it is not possible to extract minerals. Surface mining results in the destruction of the existing vegetation and soil profile. Removal of overburden and waste rock and its replacement in waste dumps or the mined-out pit can significantly change the topography and stability of the landscape. But, land should not be degraded beyond reasonable recovery. Mining should not mean permanent loss of land for other uses. The problems of open cast mines are limited but hazardous. In opencast mining proper and timely disposal of mined products is of considerable importance. Normally low lying areas and other refused areas are being used as dump sites.

IV (b) Air quality:

The main air quality issue with mining is dust particles. Large amounts in concentrations of dust can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages. However, people invariably feel a loss of environmental amenity, due to dust deposits or dust concentration, before their health is affected. Dust concentrations are monitored with mechanical high volume air samples and limits are placed on average and peak hourly values. Land degradation due to mining can be categorised as land excavated to win the earth, land used for dumping and other activities. In case of mining activity lot of dust is generated having a tendency to fly off and such fine particles remain suspended in the atmosphere. The reasons for air pollution are mainly due to increased mechanization and poor condition of roads etc., During summer, suspended particulate matter in the atmosphere is found to be beyond the permissible standard approximately of 400 PPM. Hence, all the main roads and the approach roads should be regularly sprinkled with water to suppress the dust.

IV (c) Water quality :

Mines can affect surface runoff and groundwater quality through contamination with dissolved and suspended materials. Perhaps the commonest surface water contaminant is sediment or suspended solids. Sediment can smother the beds of receiving streams, affecting fish and benthic organisms. Apart from runoff from overburden emplacements and stockpiles, storm water can be contaminated from process plants, workshops and vehicle wash-down pads. Also, mining activity disturbs the drainage pattern of the area. The silt carried out has been contaminating the water bodies, with high content of suspended solid particles. A water sample of Tungabhadra Reservoir indicated 180 MG/litre of total suspended solids which should have been less than hundred as per the general standards for inland surface water. During monsoon lot of silt will go through streams affecting reservoir capacity. Mining activity reduces the filtration capacity of the soil exposing fresh rock and de-vegetation reducing the quantum of water percolating to substrata. Here check dams help in restricting silt inflow and leaching.

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IV (d) Noise and vibration :

Noise levels generally must be controlled so that they reflect the most stringent requirements during evening hours when nearby landholders wish to relax or sleep. Blast planning must also limit ground vibration to avoid damage to building structures and annoyance to people living in the area. Vibration limits set for environmental amenity are significantly lower than for structural damage. Industrial structures can often withstand up to 50- mm/s ground vibrations without structural damage. For transport noise, average noise exposure is adopted. Excessive noise has been so far an accepted fact and greater attention has to be paid for reducing noise pollution.

IV (e) Soil quality :

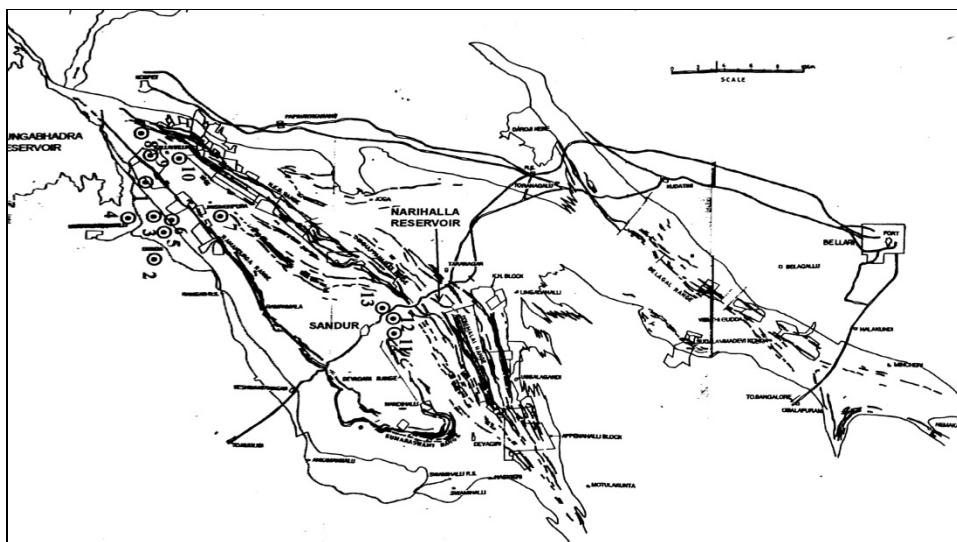
By far the greatest impact of mining on the soil resources is due to opencast mining, which is having a very much potential for the deterioration of soil quality. Topsoil is an essential component for land reclamation and shall be seriously damaged if it is not mined out separately in the beginning, with a view to replacement for due reclamation of the area. This is particularly necessary due to the scarcity of topsoil and it is necessary to save topsoil for a latter use in a manner to protect primary root medium from contamination and erosion, and hence in productivity.

IV (f) Socio economic factors :

Mining industry is the backbone of Hospet Town. Mining activity employs thousands of workers directly and many others indirectly. The towns' more than 50% economic prosperity depends on the Mining industry and is gaining further momentum consequent to the setting up of several Steel plants. These new industries will be requiring millions of tons of iron ore as raw materials per annum. Exploitation of more and more ore results in substantial impact on environment and ecosystem.

The major socio economic changes expected due to increased mining activity and setting up of Steel plants will be mainly on the following factors. There will be uprooting changes in the local population, influx of outside people, more job opportunities and improved Communication and Services. The Mining industry has been providing means of livelihood to the local population. Any measures taken without the consideration for them can be self-defeating. Studies are to be conducted to assess the environmental impact due to mining. Environment assessment is required at each of the stages of a project. The most effective way to carry out environmental investigations is to use a multidisciplinary team approach. Geologists, engineers from mining, mineral processing and civil fields and rural development officers together can play dominant role, in maintaining and safeguarding God gifted natural environment which is congenial and safe for living beings.

Fig. 1. Sample location map of the Stream sediments



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Fig. 2A Low Grade Iron Ore dumps in Ramanadurga Range



Fig. 2B Iron Ore Fines stacking at foot hill near N E B Range



Table .1 Location and Chemical analysis details of stream sediments.

Sample I	Location	Fe concentration
1	Near Vyasakeri R S	35.80
2	Near Gunda forest	38.90
3	Near Vyasakeri village	32.48
4	Near Vyasakeri village	28.28
5	Near GalemmanaGudi	10.74
6	Near GalemmanaGudi	9.7

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7	Near Jaisingapur	12.6
8	Near road culvert leading to RCC mines	13.4
9	Near Rajapur	14.28
10	Near Kallahalli	20.4
11	Near Hosalli	11.76
12	Near Hosahalli	13.3
13	Near Krishna Nagar	9.9

IV. CONCLUSIONS

The socio-economic significance of mining operations is often overlooked, and there is a need to protect its economic and social benefits. Because of a poor handling of resources, mining causes negative impacts to the environment. Therefore, proper precautions must be taken to protect the environment. In addition to many other precautionary measures, the utilisation of these iron ore fines by establishing a pelletization plant/sintering plant in the region, appears to be a major solution to the problem. The government should exercise prudence when it comes to enforcing the measures in an efficient and unbiased way and decisive steps are to be taken for environmental solutions.

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